<u>The Sonoma State University</u> <u>Department of Physics and Astronomy</u>

presents a series of lectures, demonstrations, and films

WHAT PHYSICISTS DO

Physics is what physicists do late at night

The complete list

16 FEB 1971 WHAT IS MATTER MADE OF?

Two color films on high energy nuclear physics research. What kind of experiments are done at the giant accelerators, and why?

23 FEB 1971 LASER LIGHT

A spectacular sound and light show, this film can be enjoyed as pure entertainment.

2 MAR 1971 MEASURING ONE IN A MILLION

How can nuclear physics be used to find one part per million of mercury in a can of tuna? Sonoma State physicists are getting ready to do it with neutron activation analysis.

9 MAR 1971 SILENT WITNESSES

Neutron activation analysis can detect other things besides mercury. Also, physics student Bob Porter will discuss his development of an infrared burglar alarm.

16 MAR 1971 THE WORLD OF THE SUPER COLD

Dr. Isaac Bass of the SSC Physics Department will discuss the strange phenomena near absolute zero.

23 MAR 1971 UNLIMITED POLLUTION-FREE POWER?

Controlled fusion could provide just that, if we can learn to do it. We will have a prize-winning film on fusion research, and Dr. George Johnston of the Physics Department will bring us up to date on recent developments.

30 MAR 1971 A HISTORY OF ATOMIC PHYSICS

J. Arthur Rank made this film starring Albert Einstein, J. J. Thomson, Ernest Rutherford, and other famous physicists.

13 APR 1971 PHYSICS AND WATER POLLUTION

Dr. Garrison Sposito will describe some of the ways in which physicists can contribute to water pollution research, assuming only the technical background acquired in the usual physics education. He will also discuss some of the work in this field being planned by the scientists at Sonoma State.

20 APR 1971 PEOPLE AND PARTICLES

What kind of people probe the world of elementary particles? What is their search like? See two recent films on

the subject.

27 APR 1971 REACTORS AND PUBLIC SAFETY

Giant power-producing reactors are being planned for the Mendocino coast. What safety precautions need be taken? Are they sufficient? Dr. John Dunning, Sonoma State College physicist, will talk on this vital subject.

4 MAY 1971 WHAT ARE QUASARS?

Whatever they are, they appear to be fleeing us at speeds up to 150,000 miles per second. Do they know something? What are they? Dr. Sam Greene, Chairman of the Physics Department at Sonoma State will discuss

these unusual, recently discovered objects.

11 MAY 1971 WHAT IS HAPPENING IN BIOPHYSICS?

Dr. Maurice Blaug of the Hutchins School will introduce a whole new field.

18 MAY 1971 CREATION OF THE UNIVERSE

See four leading astrophysicists — Greenstein, Fowler, Sandage, and Hoyle — in a filmed discussion of cosmological theories.

23 SEP 1971 PHYSICS AND AIR POLLUTION

See a film on smog by the Caltech scientist who discovered its origin. Hear Dr. John Dunning of the SSC Physics Department discuss current problems of air pollution.

30 SEP 1971 HISTORY OF ATOMIC PHYSICS

This is a repeat of the very popular J. Arthur Rank film featuring Rutherford, Einstein, J. J. Thomson, and other famous scientists.

7 OCT 1971 WHAT ASTROPHYSICISTS DO

The NASA film Universe on a Scratchpad will be shown followed by a discussion by Dr. Joe Tenn of the SSC Physics Department.

14 OCT 1971 PHYSICS OF MUSIC

This will be a lecture-demonstration featuring electronic music by Mr. Bob Porter who teaches the Physics of Music course at SSC.

21 OCT 1971 X-RAY FLUORESCENCE

Senior physics student Don Herriott will discuss a new technique for detecting trace quantities of elemental pollutants.

28 OCT 1971 COSMOLOGY

See four leading astrophysicists--Greenstein, Fowler, Sandage, and Hoyle--in a filmed discussion of cosmological theories. Dr. Sam Greene will add comments and answer questions.

4 NOV 1971 THE ENERGY PROBLEM: I. WHERE WE ARE

Dr. George Johnston, SSC physicist, will start this three-part series with a discussion of our present sources of energy and their problems.

11 NOV 1971 THE ENERGY PROBLEM: II. WHERE WE ARE Going

Dr. John Dunning will discuss sources of energy now coming into use: thermal reactors, fast breeder reactors, and others.

18 NOV 1971 THE ENERGY PROBLEM: III. WHERE WE MIGHT Go

Dr. Johnston will conclude with a discussion of possible future sources of energy: geothermal, fusion, and solar.

2 DEC 1971 MYSTERY OF STONEHENGE

This film, made by CBS, explores Gerald Hawkins' contention that Stonehenge was built as an astronomical

computer to predict such events as eclipses.

9 DEC 1971 PHYSICS OF GEODESIC DOMES

Dr. Sam Greene will speak on this fascinating subject.

16 DEC 1971 THE SQUID IN PHYSICS

Dr. Duncan Poland of the SSC Physics Department will speak on Superconducting Quantum Interference Devices which may provide new ultrasensitive instruments for electrical measurements.

6 JAN 1972 SPACE IN THE SEVENTIES

See two NASA films on man in space and on the role of applications satellites in solving earthbound problems.

14 FEB 1972 LASERS AND LIGHT

Dr. Isaac Bass of the SSC Physics Dept. will give a layman's description, with demonstrations, of the laser and its use in making three-dimensional photographs called holograms.

28 FEB 1972 HOW I BECAME A PHYSICIST

Professor F. Bloch of Stanford, one of the founders of solid state physics, will tell of the beginning of a career which has included a Nobel prize and important discoveries in nearly every branch of physics.

6 MAR 1972 TO DATE A ROCK

Dr. Rolfe Erickson of the SSC Geology Department will discuss radioactive dating: how an examination of carbon-14, potassium-40, and lead-206 can tell us the age of the earth and other interesting things.

13 MAR 1972 ENVIRONMENTAL AND SAFETY ASPECTS OF NUCLEAR POWER PLANTS

Mr. Owen Davis, an environmentalist from P.G. & E., will speak on this timely topic, with special emphasis on planning for the proposed power plant at Pt. Arena.

20 MAR 1972 VISION: FROM GENERATOR POTENTIAL TO BEHAVIOR

Dr. Robert Pinter of the University of Washington will speak on one of the areas of prime interest in biophysics of vision: the explanation of behavior and subjective perceptual phenomena in terms of cellular events.

3 APR 1972 NAVIGATION BY THE STARS

Senior physics student John Proud will explain some history, astronomical applications, and present-day celestial navigation techniques.

10 APR 1972 PHYSICS AND MOLECULAR BIOLOGY

Dr. Peter Connors of the University of California Bodega Bay Marine Laboratory will discuss X-ray structural studies of RNA and DNA.

17 APR 1972 THE VIOLENT UNIVERSE

This outstanding 2 1/2 hour film on modern discoveries in astronomy will start promptly at 4 p.m.

24 APR 1972 CONSERVATION OR CONVERSATION: WHICH IS IT TO BE?

Mr. Paul Brand of the Bay Area Air Pollution Control District will discuss air pollution and its inseparable relationship with other environmental and social problems.

1 MAY 1972 TRENDS IN HIGH SCHOOL PHYSICS

Mr. Charles Rhodes, from Montgomery High School in Santa Rosa, will speak on his experiences with Harvard Project Physics and other methods of teaching students physics.

8 MAY 1972 NEUTRON ACTIVATION ANALYSIS

Senior chemistry student Ken Bomben will discuss and demonstrate this technique which he has been learning for detection of trace concentrations of elements.

15 MAY 1972 A PHYSICIST IN INDUSTRY

Mr. Donald Hammond, Director of the Physical Electronics Laboratory at Hewlett-Packard, will discuss developments of new technology for applications in medicine, communications, chemistry, and geology.

18 SEP 1972 THE MYSTERY OF STONEHENGE

Mr. John Proud, a senior physics student, will explain the physical arrangement and astronomical purpose of Stonehenge. The popular film The Mystery of Stonehenge will be shown.

25 SEP 1972 TECHNOLOGICAL WARFARE IN SOUTHEAST ASIA

Dr. Charles Schwartz, Professor of Physics at the University of California at Berkeley, and Mr. Lenny Siegel of the Pacific Studies Center will speak. The Automated Air War Slide Show of the American Friends Service Committee will be shown.

2 OCT 1972 LASER FUSION

Dr. John DeGroot, Professor in the Department of Applied Science of the University of California at Davis, will discuss current attempts to achieve thermonuclear fusion through the use of high-power lasers.

9 OCT 1972 NEUTRINOS FROM THE SUN

Dr. Joe Tenn of the Physics Department will discuss the physics of the neutrino and the attempts of scientists, working a mile deep within a gold mine, to detect neutrinos emitted by the sun and thus to measure its temperature.

16 OCT 1972 THE PHYSICS OF THE ARMS RACE

Dr. David Hafemeister, Professor of Physics at California State Polytechnic University, San Luis Obispo, will show how straightforward physical considerations can be used to increase our understanding of the strategic arms race.

30 OCT 1972 ENERGY, MAN, AND ALL THAT

Dr. Charles Shapiro, Professor of Physics at California State University, San Francisco, will speak about the energy crisis and show his video tape production, "Power to the People: The Lights Won't Go Out."

6 NOV 1972 SPECIAL RELATIVITY

Mr. Arnold Christiansen, a senior physics student, will elucidate Einstein's special theory of relativity with emphasis on some intriguing predictions of the theory.

13 NOV 1972 LECTURE CANCELLED

20 NOV 1972 BLACK HOLES AND COSMOLOGY

Dr. Sam Greene of the Physics Department will speak about the prediction from general relativity of the existence of supermassive but invisible black holes and the implications for cosmology of their possible discovery.

27 NOV 1972 WATER RESOURCES IN SONOMA COUNTY

Dr. Gary Sposito of the Physics Department will discuss the contribution of physics to the understanding of ground water, surface water, salt water intrusion and geothermal steam, with respect to current problems of water development and conservation in Sonoma County.

4 DEC 1972 WOMEN IN SCIENCE

Dr. Elaine Rothstein Chan, Research Associate in Physics at the University of California at Berkeley, will discuss the situation of women in science and will present relevant statistical information.

11 DEC 1972 THE VIOLENT UNIVERSE

This excellent 2 1/2 hour film on recent discoveries in astronomy will begin promptly at 4 p.m.

12 FEB 1973 PROBING THE MOON

Two films will be shown: The Moon: Old and New from NASA and Museum of the Solar System produced by the American Chemical Society. The latter shows scientists examining lunar rocks and soil in their laboratories.

26 FEB 1973 WHAT GEOPHYSICISTS DO

Dr. William H. Wright III of the Geology Department will discuss the physics of the earth: seismology, gravity, magnetics, and plate tectonics.

5 MAR 1973 PRESENT AND FUTURE APPLICATIONS OF LASERS

Mr. John Macken, founder and President of Optical Engineering, Inc., Santa Rosa, will look at the future of this exciting field and will demonstrate one of his inventions.

12 MAR 1973 AESTHETICS AND THE RIGHT ANSWERS

Dr. Frank Oppenheimer, physicist and Director of the Exploratorium, will compare what physicists do with what artists do.

19 MAR 1973 NUCLEAR ASTROPHYSICS: SUPERNOVAE, PULSARS, AND CARBON BURNING

Dr. Peggy Dyer of the Kellog Radiation Laboratory at Caltech will speak on her work in the laboratory studying nuclear reactions which occur in the interiors of red giant stars.

26 MAR 1973 RECENT RESULTS OF X-RAY ASTRONOMY

Dr. Robert P. Kraft, Professor of Astronomy at UC Santa Cruz and Acting Director of the Lick Observatory, will describe how x-ray observations from satellites and rockets combine with ground-based optical and radio observations to prove the properties of pulsars, neutron stars, and possibly black holes.

2 APR 1973 KIRLIAN PHOTOGRAPHY

Physics student Donald Donigan will discuss and demonstrate this Russian-invented technique for photography by means of high frequency currents.

9 APR 1973 ELECTRONICS REVOLUTION

Dr. Duncan Poland of the Physics Department will present a survey of some of the technological and scientific developments that are putting computers in shirt pockets and sophisticated electronics on the hobby workbench.

23 APR 1973 A HISTORIAN LOOKS AT SCIENCE

Dr. Ed Morse of the Hutchins School will discuss how the study of dead scientific controversies can reveal much about the way the contemporary scientific community operates.

30 APR 1973 WHERE PHYSICS AND BIOLOGY MEET

Dr. Howard C. Mel of the Division of Medical Physics at UC Berkeley will speak on problems at the interface between biology and physical science.

7 MAY 1973 NUCLEAR FINGERPRINTING OF ANCIENT POTTERY

Mrs. H. V. Michel of the Lawrence Berkeley Laboratory will describe and demonstrate how neutron activation analysis and other nuclear physics techniques can pinpoint the origin of ancient pottery.

14 MAY 1973 VISUAL OBSERVATIONS NEAR ABSOLUTE ZERO

Dr. Isaac Bass of the Physics Department will demonstrate some of the strange properties of liquid helium four, the superfluid.

21 MAY 1973 HIGH SCHOOL PHYSICS – WANTED: DEAD OR ALIVE

Mr. Jim Hill, physics teacher at Los Gatos Union High School and a graduate of the Physics Department, will speak on some ideas of how physics in the high school can survive.

17 SEP 1973 PHYSICS AND PEOPLE

Two films will be shown: People and Particles and Physicists: Playing Dice with the Universe.

24 SEP 1973 INFRARED ASTRONOMY

Dr. Dowell Martz, Chairman of the Physics Department at Pacific Union College, will describe studies of cool stars, quasars, and other objects in the infrared.

1 OCT 1973 THE DISCOVERY OF THE NEUTRON

Dr. Emilio Segré, Emeritus Professor of Physics at the University of California at Berkeley and a Nobel laureate, will discuss this profoundly important event, which occurred in 1932 and revolutionized nuclear physics.

8 OCT 1973 MAGNETIC LEVITATION

Dr. Howard Coffey of Stanford Research Institute will speak on his experiments to make trains float on air, help up by superconducting magnets.

15 OCT 1973 WHAT METEOROLOGISTS DO

Dr. Morton Wurtele, Chairman of the Department of Meteorology at UCLA, will discuss what is happening in atmospheric science.

29 OCT 1973 PSYCHOPHYSICS, MAGNETIC FIELDS, AND SOME ENVIRONMENTAL IMPLICATIONS

Dr. Burton Milburn, President of Environmental Impact Profiles, will discuss his research on psychophysical effects of magnetic fields and possible environmental effects of low-level electromagnetic fields.

5 NOV 1973 BIOMEDICAL APPLICATIONS OF HEAVY ION BEAMS

Dr. Eugene Benton of the University of San Francisco will discuss the use of heavy ion beams for diagnostic and radio-therapeutic studies of tumors.

12 NOV 1973 MYSTERY OF STONEHENGE

This popular film probes Gerald Hawkins' thesis that the famed rock structure was actually built as an astronomical observatory.

19 NOV 1973 SCIENCE FICTION AND THE PREDICTION OF THE FUTURE

Dr. James Benford of Physics International Company, physicist and science fiction writer, will discuss the ways in which science fiction writers deal with the future in their work.

26 NOV 1973 THE GREAT COMET OF 1973

Mr. Ralph Palsson of the Astronomical Society of the Pacific will discuss Comet Kohoutek, which will soon be visible to the naked eye.

3 DEC 1973 POWER FROM THE EARTH

Dr. John R. Dunning, Jr., of the Department of Physics and Astronomy, will speak on the future of geothermal power, which is rapidly being developed in Sonoma County.

10 DEC 1973 SCIENCE AND SOCIETY

Dr. John Gofman, Professor of Medical Physics at the University of California at Berkeley, an articulate and effective critic of the safety aspects of the U.S. atomic energy programs, will discuss the social implications of science.

11 FEB 1974 COSMIC DISTANCES

Dr. Joe Tenn of the Department of Physics and Astronomy will discuss the determination of astronomical distances, ranging from the nearby planets to the remote (?) quasars.

25 FEB 1974 BLACK HOLES, NEUTRON STARS, SINGULARITIES, AND ALL THAT

Dr. Remo Ruffini of the Department of Physics, Princeton University, will speak on the spectacular ways in which a star can die.

4 MAR 1974 MAR 4 PLUS FIVE YEARS

On March 4, 1969, scientists and MIT and 30 other universities staged a research stoppage to protest the misuse of scientific and technical knowledge. Dr. Barry M. Casper, Chairman of the American Physical Society's Forum on Physics and Society, will discuss how the physics profession has reacted.

11 MAR 1974 LASERS AND THE MOLECULES OF LIFE

Dr. Yin Yeh of the Department of Applied Science, University of California, Davis, will discuss laser scattering experiments with biopolymers.discuss how the physics profession has reacted.

18 MAR 1974 BIOPHYSICS IN CLINICAL NEUROSURGERY AND NEUROLOGY

Dr. Curtis Gleason of the Mount Zion Neurological Institute will speak on stereotaxic surgery and transcutaneous electrical nerve stimulation.

25 MAR 1974 PHYSICS AND CHEMISTRY

Dr. F. Leslie Brooks of the Department of Chemistry will discuss what chemical physicists and physical chemists do.

1 APR 1974 PLANET, PULSAR, GLITCH, AND WISP: VIOLENT ENDS TO STELLAR EVOLUTION

Dr. Virginia Trimble of the Department of Physics, University of California, Irvine, will discuss some astrophysical processes which are just beginning to be understood.

15 APR 1974 TERRESTRIAL UTILIZATION OF SOLAR ENERGY

Dr. Joseph H. Apfel, Director of Research at Optical Coating Laboratory, Inc., will speak on industrial efforts to harness solar energy.

22 APR 1974 SOLAR ENERGY AND ALTERNATIVE PHYSICS

Ms. Barbara Greene of the Lawrence Berkeley Laboratory_[CANCELLED] and Mr. Kent Nelsen of the Department of Physics and Astronomy will speak on physics for the counterculture and individual use of solar energy.

29 APR 1974 PARANORMAL PHYSICAL PHENOMENA

Mr. Robert Porter of the Department of Physics and Astronomy will describe a physicist's analysis of psychic phenomena.

6 MAY 1974 OBSERVATIONS OF ELLIPTICAL GALAXIES

Dr. Sandra Faber of the University of California, Santa Cruz, will discuss observations she is making with both optical and radio telescopes.

13 MAY 1974 PHYSICS AND CANCER

Ms. Mary Meurk, radiological physicist at the West Coast Cancer Foundation, will describe the work of a physicist engaged in cancer therapy.

9 SEP 1974 MYSTERY OF STONEHENGE

This popular film, which explores Gerald Hawkins' contention that the ancient monument is actually an astronomical computer, will be shown twice, at 3:30 p.m. and at 4:30 p.m.

16 SEP 1974 PHYSICISTS AS INVENTORS AND DISCOVERERS

Dr. Egon Loebner of Hewlett-Packard Laboratories and Stanford University will discuss the various styles of doing physics, inventing, and discovering. Note this lecture will begin at 3:30 p.m.

23 SEP 1974 IMPROVED COMFORT AND ECONOMY WITH A SEMISOLAR HOUSE

Dr. Loren W. Neubauer, professor emeritus of engineering and agricultural engineering at the University of California, Davis will discuss energy conservation with solar heating.

30 SEP 1974 THE AURORA AND THE EARTH'S MAGNETIC FIELD

Dr. Richard H. Karas of the department of physics and astronomy will describe an interesting series of experiments on the relation between the northern lights and the earth's magnetic field.

7 OCT 1974 THE STUDENT AND THE COMPANY

Dr. Norman R. Bodine, Vice President of Engineering, Independent Cable Division, Eltra Corp., will discuss how industry relates to students.

14 OCT 1974 THE BIRTHPLACE OF STARS

Dr. Nan Dieter of the Radio Astronomy Laboratory, University of California, Berkeley will speak on gas, dust, and molecules between the stars.

21 OCT 1974 CAN PHYSICS SURVIVE IN THE MODERN WORLD?

Dr. Don Villarejo of the department of physics, UCLA will discuss physics, its relation to other intellectual endeavors, and current attitudes toward physics.

28 OCT 1974 THE NOT-SO-ELEMENTARY PARTICLES

Dr. Tom Barnebey of the department of physics and astronomy will talk about some of the problems physicists have encountered in trying to understand the interactions of the smallest known bits of matter.

4 NOV 1974 ATMOSPHERIC PHYSICS NOW AND IN THE FUTURE

Dr. Thomas E. Hoffer of the Laboratory of Atmospheric Physics, Desert Research Institute, University of Nevada will discuss current research and prospects for the future.

11 NOV 1974 PIONEER 10 AND 11 MISSIONS--SPACE ODYSSEY TO JUPITER

Jack Dyer of the Pioneer project, NASA Ames Research Center, will discuss these two missions--just three weeks before Pioneer 11 reaches Jupiter.

18 NOV 1974 PHYSICS AND THE PARANORMAL

Mr. Doug Greene of the department of physics and astronomy will explore some of the current models in modern physics and their implications for paranormal phenomena.

25 NOV 1974 VIOLENT EVENTS IN THE NUCLEI OF GALAXIES

Dr. Joe S. Miller of the Lick Observatory and the University of California, Santa Cruz will discuss speculations on what may be happening in galactic nuclei.

2 DEC 1974 MAN'S IMPACT ON THE CLIMATE

Mr. Dwight Nicholson of the department of physics, University of California, Berkeley will review the present understanding of the influence of human activities on the earth's climate.

28 JAN 1975 HEAT CONDUCTION IN SOLIDS AT LOW TEMPERATURES

Dr. Cheuk-Kin Chau of the Illinois Institute of Technology will give an introduction to recent experiments in this field.

4 FEB 1975 COSMIC GAMMA RAYS

Dr. Dennis Herzo of the University of California, Riverside will talk about recent developments, observations, and speculations in the exciting new field of gamma ray astronomy.

11 FEB 1975 THERMODYNAMICS OF BIOLOGICAL SYSTEMS

Dr. Sukhbir Mahajan of California State University, Fresno will explain how entropy decreases in living systems.

18 FEB 1975 THE BUILDING OF THE BOMB

Physicists Oppenheimer, Teller, Segré, Fermi, and Heisenberg give their interpretations of the events that led to Hiroshima in this historic film.

25 FEB 1975 THE GATHERING UNIVERSE

Dr. David Cudaback of the University of California, Berkeley will discuss several places in the universe where material draws itself together to form new objects of all sizes, from galactic arms to inhabitable planets.

4 MAR 1975 WHY IS THE SKY BROWN?

Dr. Terry Galloway of the University of California, Berkeley will give a review of environmental engineering programs at Berkeley including the use of optical probe techniques for air pollution monitoring.

11 MAR 1975 COLLIDING NUCLEAR DROPS

Dr. Carol Travis Alonso of the Lawrence Berkeley Laboratory will show films and discuss oscillations, fissions, and fusions of these drops and compare them with water drops on Skylab.

18 MAR 1975 EXPERIMENTAL EVIDENCE FOR REMOTE VIEWING OF NATURAL TARGETS

Dr. Russell Targ of Stanford Research Institute will discuss his work in paranormal perception and efforts to find a physical basis for it.

1 APR 1975 BIOMEDICAL APPLICATIONS OF PHYSICS TECHNIQUES

Dr. Victor Perez-Mendez of the University of California, San Francisco and the Lawrence Berkeley Laboratory will discuss applications of particle detectors in medicine.

8 APR 1975 AN UNBOUND UNIVERSE?

Dr. Beatrice Tinsley of the University of California, Santa Cruz and the Lick Observatory will discuss some recent research on whether the universe will stop expanding.

15 APR 1975 OCEANS, WEATHER, AND CLIMATE

Dr. Charles Cox of the Scripps Institution of Oceanography will describe recent research on the relation between sea surface temperatures and unseasonal trends in the weather.

22 APR 1975 TRANSMUTATION OF ELEMENTS IN STARS

Dr. Robert Kraft of the Lick Observatory and the University of California, Santa Cruz will discuss evidence for the formation of the elements in stellar interiors.

29 APR 1975 LECTURE CANCELLED

6 MAY 1975 ENERGY CONSERVATION: HIDDEN BENEFITS, HIDDEN BARRIERS

Mr. Lee Schipper of the Energy Resources Group of the University of California, Berkeley will explain how the American people could reduce energy consumption by one-third and have more jobs and less pollution.

9 SEP 1975 THIN FILMS AND SOLAR ENERGY

Mr. Richard Winegarner, Solar Product Development Manager, Optical Coating Laboratory, Inc. will discuss the impact of solar energy as an alternate energy source and the role that thin films can play in its development.

16 SEP 1975 THE PHYSICS OF SOARING FLIGHT

Dr. Richard H. Karas of the Department of Physics and Astronomy will discuss the principles of motorless flight--birds and gliders.

23 SEP 1975 WHY HAS THE SUN SLOWED DOWN?

Dr. Leonard Kuhi of the Department of Astronomy, University of California, Berkeley will discuss the rotation of stars and the formation of planetary systems.

30 SEP 1975 HOLOGRAPHY AND INFORMATION DISPLAY

Dr. H. R. Luxenberg of the Departments of Computer Science and Photography at Chico State University will discuss holography and its application to information storage, processing, and display.

7 OCT 1975 EXPLORING OUR SOLAR SYSTEM—THE ONLY GAME IN TOWN

Dr. Kerry M. Joels of NASA Ames Research Center will summarize our current approach to planetary exploration and some of the results to date.

14 OCT 1975 COOLING IT WITH THE SUN

Mr. Douglas Hayes, a recent graduate of the Department of Physics and Astronomy, will relate his experiences in trying to cool his beer with a solar powered refrigerator.

21 OCT 1975 THE EVOLUTION OF THE UNIVERSE

Dr. Robert V. Wagoner of the Department of Physics, Stanford University, will discuss what present observations reveal about the past history and eventual fate of the universe.

28 OCT 1975 PREDICTING EARTHQUAKES AND WHAT TO DO ABOUT THEM

Dr. Bruce Bolt of the Department of Geophysics, University of California, Berkeley will discuss recent advances in this field.

4 NOV 1975 MODERN PHYSICS AND CONSCIOUSNESS

Dr. E. A. Rauscher, a theoretical physicist at the Lawrence Berkeley Laboratory, will describe what physics has to say about the nature of consciousness.

11 NOV 1975 RECENT DISCOVERIES IN PARTICLE PHYSICS: A NEW WORLD

Dr. Harvey Lynch of the Stanford Linear Accelerator Center will explain why physicists are so excited about the new particles.

18 NOV 1975 DIRTY AIR -- WHERE DOES IT COME FROM?

Dr. Susanne V. Hering of the Department of Environmental Health Engineering, California Institute of Technology, will discuss the formation of aerosols from emitted pollutants and its relation to light scattering.

25 NOV 1975 EJECTION AND ALIGNMENT IN EXTRAGALACTIC OBJECTS

Dr. Halton Arp of the Hale Observatories will discuss peculiar galaxies, exploding galaxies, ejection phenomena, and associations of quasars and high redshift objects.

2 DEC 1975 THE NORTHERN LIGHTS

Senior physics student Peter Conwell will describe his summer trip to Greenland where he researched the aurora and the earth's magnetosphere with high-flying balloons.

10 FEB 1976 ALBERT EINSTEIN: THE EDUCATION OF A GENIUS

This recent film tells the remarkable story of Albert Einstein's childhood, education and early career.

17 FEB 1976 MICROCOMPUTERS

Mr. Paul Vanderbilt, Program Design Engineer at Fairchild Semiconductors and a senior physics major, will discuss recent developments in microprocessors and their applications

24 FEB 1976 LIGHTNING EXPOSED

Mr. Leon Salanave, visiting lecturer in the Department of Physics, San Francisco State University, and a former research associate at the University of Arizona, will describe his adventures and findings while chasing thunderbolts with cameras and spectroscopes.

2 MAR 1976 NUCLEAR REACTIONS IN STARS

Dr. Joe S. Tenn of the Department of Physics and Astronomy will introduce nuclear concepts and describe the formation of the chemical elements.

9 MAR 1976 WHAT NUCLEAR POWER PLANTS DO

Dr. Rudoph Sher of the Department of Mechanical Engineering, Stanford University will describe various types of nuclear reactors and how they work.

16 MAR 1976 RADIOACTIVE WASTES: WHERE WILL THEY GO?

Dr. Terry Lash of the Natural Resources Defense Council will describe radioactive wastes produced in the nuclear fuel cycle and government and industry plans for handling them.

23 MAR 1976 REACTOR SAFETY: THE AMERICAN PHYSICAL SOCIETY STUDY

Dr. Robert Budnitz of the UC Lawrence Berkeley Laboratory will discuss issues of light water reactor safety based upon a year-long study sponsored by the American Physical Society.

30 MAR 1976 HEALTH ASPECTS OF NUCLEAR POWER

Dr. Roland Finston, Senior Health Physicist and Lecturer in Nuclear Medicine, Stanford University, will discuss potential hazards from release of radioactive materials into the environment.

6 APR 1976 COAL: THE NEW BLACK GOLD?

Dr. John R. Dunning of the Department of Physics and Astronomy will will discuss coal as an alternate source of energy.

20 APR 1976 ENERGY CONSERVATION AND ITS IMPLICATIONS

Dr. Ronald Doctor of the California Energy Resources Conservation and Development Commission will discuss California's future energy system and ways in which conservation can affect this system.

27 APR 1976 FUSION: STATUS AND PROSPECTS

Dr. Wulf B. Kunkel of the Department of Physics, University of California, Berkeley will discuss the current status and future prospects of controlled fusion as a source of power.

4 MAY 1976 THE IMPACT OF NUCLEAR ENERGY IN CALIFORNIA

Dr. Lawrence Ruby of the Department of Nuclear Engineering, University of California, Berkeley will discuss the factors influencing the choice of nuclear energy to satisfy future needs in California and questions of public

acceptance.

11 MAY 1976 CAN A BEAUTIFUL YOUNG STAR FIND LASTING HAPPINESS IN THE ARMS OF A DEGENERATE DWARF?

Dr. John Faulkner of the Board of Studies in Astronomy and Astrophysics, University of California, Santa Cruz will describe the interesting events that accompany the stripping of one star by another.

7 SEP 1976 GRAVITY WAVES

Dr. Stephen Boughn of the Department of Physics, Stanford University will describe current efforts to detect gravitational radiation with an ultra-low temperature detector. A new film Gravity Waves: Search and Discovery will be shown.

14 SEP 1976 EXPLORERS OF THE INFINITE: TEACHING PHYSICS THROUGH SCIENCE FICTION

Mr. Roger Freedman of the Department of Physics, Stanford University will describe the ways in which advanced physics can be taught to introductory students through the medium of science fiction.

21 SEP 1976 EXTREME ULTRAVIOLET ASTRONOMY

Dr. Michael Lampton of the Space Sciences Laboratory, University of California, Berkeley will describe observational methods and recent results from the newest branch of astronomy.

28 SEP 1976 HIGH SPEED STREAMS IN THE SOLAR WIND AND CORONAL HOLES

Dr. Steven F. Nerney of NASA Ames Research Center will discuss what has been learned about the solar wind from x-ray observations from the Skylab satellite.

5 OCT 1976 THE RELATIVITY TWINS VISIT THE BLACK HOLE

Dr. Donald E. Hall of the Department of Physics, California State University, Sacramento will discuss recent developments in the resolution of the twin paradox.

12 OCT 1976 THE BRAND X LASER

Dr. Michael Samis of Optical Engineering Company will discuss the advanced laser that is required for the development of laser fusion.

19 OCT 1976 EVIDENCE FOR SUPERHEAVY ELEMENTS IN ANCIENT ROCKS

Dr. Thomas A. Cahill of the Department of Physics, University of California, Davis will describe how analytical development for studies of smog particulates led to evidence for multiple superheavy elements in ancient African rocks.

26 OCT 1976 THE SEARCH FOR EXTRATERRESTRIAL LIFE

Dr. Sam Greene of the Department of Physics and Astronomy will discuss this fascinating topic and show slides taken on his recent round-the-world tour of sites claimed to have been visited by ancient astronauts.

2 NOV 1976 SPINNING LITTLE MAGNETS

Dr. Isaac L. Bass of the Department of Physics and Astronomy will explain the basic physics and some applications of magnetic resonance.

9 NOV 1976 IN SEARCH OF THE MAGNETIC MONOPOLE

Dr. P. Buford Price of the Department of Physics, University of California, Berkeley will discuss the discovery and interpretation of what may be the first evidence for the existence of a magnetic monopole.

16 NOV 1976 UNDERSTANDING SPIRAL GALAXIES

Dr. Frank H. Shu of the Department of Astronomy, University of California, Berkeley will discuss a wave theory for the shapes of spiral galaxies.

23 NOV 1976 IS THERE A TOKAMAK IN YOUR FUTURE?

Dr. George L. Johnson of the Department of Physics and Astronomy, currently a visiting research associate at MIT, will discuss the prospects and problems of achieving thermonuclear fusion with the Tokamak, a device receiving much emphasis in fusion power research programs.

30 NOV 1976 A PHYSICIST BLOWS HIS OWN HORN

Dr. Tom Barnebey of the Department of Physics and Astronomy will demonstrate and discuss the physics of trumpets and other brass instruments.

8 FEB 1977 APPLICATIONS OF SPACE AND AERIAL PHOTOGRAPHY

Sharon Wall of the Remote Sensing Research Program, University of California, Berkeley, will discuss the

utility of LANDSAT and aerial photography for the inventory of natural resources and agriculture.

15 FEB 1977 VIKING – THE SEARCH FOR LIFE ON MARS

Dr. Donald de Vincenzi of the Extraterrestrial Biology Division, NASA Ames Research Center, will discuss the most recent life detection data from the Viking Landers on Mars.

22 FEB 1977 FINDING PHYSICS IN MODERN LITERATURE

Dr. Alan Friedman of the Lawrence Hall of Science, University of California, Berkeley, will discuss how serious modern fiction has been able to use the exciting ideas of relativity, thermodynamics, and quantum mechanics.

1 MAR 1977 ENVIRONMENTAL PHYSICS AND THE ENERGY CRISIS

Kirk Smith of the Department of Biomedical and Environmental Health Sciences, University of California, Berkeley, will discuss the environmental health aspects of nuclear and fossil fuels.

8 MAR 1977 COMPACT X-RAY SOURCES

Dr. Jonathan Arons of the Department of Astronomy, University of California, Berkeley, will talk about x-ray

emitting neutron stars, black holes, and the new x-ray bursts.

15 MAR 1977 SEMICONDUCTOR ELECTRONICS

Dr. C. Lester Hogan, Vice Chairman, Fairchild Camera and Instrument Corp., will describe the large scale integrated circuit revolution and its impact on science and engineering.

22 MAR 1977 ENVIRONMENTAL NOISE CONTROL

Dr. Frank Brittain of Bechtel Research and Engineering will discuss the role of noise control in protecting the environment and workers' hearing.

29 MAR 1977 COLOR VISION

Dr. Richard Gordon of the Department of Physics and Astronomy will discuss some experiments and theories concerning the perception of colors.

12 APR 1977 THE SEARCH FOR PLANETS BEYOND THE SOLAR SYSTEM

Dr. Gordon Spear of the Department of Physics and Astronomy will describe how astronomers attempt to detect planets around other suns.

19 APR 1977 LOW COST COMPUTING FOR EVERYONE

Dr. John Torode of Digital Systems will describe current trends in the application of LSI microcomputers to problems in industry and in the home.

26 APR 1977 ON A CLEAR DAY YOU CAN SEE FOREVER

Dr. Richard H. Karas of the Department of Physics and Astronomy will discuss atmospheric aerosols and their effect on visibility.

3 MAY 1977 THE SCIENCE OF MATERIALS

Dr. Irving Goldstein of Optical Coating Laboratory, Inc. will discuss some interesting practical problems in materials science and thin films.

10 MAY 1977 SOME ASPECTS OF EARTHQUAKES, EARTHQUAKE PREDICTION, AND QUAKES ON MARS

Dr. Robert Kovach of the Department of Geophysics, Stanford University, a member of the Viking seismology team, will discuss these topics of current interest in geophysics.

19 SEP 1977 THE BUILDING OF THE BOMB

Physicists Oppenheimer, Teller, Segré, Fermi, and Heisenberg give their interpretations of the events that led to Hiroshima in this historic film.

26 SEP 1977 CLIMATIC CHANGE ON MARS

Dr. Owen B. Toon of Cornell University will compare current theories of the evolution of the Martian climate and the terrestrial climate.

3 OCT 1977 SEARCHING FOR EXTRATERRESTRIAL INTELLIGENCE WITH EXISTING RADIO TELESCOPES

Dr. Jill C. Tarter of NASA Ames Research Center will describe previous and current searches for radio signals from nearby stars.

10 OCT 1977 SEMICONDUCTOR PHYSICS: WHY TRANSISTORS DIE Mr. John Hiatt of Hewlett Packard will discuss research into semiconductor failure mechanisms. 17 OCT 1977 ELECTRICITY FROM THE SUN: PROSPECTS AND PROBLEMS Dr. Arlon Hunt of the University of California Lawrence Berkeley Laboratory will describe present and future developments in large scale thermal electric power generation. THE EARTH AS VIEWED FROM SPACE 24 OCT 1977 Mr. Richard W. Underwood of NASA Johnson Space Center will speak on applications of photography from manned spacecraft. This lecture, part of the California Council for Geographic Education/NASA Space Photography Series, is co-sponsored by the Department of Geography. THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE, PART II 31 OCT 1977 Dr. Sam Greene of the Department of Physics and Astronomy will discuss his searches in South America, Africa, and elsewhere for evidence that the earth has been visited by extraterrestrial beings. **IN SEARCH OF THE OUARK** 7 NOV 1977 Dr. William M. Fairbank of Stanford University will discuss experiments to detect fractional charges in matter. SYNCHROTRON RADIATION: NEW WAYS IN RESEARCH WITH PHOTONS 14 NOV 1977 Dr. Herman Winick of Stanford University will describe the extraordinary research capabilities of intense broad band synchrotron radiation. 21 NOV 1977 THE DISCOVERY OF THE GALAXIES Dr. Joe S. Tenn of the Department of Physics and Astronomy will describe how astronomers just half a century ago determined that we live in a universe of galaxies. 28 NOV 1977 **A PITCH ABOUT PITCH** Dr. Tom Barnebey of the Department of Physics and Astronomy will discuss recent developments in the theory of musical pitch perception and will demonstrate some pitch-related phenomena. 5 DEC 1977 GAS LASERS AND HOLOGRAPHY Dr. Isaac L. Bass of the Department of Physics and Astronomy will describe some of the studies which he and his students are making with the College's new five-watt argon laser and tunable dve laser. 13 FEB 1978 PLANNING CALIFORNIA'S ENERGY FUTURE Dr. George L. Johnston of the California Energy Resources Conservation and Development Commission, on leave from the Department of Physics and Astronomy, will discuss conservation, conventional power sources, and the development of alternatives. THE COSMIC BACKGROUND RADIATION AND A MODERN ETHER DRIFT 27 FEB 1978 Dr. Marc Gorenstein of the University of California Lawrence Berkeley Laboratory will describe recent measurements from a U-2 jet in which the motion of the earth with respect to the universal 3-degree Kelvin background radiation has been detected. THE PIONEER SPACE MISSIONS - PAST, PRESENT, AND FUTURE 6 MAR 1978 Robert Skip Nunamaker, Chief of the Space Projects Division, NASA Ames Research Center, will discuss the Pioneer Missions to Jupiter and Venus and the future of planetary exploration. 13 MAR 1978 EXPERIMENTAL EVIDENCE FOR THE NEW FAMILY OF QUARKS Dr. W. K. H Panofsky, Director of the Stanford Linear Accelerator Center, will discuss recent events from electron-positron colliding beams and their implications regarding the structure of strongly interacting particles. THE MULTIPLE MIRROR TELESCOPE AND STELLAR INTERFEROMETRY 27 MAR 1978 Dr. Gregory M. Sanger of the University of California Lawrence Livermore Laboratory will describe a new concept in large astronomical instruments and one novel experiment, based on Michelson interferometry. MEDICAL PHYSICS 3 APR 1978 Dr. Vernon Smith of the University of California, San Francisco will describe the many different ways in which physics is applied to the solution of medical problems. **IS GOD A MATHEMATICIAN?** 10 APR 1978

Dr. Hans J. Bremermann of the University of California, Berkeley will discuss the physical limitations to mathematical understanding of physical and biological systems.

17 APR 1978 EXPLOSIVE EVENTS IN THE MILKY WAY

Dr. Harold Weaver of the University of California, Berkeley will discuss the effects of supernova explosions within a few hundred light years of the sun.

24 APR 1978 GEOTHERMAL ENERGY--ITS PRODUCTION AND ENVIRONMENTAL CONSEQUENCES

Dr. Richard H. Karas of the Department of Physics and Astronomy will describe how electric power is obtained from heat within the earth and the environmental benefits and hazards of development of this major Sonoma County resource.

1 MAY 1978 THE FREE-ELECTRON LASER

Dr. John M. J. Madey of Stanford University will discuss the use of a beam of free electrons to generate coherent optical radiation.

8 MAY 1978 PHYSICS AT VERY HIGH PRESSURES

Dr. Lynn Seaman of SRI International will describe experiments and computational procedures developed to discover how materials respond to intense shock wave loading.

15 MAY 1978 ASTRONOMICAL RESEARCH AT THE SONOMA STATE COLLEGE OBSERVATORY

Dr. Gordon G. Spear and his students will exhibit some of the photographs and research results obtained in observational astronomy classes and independent study projects.

11 SEP 1978 COMPUTERS AND ROBOTS

Two recent films: Computers: Challenging Man's Supremacy — featuring Arthur C. Clarke and Robots: Isaac Asimov's Artificial Man with Isaac Asimov

18 SEP 1978 SOLAR ENERGY IS HERE

Robert P. Lucas, President, Solar Energy Engineering, will describe the design, engineering, and manufacture of active solar heating systems.

25 SEP 1978 HOW BRIGHT ARE THE QUASARS?

Dr. E. Joseph Wampler of Lick Observatory will explain how recent observations of quasars are telling us more about these unusual objects and giving new insights into the structure and evolution of the universe.

2 OCT 1978 THE EXPLORATION OF SPACE

Three films from NASA: Nineteen Minutes to Earth—the Viking missions to Mars; Probing the Clouds of Venus—the Pioneers currently en route; and HEAO: The New Universe—The High Energy Astrophysical Observatory.

9 OCT 1978 A BALLOON-BORNE COSMIC RAY BERYLLIUM ISOTOPE EXPERIMENT

Dr. Andrew Buffington of the University of California Lawrence Berkeley Laboratory will describe a recent measurement of light cosmic ray isotopes which tells about cosmic ray origin and history.

16 OCT 1978 REMOTE AIR POLLUTION MEASUREMENTS USING LASERS

Dr. Robert L. Byer of Stanford University will describe experiments in which light is scattered from pollutants in the atmosphere.

23 OCT 1978 THE SUN AS A STAR

Dr. Philip Scherrer of Stanford University will discuss large scale structures on the sun and their effects on the earth.

30 OCT 1978 PHOTOCHEMISTRY OF THE POLLUTED ATMOSPHERE

Lynn Hubbard of the University of California, Riverside and the National Center for Atmospheric Research will discuss daily photochemical cycles and how they are affected by pollution.

6 NOV 1978 AN ENERGY-SAVING LIGHT BULB

Donald Hollister, President, Lighting Technology Corporation, will discuss his invention and development of an electrodeless fluorescent bulb which fits standard incandescent lamps but lasts longer and uses much less power than ordinary light bulbs.

13 NOV 1978 STELLAR EXTREME-ULTRAVIOLET SPECTROSCOPY

Roger Malina of the University of California, Berkeley will describe the construction and use of a rocket-borne extreme ultraviolet telescope which has obtained the first stellar spectra in this new wavelength range.

20 NOV 1978 THE INFLUENCE OF MATTER ON GEOMETRY

Dr. Iris Bloomer of the Department of Physics and Astronomy will present an introduction to the general theory of relativity.

27 NOV 1978 LOOKING AT THE STARS WITH A RUBBER MIRROR

Dr. Frank S. Crawford of the University of California Lawrence Berkeley Laboratory will describe recent measurements with a telescope system which restores diffraction-limited performance to astronomical telescopes by correcting, in real time, the phase errors introduced by the turbulent atmosphere.

4 DEC 1978 ENTROPY-EBB AND FLOW OF CHAOS

Dr. Erwin L. Hahn of the University of California, Berkeley will discuss experiments which bring order out of chaos.

12 FEB 1979 A PINHOLE VIEW OF GEOMETRICAL OPTICS

Dr. Jim Hauser of the University of California, Berkeley and Chabot College will make the subject of geometrical optics more accessible by discussing the relationship between pinhole cameras and ordinary cameras.

26 FEB 1979 RELATIVISTIC TIME DILATION

Paul G. Hewitt of City College of San Francisco will explain the famous twin paradox of Einstein's special theory of relativity and present his animated film on the subject.

5 MAR 1979 THE BLACK HOLES OF GRAVITY

Professor John Taylor presents one of the most astonishing predictions of Einstein's general theory of relativity in this new British Broadcasting Corporation film.

12 MAR 1979 THE MAGNETIC RECORDER AS A COMMUNICATIONS CHANNEL

John C. Mallinson of the Ampex Corporation will discuss the development of digital tape recorders with extremely high data rates and areal densities.

19 MAR 1979 BOSE-EINSTEIN CONDENSATION AND SUPERFLUIDITY IN LIQUID HELIUM

Dr. Joe S. Tenn of the Department of Physics and Astronomy will show a film on superfluidity in liquid helium and discuss neutron scattering experiments which demonstrate the existence of this quantum effect in a macroscopic system.

26 MAR 1979 EINSTEIN AND COSMOLOGY

Dr. Rainer Sachs of the University of California, Berkeley will discuss the structure and evolution of the universe with particular reference to Einstein's contributions.

2 APR 1979 STIMULATED EMISSION: FROM EINSTEIN TO THE LASER

Rick DeFreez of the Department of physics and Astronomy will discuss the history of stimulated emission and describe some of the laser applications he and others are investigating at Sonoma State University.

16 APR 1979 NOW YOU SEE IT, NOW YOU DON'T: STALKING THE ELUSIVE PHOTON

Dr. Sumner P. Davis of the University of California, Berkeley will talk about the electromagnetic properties of Einstein's brainchild, the photon.

23 APR 1979 PRELIMINARY RESULTS OF THE VOYAGER JUPITER ENCOUNTER

James E. Long of the Jet Propulsion Laboratory will present some of the spectacular photographs and scientific data obtained by the Jupiter flyby of Voyager 1 on March 5, 1979.

30 APR 1979 RELATIVISTIC INTERSTELLAR TRAVEL

Dr. Arthur Huffman of the University of California, Los Angeles will discuss the possibility of using time dilation to travel to the stars.

7 MAY 1979 HOW TO KEEP A SPACECRAFT FROM WOBBLING

Horace Newkirk (retired) of China Lake Naval Weapons Center will present a film, lecture, and demonstration of a nutation damper used in the Explorer satellite.

14 MAY 1979 THE EXTENSIVE EXPLORATION OF VENUS IN DEC 1978

Dr. Lawrence Colin of NASA Ames Research Center will present the results of the Pioneer Venus orbiter and

probes.

10 SEP 1979 THE RELATIVITY GYROSCOPE EXPERIMENT

Dr. Francis Everitt of Stanford University will describe a new test of Einstein's general theory of relativity based on orbiting very precise gyroscopes in satellites.

17 SEP 1979 RECENT EXPERIMENTS WITH POLARIZED ELECTRON BEAMS

Mary Silber, Sonoma State University student, will describe two summers of research at the Stanford Linear Accelerator Center and will discuss some applications of polarized electron beams in high and low energy physics.

24 SEP 1979 AUDITORIUMS: THE LARGEST MUSICAL INSTRUMENTS

Dr. Tom Barnebey of Sound Solutions Acoustical Consulting Services and Sonoma State University will discuss the problems encountered in designing a space suitable for playing and listening to music.

1 OCT 1979 ONE SMALL STEP

This film will present the story of the Apollo program and how it led to one small step for a man, one giant step for mankind, on July 20, 1969.

8 OCT 1979 THE PHYSICS OF MAGIC--AND VICE VERSA

Jesse David Wall of the City College of San Francisco will show that some physics demonstrations are based on old magic tricks--and that some magic tricks are based on old physics demonstrations.

15 OCT 1979 ENERGY CONSERVATION--WHERE WE SHOULD BE NOW

Jan Wright of the Lawrence Berkeley Laboratory will demonstrate that the efficient use of energy is more economical than the development of new energy supplies.

22 OCT 1979 INTERSTELLAR SHELLS AND SUPERSHELLS

Dr. Carl Heiles of the University of California, Berkeley will illustrate the shapes and motions of interstellar gas structures as seen by radio telescopes.

29 OCT 1979 ARMS CONTROL AND SALT

Dr. W.K.H. Panofsky, Director of the Stanford Linear Accelerator Center, will discuss the background and potential of the Strategic Arms Limitation Treaty.

5 NOV 1979 SQUIDS AND GEOPHYSICS

Dr. John Clarke of the University of California, Berkeley will outline the principles of superconducting quantum interference devices and describe their use to measure the resistivity of the earth's crust.

12 NOV 1979 THE MOONS OF JUPITER

Dr. David Morrison of the University of Hawaii will describe the properties of Io, Europa, Ganymede, and Callisto—objects which have been the subjects of intense study since the Voyager missions of March and July, 1979.

19 NOV 1979 PRELIMINARY RESULTS OF THE PIONEER 11 SATURN ENCOUNTER

Dr. John Wolfe, Pioneer 11 Project Scientist, NASA Ames Research Center, will present some of the results obtained after the spacecraft's six-year voyage to the ringed planet and its giant moon, Titan.

26 NOV 1979 PHYSICS, PHILOSOPHY, AND BUSINESS

Dr. Paul Goodwin, Vice President of Operations, Calista Corporation; President, Earth Science Consulting and Technology Corporation; and Adjunct Professor, Alaska Pacific University; will discuss the salient features of the philosophical foundations of modern physics and how these may act as the impetus for both disillusionment and hope concerning the business of technology.

3 DEC 1979 EXTRAGALACTIC X-RAY SOURCES

Dr. Susan Lea of the University of California, Berkeley will discuss models for x-ray emissions by quasars, Seyfert galaxies, and clusters of galaxies, sources recently detected by the High Energy Astrophysical Observatories.

11 FEB 1980 THE SPACELAB ONE MISSION

Dr. Michael Lampton of the University of California, Berkeley, a scientist astronaut currently in training for the forthcoming mission, will describe some of its 94 experiments, ranging from hematology and metallurgy to meteorology and astrophysics.

25 FEB 1980 REMOTE DETECTION OF METHANE USING LASERS

Richard DeFreez of Sonoma State University will describe research he performed last summer as an American Physical Society Industrial Graduate Intern, work which may lead to remote measurement of methane levels in coal mines, using coal dust as a Mie retroreflector.

3 MAR 1980 ASTROLOGY, UFO'S, WORLDS IN COLLISION, AND ANCIENT ASTRONAUTS

Andrew Fraknoi, Executive Officer of the Astronomical Society of the Pacific, will present a scientist's view of some popular topics in pseudoscience.

10 MAR 1980 INFRARED ASTRONOMY FROM HIGH FLYING OBSERVATORIES

Dr. Jesse Bregman of NASA Ames Research Center will discuss observations of cool stars from the Gerard P. Kuiper Airborne Observatory.

17 MAR 1980 EXPLORING MARS AND VENUS

Two new NASA films will be shown: Planet Mars and Venus Pioneer.

24 MAR 1980 MESSIER 87-THE GIANT BLACK MASS GALAXY

Dr. William Mathews of Lick Observatory and the University of California, Santa Cruz will describe optical, radio, and x-ray observations which suggest that this enormous galaxy in Virgo is rapidly devouring hot gas and shooting out jets of relativistic gas from its center, which may contain a huge black hole.

7 APR 1980 HOW SNOW CRYSTALS GROW

Dr. John Hallett, Marston Research Professor of Atmospheric Physics, Desert Research Institute and University of Nevada, Reno, will talk about his experimental and field studies of snow crystals, and the various molecular processes which give rise to the beautiful and complex shapes found in nature.

14 APR 1980 SUPERCONDUCTORS--THEIR EXISTENCE AND USE

Dr. Theodore H. Geballe of Stanford University will discuss the understanding of known superconductors and the prospects for finding higher temperature ones.beautiful and complex shapes found in nature.

21 APR 1980 FORGOTTEN FUNDAMENTALS OF THE ENERGY CRISIS

Dr. Albert A. Bartlett of the University of Colorado eloquently points out the consequences of exponential growth in this videotaped lecture.

28 APR 1980 THE TIME PROJECTION CHAMBER – NEW PARTICLE DETECTOR

Dr. Owen Chamberlain of the University of California, Berkeley will describe the new detector being constructed for use at PEP, the giant colliding beam accelerator under construction at the Stanford Linear Accelerator Center.

5 MAY 1980 INTRODUCTION TO HOLOGRAPHY

Lloyd Cross of the School of Holography, San Francisco, will describe the making of holograms and exhibit both monochromatic and white light examples.

12 MAY 1980 COAL AND ELECTRIC POWER PROSPECTS TO THE YEAR 2000

Dr. Andrew Van Horn of Teknekron Research, Inc., Berkeley, will discuss the environmental and energy problems associated with increased coal consumption and electricity demand growth.

19 MAY 1980 HOLES, WAVES, AND EDDIES

Senior physics and mathematics student Richard Montgomery of Sonoma State University will discuss fluid dynamics and turbulence with particular application to whitewater kayaking.

8 SEP 1980 THE ORIGIN OF THE GALAXIES

Dr. Joseph Silk of the University of California, Berkeley will discuss modern views on how galaxies originated in the early universe.

15 SEP 1980 ELECTRONIC STRUCTURE OF SOLIDS

Dr. Walter A. Harrison of Stanford University will show how the dielectric and bonding properties of solids may be understood in terms of their electronic structure.

22 SEP 1980 ATMOSPHERIC CARBON DIOXIDE: THE LONG TERM IMPACT ON CLIMATE

Dr. Henry D. I. Abarbanel of the Lawrence Berkeley Laboratory will discuss climate models and some implications of the possible doubling of atmospheric carbon dioxide in the next few decades.

29 SEP 1980 TWO FILMS ON MODERN TELESCOPES

Stars, Galaxies, and Southern Skies features Dr. Bart Bok of the University of Arizona at work at the 4-meter telescope of the Cerro Tololo Inter-American Observatory. Mirrors on the Universe: the MMT Story describes the new multimirror telescope in Arizona.

6 OCT 1980 GASOHOL: AN EXAMPLE OF FEDERAL SCIENCE-ENERGY POLICY BEING MADE

Dr. David Eck of the SSU Department of Chemistry will describe his experiences working on science and energy policy as an American Chemical Society Congressional Fellow in 1979-80.

13 OCT 1980 PHYSICS BETWEEN THE TWO WORLD WARS

Dr. John L. Heilbron of the University of California, Berkeley will discuss the transformation that physics underwent in conduct as well as in content in the 1920's and '30's.

20 OCT 1980 WHAT CAN WE LEARN FROM ATOMIC COLLISIONS?

Dr. Walter E. Meyerhof of Stanford University will discuss recent research with superheavy systems.

27 OCT 1980 PHOTOGRAPHING QUANTIZED VORTEX LINES IN SUPERFLUID HELIUM: QUANTUM

MECHANICS YOU CAN SEE

Dr. Richard E. Packard of the University of California, Berkeley will describe experiments which have made possible studies of the dynamics of quantized vortices in liquid helium.

3 NOV 1980 SUPERFICIAL PHYSICS AND ELECTRONICS

Dr. Robert S. Bauer of the University of California, Berkeley will describe experiments which have made possible studies of the dynamics of quantized vortices in liquid helium.

10 NOV 1980 THE UNIVERSITY OF CALIFORNIA 10-METER TELESCOPE PROJECT

Dr. Jerry E. Nelson of the Lawrence Berkeley Laboratory will discuss plans for construction of what will be the world's largest telescope.

17 NOV 1980 SPACE DUST AND THE REDDENING OF STARLIGHT

Dr. Peter B. Lucke of the SSU Department of Physics and Astronomy will describe the distribution of dust clouds in the solar neighborhood.

24 NOV 1980 SPACE ASTRONOMY: THE EINSTEIN AND IUE OBSERVATORIES

Dr. Gibor Basri of the University of California, Berkeley will describe what these space-borne observatories can look at, how they are used by astronomers, and some of the wealth of new information they have yielded.

1 DEC 1980 OPTICAL INTERFERENCE COATINGS

Dr. Philip W. Baumeister of Optical Coating Laboratories, Inc. will describe how interference in thin films is used for practical applications.

23 FEB 1981 HEAVY ION INERTIAL FUSION

Dr. Andrew M. Sessler of the Lawrence Berkeley Laboratory will discuss the physics of one of the few ways which potentially could lead to an unlimited energy source.

2 MAR 1981 SUB-MICRON LITHOGRAPHY

Doug Gray of the Hewlett-Packard Company, Santa Rosa, will discuss current and proposed methods for the replication of micron and sub-micron geometries for semiconductor devices and integrated circuits using optics, electron beams, and x-rays.

9 MAR 1981 TOWARD A PRACTICAL X-RAY MICROSCOPE

Dr. John Dunning of Sonoma State University will describe synchrotron radiation and attempts to use radiation from the SPEAR storage ring at Stanford in an element sensitive x-ray microscope.

16 MAR 1981 HOW GALAXIES ROTATE

Dr. Vera C. Rubin of the Carnegie Institution of Washington will describe the very systematic way in which stars move in galaxies.

23 MAR 1981 THE SATURN SYSTEM AS SEEN BY VOYAGER I

Dr. Jeffrey N. Cuzzi of NASA Ames Research Center will present images of Saturn, its rings, and its satellites as seen by the Voyager spacecraft and discuss principal scientific results of the mission.

30 MAR 1981 BE AND SHELL STARS

Stephanie Snedden of Sonoma State University will discuss properties of stars with extended atmospheres and present recent results of observations of 28 Cygni.

6 APR 1981 TUNABLE VISIBLE AND ULTRAVIOLET LASER LIGHT: GETTING THERE FROM THE INFRARED

Dr. Isaac L. Bass of Quanta Ray, Inc. will discuss some of the techniques used in commercial instruments to generate tunable, high power laser light.

20 APR 1981 ASSESSMENTS OF TOMORROW'S ENERGY: A NEW VENTURE FOR PHYSICISTS

Dr. Will Siri of the Lawrence Berkeley will discuss the role of physicists in the analysis of alternate energy futures.

27 APR 1981 EROSION OF THE EARTH'S MAGNETIC FIELD

Dr. Richard Karas of Sonoma State University will describe a recent experiment which demonstrates the rapid erosion of the earth's dayside magnetic field lines caused by a sudden southward turn of the interplanetary magnetic field.

4 MAY 1981 OPTICAL LEVITATION

Keith Soreng of Sonoma State University will discuss experiments performed at Sonoma State on laser levitation of silicone oil drops.

11 MAY 1981 SOLAR ENERGY CAPTURE AND STORAGE BY WATER SPLITTING

Dr. Melvin Calvin of the University of California, Berkeley will talk about the physics and chemistry of quantum conversion with synthetic chloroplasts.

14 SEP 1981 SPECTROSCOPIC STUDIES OF RECENT COMETS

Dr. Hyron Spinrad of the University of California, Berkeley will discuss quantitative measurements of the atomic and molecular fragments spectroscopically observable in Comets Encke, Stephan-Oterma, and Tuttle.

21 SEP 1981 THE FIRST GREAT UNIFICATION IN PHYSICS

Dr. C. W. Francis Everitt of Stanford University will describe the process that led up to the unification of electricity, magnetism, and optics achieved between 1861 and 1865 by James Clerk Maxwell.

28 SEP 1981 THE UNITY OF THE ELECTROMAGNETIC AND WEAK NUCLEAR FORCES

Dr. Michael Chanowitz of the Lawrence Berkeley Laboratory will describe recent theoretical developments in elementary particle physics which suggest that electromagnetism and the weak nuclear force are actually aspects of a single underlying force.

5 OCT 1981 GASES IN SOLIDS

Keith Brister of Sonoma State University will describe thermal dissorption spectrometry experiments he performed as a summer research participant at Oak Ridge National Laboratory.

12 OCT 1981 GRAND UNIFICATION THEORIES

Dr. Helen R. Quinn of the Stanford Linear Accelerator Center will describe current efforts towards grand unification in particle physics theories.

19 OCT 1981 THE CRISIS IN SCIENCE AND TECHNOLOGY: IT'S HERE NOW

Dr. Wilson K. Talley of the University of California, Davis and the Lawrence Livermore National Laboratory will describe those trends that have led to the United States becoming a net importer of technology.

26 OCT 1981 THE SOUND OF CHAOS

Dr. Bernardo Huberman of Xerox Palo Alto Research Center and Stanford University will describe recent work on chaotic behavior of simple dynamical systems with applications to solid state turbulence.

2 NOV 1981 THE VOYAGER EXPLORATION OF SATURN

Dr. David Morrison of the University of Hawaii will discuss the new discoveries concerning Saturn, its rings, and satellites and will compare the Saturnian and Jovian systems.

9 NOV 1981 ACTIVE GALACTIC NUCLEI

Dr. Donald E. Osterbrock of the Lick Observatory will describe his research on Seyfert galaxies, radio galaxies, and quasars.

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16 NOV 1981	ADVANCED BATTERIES: A STEP TOWARD ENERGY INDEPENDENCE
	Dr. Elton J. Cairns of the Lawrence Berkeley Laboratory and the University of California, Berkeley will discuss how recent results of electrochemical research and development provide some new battery options
23 NOV 1981	RESONANT COLLISIONS BETWEEN RYDBERG ATOMS
	Dr. Thomas F. Gallagher of SRI International will discuss the properties of highly excited atoms and recent
	experiments to study resonant collisions of Rydberg atoms.
30 NOV 1981	HOT AND CHILLED WATER STORAGE IN UNDERGROUND FORMATIONS
	Dr. Chin-Fu Tsang of the Lawrence Berkeley Laboratory will discuss the physical process underlying a seasonal thermal energy storage system
8 FEB 1982	DO STATES MATTER? PHASE TRANSITIONS IN TWO AND THREE DIMENSIONS
	Dr. Douglas Henderson of the IBM Research Laboratory in San Jose will describe theories and computer simulations of the states of matter and phase transitions in bulk and interfacial materials.
22 FEB 1982	SEMICONDUCTOR MATERIALS CHARACTERIZATION: GALLIUM ARSENIDE AND SILICON
	Dr. Len Forbes of the University of California, Davis will describe four techniques-ELTS, photo-Hall, C-V
	lifetime, and FTIR—and their applications.
1 MAR 1982	SUPERCONDUCTING MATERIALS
	Dr. A. C. Lawson of Pomona College will discuss now physicists search for superconducting materials—and why.
8 MAR 1982	X-RAY BURSTS AND THE EDDINGTON LIMIT
	Dr. Lynn Cominsky of the University of California, Berkeley will discuss observations of x-ray bursts and
	describe how they can be used to determine the characteristics of some interesting objects in the galaxy.
15 MAR 1982	COSMOLOGY AND PARTICLE PHYSICS
	Dr. Mary K. Gaillard of the University of California, Berkeley will discuss the early universe in light of recent developments in particle physics.
22 MAR 1982	TO SEE WITHIN
	Dr. Dennis L. Parker of the University of California, San Francisco and Sonoma State University will describe two techniques of medical physics: computerized tomography (CT) and nuclear magnetic resonance (NMR).
29 MAR 1982	METEORITES: MESSENGERS FROM SPACE
	Ronald A. Oriti of Santa Rosa Junior College will discuss meteors, meteorites, asteroids, and comets, and how they are related.
12 APR 1982	RIDING A BICYCLE WITHOUT HANDS
	Dr. John V. Breakwell of Stanford University will discuss the stability of a bicycle.
19 APR 1982	MACHINE INTELLIGENCE AND ROBOTICS
	Dr. Charles A. Rosen of Machine Intelligence Company, Sunnyvale, will discuss the application of machine intelligence to programmable automation.
26 APR 1982	THINKING PHYSICS
	Dr. Lewis Epstein of City College of San Francisco will present some new ways of looking at old things.
3 MAY 1982	MODELING FLUID FLOW
	dynamic simulations.
10 MAY 1982	PHOTOACOUSTIC SPECTROSCOPY
	Dr. Nabil M. Amer of Lawrence Berkeley Laboratory will discuss a new tool for determining properties of
	amorphous photovoltaic materials and for remote sensing of pollutants.
20 SEP 1982	THE LARGE SCALE UNIVERSE
	Dr. Marc Davis of the University of California, Berkeley will discuss recent results from redshift surveys of
	galaxies which provide detailed information on the large scale structure of the universe.
27 SEP 1982	CONTROLLED THERMONUCLEAR FUSION: DOING IT WITH MIRRORS
	Dr. Kobert K. Borchers of the Lawrence Livermore National Laboratory will discuss the present status and

prospects of the magnetic fusion energy program.

4 OCT 1982 DEEP IMPURITIES IN SEMICONDUCTORS

Dr. Saeid Rahimi of Sonoma State University will discuss theoretical and experimental means of identification of impurities and defects in semiconductors.

11 OCT 1982 SURFACE PHYSICS ENLIGHTENED BY SYNCHROTRON RADIATION

Dr. Stig B. M. Hagström of Xerox Palo Alto Research Center and Stanford University will discuss modern techniques for the study of surfaces and their applications in modern electronics.

18 OCT 1982 PROBING MOLECULAR CLOUDS WITH RADIO INTERFEROMETERS

Stuart Vogel of the University of California, Berkeley will introduce techniques of mapping with radio interferometers and describe observations of star-formation regions with the Very Large Array and the Hat Creek Radio Observatory.

25 OCT 1982 IN SEARCH OF THE MAGNETIC MONOPOLE

Dr. Michael Taber of Stanford University will describe the use of superconducting devices to detect moving magnetic monopoles.

1 NOV 1982 SPECTROSCOPY IN A NEW LIGHT

Dr. Arthur L. Schawlow of Stanford University, co-winner of the 1981 Nobel Prize in Physics, will describe how-with intense, directional, and monochromatic light from lasers-it is possible to detect single atoms, to resolve hidden details of spectra, and to make measurements of unprecedented precision.

8 NOV 1982 MOLTEN CARBONATE FUEL CELLS

Geoffrey A. Wilson of Sonoma State University and Argonne National Laboratory will describe mathematical models used to predict current yields from fuel cells using gasified coal as fuel.

15 NOV 1982 THE SEARCH FOR HIGH DENSITY NUCLEAR MATTER

Dr. John Harris of the Lawrence Berkeley Laboratory will discuss current experiments in high energy nucleusnucleus collisions used to search for high density nuclear matter.

22 NOV 1982 INTERSTELLAR TRAVEL: POSSIBILITIES AND TECHNIQUES

Dr. Gordon G. Spear of Sonoma State University will discuss the differences between interplanetary and interstellar travel and will outline several possible technologies for reaching the stars.

29 NOV 1982 ARTHUR STANLEY EDDINGTON

Dr. Joseph S. Tenn of Sonoma State University will celebrate the centennial of one of the pioneers of astrophysics by describing some of Eddington's contributions to the theories of galactic structure, stellar structure and evolution, and cosmology.

6 DEC 1982 LIQUID CRYSTALS: APPLICATIONS TO ELECTRONICS AND LIFE

Dr. Frederick J. Kahn of Hewlett-Packard Laboratories, Palo Alto, will describe the properties of liquid crystals underlying such diverse applications as television and computer displays,non-destructive testing, and biological systems.

7 FEB 1983 GRAVITINOS AND THE CLUMPY UNIVERSE

Dr. George R. Blumenthal of the University of California, Santa Cruz will discuss models of the early universe and the role of particle physics in explaining galaxy formation.

14 FEB 1983 X-RAY OBSERVATIONS OF THE SOLAR CORONA

Dr. William A. Brown of the Lockheed Palo Alto Research Laboratory will describe current x-ray and ultraviolet observations of the solar atmosphere with emphasis on recent sounding rocket observations of a solar flare.

28 FEB 1983 THREE DECADES IN FIBER OPTICS

Dr. Narinder Kapany of Kaptron, Inc. and the Center for Innovation and Entrepreneurial Development, University of California, Santa Cruz, will describe the history, basic principles, and current applications of fiber optics.

7 MAR 1983 CREATING NEW STATES OF MATTER

Dr. Lee S. Schroeder of the Lawrence Berkeley Laboratory will discuss current experiments using high energy nuclear beams which are aimed at creating new states of matter-perhaps quark matter-at high energy and particle densities

particle delisities.

14 MAR 1983 THE MILLISECOND PULSAR

Dr. Donald C. Backer of the University of California, Berkeley will recount the discovery of a radio pulsar spinning 642 times per second.

21 MAR 1983 THE STANFORD ARTIFICIAL EAR PROJECT

Dr. Robert L. White of Stanford University will describe the status of a project directed at developing an artificial implantable ear based on the principle of direct electrical stimulation of the auditory nerve.

4 APR 1983 PIXE: FROM AIR POLLUTION TO THE GUTENBERG BIBLE

Dr. Robert A. Eldred of the University of California, Davis will describe the use of particle induced x-ray emission for analysis of air pollution in the national parks and for matching of inks in old manuscripts.

11 APR 1983 PREDICTING PROPERTIES OF SOLIDS

Dr. Marvin L. Cohen of the University of California, Berkeley will describe how it is possible to explain many of the observed properties of solids using only quantum mechanics.

18 APR 1983 ARTIFICIAL INTELLIGENCE: A PERSONAL PERSPECTIVE

Dr. Johan de Kleer of Xerox Palo Alto Research Center will discuss causality, quantitative reasoning, and physics problem solving.

25 APR 1983 ROUTES TO CHAOS

Dr. Alan M. Portis of the University of California, Berkeley will discuss the interpretation of current experiments on the transition from smooth and ordered to turbulent and disordered dynamical behavior in ferromagnetic resonance.

2 MAY 1983 FUNDAMENTALS OF SOLAR CELLS

Dr. Richard H. Bube of Stanford University will discuss the basic principles involved in the conversion of solar energy into electricity using semiconductor junctions.

9 MAY 1983 INDOOR RADIATION EXPOSURES: POTENTIAL INCREASES FROM CONSERVING ENERGY IN BUILDINGS

Dr. Anthony V. Nero, Jr. of the Lawrence Berkeley Laboratory will discuss the influence of various factors on the concentration of indoor air pollutants, emphasizing radon-222 and its decay products— naturally occurring radionuclides in the air we breathe.

12 SEP 1983 COMPUTER AIDED DESIGN OF MICROWAVE CIRCUITS

Holly Wallace of Sonoma State University will describe work she performed in the accelerator physics group of the Stanford Linear Accelerator Center as a student summer intern.

19 SEP 1983 THE NEW TRANSISTORS

Dr. Duncan E. Poland of Sonoma State University will explain how the development of devices involving new physical mechanisms to produce the transistor action offer the possibilities of greater speed and higher densities for integrated circuits.

26 SEP 1983 INFRARED ASTRONOMY IN THE EIGHTIES

Dr. Palmer Dyal of NASA Ames Research Center will discuss the Infrared Astronomy Satellite and plans for the next generation of space infrared facilities.

3 OCT 1983 MICRO-MINIATURE REFRIGERATORS

Dr. William A. Little of Stanford University will describe the recent development of computer chip—like micro—miniature refrigerators-devices which are finding widespread use in instruments for simple cooling.

10 OCT 1983 NUCLEAR WEAPONS AND NUCLEAR ARMS CONTROL

Dr. John A. Jungerman of the University of California, Davis and clinical psychologist Nancy K. Jungerman will discuss the physical and psychological effects of the nuclear arms race.

17 OCT 1983 RADIOACTIVITY, FLEETING BEAUTY, AND THE SEARCH FOR TRUTH

Dr. John A. Jaros of the Stanford Linear Accelerator Center will discuss the measurement of the lifetime of mesons containing the beauty quark and what it implies about the as-yet-undiscovered truth quark.

24 OCT 1983 SHEDDING NEW LIGHT ON FLAMES WITH LASERS

Dr. John E. M. Goldsmith of Sandia National Laboratories will describe applications of laser spectroscopy for

combustion diagnostics.

31 OCT 1983 THE AGE OF THE UNIVERSE

Dr. Allan Sandage of the Mount Wilson and Las Campanas Observatories will review the thirty year search for the Hubble Constant.

7 NOV 1983 ANALYTICAL ELECTRON MICROSCOPY IN MATERIALS SCIENCE

Dr. Ignatius Y. Chan of Chevron Research Company will explain how information from the microscopic level can be related to the macroscopic behavior of materials.

14 NOV 1983 TELLING ABOUT SCIENCE

Judith Goldhaber, science writer and editor at the University of California Lawrence Berkeley Laboratory, will discuss writing about science from the perspective of over twenty years in the field.

21 NOV 1983 THREE DECADES IN FIBER OPTICS

Dr. Narinder Kapany of Kaptron, Inc. and the Center for Innovation and Entrepreneurial Development, University of California, Santa Cruz will describe the history, basic principles, and current applications of fiber optics.

28 NOV 1983 SPACE SHUTTLE AND SECONDARY PAYLOADS

William F. Cabral of Martin Marietta will describe on-orbit fluid transfer and placing small scientific experiments in space.

5 DEC 1983 RADIO EXPLORATION OF THE SATURN SYSTEM

Dr. Von Eshleman of Stanford University will discuss Voyager measurements of the rings of Saturn and the atmosphere of Titan.

6 FEB 1984 PICTURING FLUID FLOW

Dr. Milton Van Dyke of Stanford University will discuss the motion of liquids and gases with illustrative photographs colected from around the world.

13 FEB 1984 TAKING THE EARTH'S TEMPERATURE WITH BLACKBODY RADIATION

Dr. Nancy Kerr Del Grande of Lawrence Livermore National Laboratory will explain how a precise application of Planck's law has increased accuracy of temperature mapping tenfold, leading to new exploration techniques in geology and archaeology.

27 FEB 1984 RENAISSANCE OF THE LIGHTQUANTUM

Dr. Bruce R. Wheaton of the University of California, Berkeley will discuss one of the major issues involved in the rejection of deterministic theory in early twentieth century physics.

5 MAR 1984 HAVE YOU THOUGHT OF HIGH SCHOOL PHYSICS TEACHING?

Arthur V. Farmer, presidential-award-winning physics teacher at Gunn High School, Palo Alto, will discuss his innovative teaching techniques.

12 MAR 1984 ANTI-REFLECTION COATINGS ON VIDEO DISPLAY TERMINALS

Paul LeFebvre of Optical Coating Laboratory, Inc. and Sonoma State University will discuss the design and the need for coatings to reduce ambient glare on computer terminals.

19 MAR 1984 PROCESSING AND DISPLAY OF THREE-DIMENSIONAL DATA

Eugene F. Pischel of Lockheed Missiles and Space Company will review classical and new-generation stereo displays with emphasis on digital imagery.

26 MAR 1984 CLIMATIC CHANGE ON THE EARTH AND ITS NEIGHBORS

Dr. James B. Pollack of NASA Ames Research Center will describe how the climates of Earth, Venus, and Mars have been affected by evolution of the planets' atmospheres.

2 APR 1984 SURFACE ACOUSTIC WAVE DEVICES

Dr. Robert Bray of Hewlett-Packard Company, Santa Rosa, will discuss the design and measurement of devices for instrument frequency control and filtering applications.

9 APR 1984 XEROGRAPHIC IMAGING AND ITS USES

Gary K. Starkweather of Xerox Palo Alto Research Center will describe how the xerographic process works and how laser printing is implemented.

23 APR 1984 SUPERCONDUCTIVITY, PENDULA, AND CHAOS

Dr. M.R. Beasley of Stanford University discuss how the practical and the profound meet in the study of superconducting devices, and, along the way, will explain how the three concepts in the title are related.

30 APR 1984 SEMICONDUCTOR RESEARCH AT THE CENTER FOR ADVANCED MATERIALS

Dr. Eugene E. Haller of Lawrence Berkeley Laboratory and the University of California, Berkeley will describe the scientific programs of the CAM with emphasis on the semiconductor program.

7 MAY 1984 THE BIRTH OF STARS

Dr. Martin Cohen of the University of California, Berkeley and NASA Ames Research Center will describe radio, optical, and infrared observations that illustrate the surprising behavior of stars in formation.

14 MAY 1984 PARTICLES WITH HIDDEN AND NAKED CHARM

Dr. Gerson Goldhaber of the University of California, Berkeley and Lawrence Berkeley Laboratory will discuss the discovery of psion spectroscopy and the charmed particles, and how they relate to the quark model.

17 SEP 1984 THE INFRARED UNIVERSE: IRAS DISCOVERIES AND THE PROMISE OF SIRTF

Dr. Michael Werner of NASA-Ames Research Center, Moffett Field will describe the astronomical discoveries made by the Infrared Astronomical Satellite (IRAS) and will explain how some of these discoveries will be examined in greater detail with the more ambitious Shuttle Infrared Telescope Facility (SIRTF) planned for the 1990's.

24 SEP 1984 DEEP LEVEL DEFECTS IN SEMICONDUCTORS

Dr. Eicke Weber, Materials Science and Mineral Engineering professor at University of California, Berkeley, will describe which kind of semiconductor imperfections create deep level defects capable of strongly influencing the performance of a semiconductor device.

1 OCT 1984 A PHYSICIST IN YELLOWSTONE WITH A MASS SPECTROMETER

Dr. John Reynolds of University of California, Berkeley Physics Department, will describe his use of a mobile mass spectrometer to study noble gasses of hydrothermal fluids in the Yellowstone Caldera.

8 OCT 1984 NEW IDEAS IN ELEMENTARY PARTICLE PHYSICS

Dr. Orlando Alvarez of University of California, Berkeley Physics Department will suggest some answers to the question, Are all the forces of nature really the same force?

15 OCT 1984 ION BEAM ANALYSIS OF SILICON INTERFACE STRUCTURES

Dr. Nathan Cheung, Professor of Electrical Engineering at University of California, Berkeley will describe how ion beams may be used to explore the interfaces of silicon with metals, oxides and other semiconductors.

22 OCT 1984 HOLOGRAPHY AND THE LASER ARTS

Nancy Gorglione, 1984-85 Artist-in-Residence for the California Arts Council, will discuss technical and practical aspects of silver-halide holography including aesthetic and philosophical implications of the use of lasers.

29 OCT 1984 GLOBULAR CLUSTERS: THE OLDEST STARS

Dr. Catherine Pilachowski of Kitt Peak National Observatory will discuss the history of globular clusters and what they have taught us about the evolution of stars and about the origins of the Milky Way Galaxy.

5 NOV 1984 COLLECTIVE COMPUTATION AND SELF REPAIR

Dr. Bernardo A. Huberman of Xerox Palo Alto Research Center will describe a machine composed of layers of connected automata which can be used to learn and reorganize characters.

12 NOV 1984 NOVEL ELECTRONIC CONDUCTION IN LOW DIMENSIONAL SYSTEMS

Dr. Alex Zettl of University of California, Berkeley Physics Department will describe the only known collective mode transport mechanism other than superconductivity.

19 NOV 1984 SCANNING TUNNELING MICROSCOPY

Dr. David Abraham of University of California, Berkeley Physics Department will describe a nondestructive surface imaging technique with atomic resolution.

26 NOV 1984 STEAMBOAT WAVES

Dr. Lewis Epstein of San Francisco City College Department of Physics will discuss the behavior of the V

shaped wakes created by supersome and subsome projecties such as an planes, buncts and steamboats.

3 DEC 1984 THE UNIVERSITY OF CALIFORNIA 10-METER TELESCOPE PROJECT

Dr. Robert Kraft, director of Lick Observatory, will describe the status of the University of California project to construct a new generation giant optical telescope with an aperture of 10 meters.

NUCLEAR WEAPONS: OFFENSIVE, DEFENSIVE, OR NONE-OF-THE-ABOVE 11 FEB 1985

Dr. Charles Schwartz of the Department of Physics at the University of California, Berkeley will address the non-technical aspects of the controversies but aspects pertinent to the work of physicists.

THE STRATEGIC DEFENSE INITIATIVE 25 FEB 1985

Dr. Gerald P. Kiernan of Lawrence Livermore National Laboratory, University of California, will describe the scientific and technological issues underpinning the proposed space weapons initiative.

DOPPLER IMAGING THE SURFACES OF STARS 4 MAR 1985

Dr. Steven S. of the Department of Astronomy at University of California, Santa Cruz and Lick Observatory will describe a method developed for obtaining resolved images of spotted stars from their spectra and discoveries about the nature of starspots and stellar activity.

11 MAR 1985 SOFT X-RAY LASER EXPERIMENT

Dr. Dennis Matthews of Lawrence Livermore National Laboratory, University of California, will describe experiments which demonstrate a soft x-ray laser

18 MAR 1985 ELECTRONIC AND MAGNETIC PROPERTIES OF TRANSITION METAL ALLOYS, SURFACES, AND OVERLAYERS

Mr. Randy Victora, Department of Physics Ph.D. candidate at the University of California, Berkeley will describe some unusual computational results suggesting broken spatial symmetry and extremely high spin polarization for transition metals.

25 MAR 1985 SEMI-INSULATING GaAs MATERIAL: PHYSICS IN APPLICATION

Dr. Fau Ching Wang of Hewlett-Packard's Santa Rosa Microwave Technology Division will discuss the physics of gallium arsenide materials and the limitations implied for discrete and integrated circuit devices.

CHAOS IN SUPERFLUID HELIUM AND AT LOS ALAMOS 8 APR 1985

Mr. Richard Montgomery, Department of Mathematics Ph.D. candidate at the University of California, Berkeley, will discuss experimental and theoretical results of chaotic behavior in the magnetization of superfluid helium. Also he will discuss some of his experiences while visiting Los Alamos Scientific Laboratory.

METAL CLUSTERS: A NEW PERIODIC SYSTEM 15 APR 1985

Dr. Walter Knight of the Department of Physics at University of California, Berkeley will describe how clusters of metal atoms show periodic structure in their stability and electronic properties.

LEFT-HANDED FORCES AND PARTICLES 22 APR 1985

Dr. John Carr of the Department of Physics HIgh Energy Physics Group at University of Colorado, Boulder will discuss experiments studying the basic left-right asymmetry of some natural phenomena.

DUPER AND SUPER-DUPER FAST RELAXATION OF CARRIERS IN GaAs AND RELATED 29 APR 1985 **SEMICONDUCTORS**

Dr. David Erskine of the Department of Physics at University of California, Berkeley will discuss measurement of scattering times of carriers in semiconductors using optical pulses of 100-femtosecond duration.

6 MAY 1985 SETI: PLANS AND PREPARATIONS FOR THE MICROWAVE OBSERVING PROGRAM

Dr. Jill Tarter of the Department of Space Science at University of California, Berkeley and NASA Ames Research Center will describe prototype instrumentation and the ongoing field testing to learn how to conduct a systematic search for extraterrestrial life.

EXPERIMENTS ON ROTATING SUPERFLUID 3HE: WHAT'S NEW NEAR ABSOLUTE ZERO? 13 MAY 1985

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Dr. Richard Packard, post-doctoral researcher in the Department of Physics at University of California, Berkeley, will describe how an AC gyroscope has been used to detect superfluid persistent currents in 3He.

16 SEP 1985 THE ASTEROID AND THE DINOSAUR

Ms. Helen V. Michel, Staff Scientist at Lawrence Berkeley Laboratory, University of California will present a .

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theory contending that the dinosaurs as well as most other life forms of the cretaceous period became extinct due to the impact of a large asteroid. The periodic nature of mass extinctions and comet impacts will also be discussed.

23 SEP 1985 WHY SARAN WRAPS

Dr. Lawrence B. Coleman, Associate Professor of Physics at University of California, Davis will discuss the underlying physical basis for the properties of materials. Why copper is a metal, silicon a semiconductor, and diamond a hard insulator.

30 SEP 1985 COMPUTER-AIDED ACOUSTICAL MEASUREMENTS

Dr. Thomas Barnebey, Lecturer in Physics at Sonoma State University. Acoustic tests of rooms and partitions can be conveniently performed with the help of a microcomputer. A computerized measurement system will be demonstrated by measuring some acoustic characteristics of the lecture hall.

7 OCT 1985 OPTICAL PROPERTIES OF THIN FILMS

Dr. Jerome Swalen, Manager of Molecular Films, IBM Research Laboratories, San Jose will describe some current applications of ultra thin films, the optical techniques and measurements to characterize them, and some examples.

14 OCT 1985 HIGH-POWERED LASERS

Dr. Kenneth Manes, Fusion Experiments Program, Lawrence Livermore National Laboratory, University of California, will describe the development of 10¹² to 10¹⁴ watt lasers over the last decade.

21 OCT 1985 INTERFACING COMPUTERS TO PHYSICS EXPERIMENTS

Eric Reiter, Owner/Designer of Computer Continuum, Daly City will discuss the theory and demonstration of real world interfacing using a newly developed applications bus. Eric, a former SSU physics major, now serves physics as an entrepreneur.

28 OCT 1985 HEAVY ION ACCELERATORS FOR INERTIAL CONFINEMENT FUSION

Dr. W. B. Herrmannsfeldt of the Stanford Linear Accelerator Center will discuss the prospects for achieving economic power production from inertial confinement fusion. The special attributes of high energy heavy ion accelerators may make this approach to fusion particularly attainable.

4 NOV 1985 ERASABLE OPTICAL STORAGE: A REVOLUTION IN RECORDING TECHNOLOGY

Dr. Neville Connell, Manager of the Interfaces and Artificial Structures Group, General Sciences Laboratory at Xerox Palo Alto Research Center will discuss how the physical properties of magneto-optic and phase change media may allow significant increases in the storage density of rotating memories.

11 NOV 1985 FREQUENCY MODULATION SPECTROSCOPY

Dr. David E. Cooper, Senior Research Physicist, Electro-optics System Laboratory at SRI International, Palo Alto. Frequency modulation (FM) spectroscopy is a novel optical spectroscopic technique capable of sensitive and rapid absorption measurement. In this talk Dr. Cooper will discuss FM spectroscopy and its application to the ultrasensitive detection of atoms and molecules.

18 NOV 1985 THE HUGGINSES, THE DRAPERS, AND THE BEGINNINGS OF ASTROPHYSICS

Dr. Joe Tenn, Professor of Physics and Astronomy at Sonoma State University will describe how two couples working in their private observatories began the study of the composition of stars.

25 NOV 1985 LIFE IN THE UNIVERSE

Dr. John Billingham, Chief of Life Sciences Division at the NASA-AMES Research Center will describe biological evolution in a cosmic and planetary context. He will address the question of extraterrestrial intelligence (ETI) and how to detect it.

10 FEB 1986 EXTREME ULTRAVIOLET ASTRONOMY

Dr. Lynn R. Cominsky of the University of California, Berkeley will discuss the current status of the Extreme Ultraviolet Explorer: science payload, spacecraft, and observing plans.

24 FEB 1986 MICROCOMPUTING IN CHINA

Dr. Richard Karas of Sonoma State University, former director of technical services for ComputerLand China, will discuss users and uses of microcomputers in China and aspects of government policy affecting foreign trade in high technology products.

5 MAR 1986 SUPERFLUID PHYSICS

Dr. Alexander L. Fetter of Stanford University will describe the unusual frictionless properties of helium at very low temperatures.

10 MAR 1986 THE DISCOVERY OF THE W AND Z PARTICLES

Dr. Darrel W. Smith of the University of California, Riverside will describe the experimental discovery of the long-sought intermediate vector bosons at the UA1 experiment at CERN in Geneva, Switzerland.

17 MAR 1986 WHAT DO PHYSICISTS DO, ANYWAY? THE COPERNICAN CASE

Dr. Douglas R. Martin of Sonoma State University will present descriptions of science provided by several philosophers of science and will compare their views with some details of the Copernican Revolution in astronomy.

31 MAR 1986 THE QUEST FOR THE ORIGIN OF THE ELEMENTS

Dr. William A. Fowler of the California Institute of Technology will present an updated version of his 1983 Nobel lecture, discussing fifty years of experimental and theoretical work on the nuclear processes which generate energy in the sun and other stars and which have synthesized the chemical elements in the universe.

7 APR 1986 THE BIOMEDICAL USE OF HEAVY IONS

Dr. William T. Chu of the UC Lawrence Berkeley Laboratory will discuss the use of Bevatron beams for diagnostic imaging and for the treatment of cancer patients.

14 APR 1986 VOYAGER DISCOVERIES AT URANUS

Dr. Jeffrey Cuzzi of NASA Ames Research Center will discuss the recent Voyager encounter with Uranus and describe what has been learned about the planet and its satellites and rings.

21 APR 1986 BIOMEDICAL ENGINEERING CAREER OPPORTUNITIES

Dr. John Oldenburg of California State University, Sacramento will discuss what biomedical engineers do, opportunities in biomedical engineering, and educational paths students may follow to achieve career objectives in the field.

28 APR 1986 HOW MANY ELEMENTS ARE THERE?

Dr. Darleane C. Hoffman of the UC Lawrence Berkeley Laboratory will discuss the discovery of new chemical elements and the problems associated with identifying them when only a few atoms of very short half-life are produced.

5 MAY 1986 HALLEY'S COMET: WHAT HAVE WE LEARNED?

Dr. Hyron Spinrad of the University of California, Berkeley will present results of worldwide observations in many wavelength regions of the 1985-86 visit of Comet Halley to the inner solar system.

12 MAY 1986 MICROCOMPUTER SIMULATIONS

Scott Anderson of Anderson Studies, a Sonoma State University physics graduate and the author of Fantavision, will demonstrate the use of microcomputer animation in physics simulations.

8 SEP 1986 X-RAY MICROSCOPES, TELESCOPES, AND HOLOGRAMS-THE EARLY DAYS

Dr. Albert V. Baez, formerly visiting professor of physics at Stanford University, will present a review of the early experiments in x-ray imaging that have found applications in physics, biology, and astronomy.

15 SEP 1986 CAN COMPUTERS PROMOTE INTUITIVE UNDERSTANDING OF PHYSICS?

Dr. Zvonko Fazarinc of Hewlett-Packard Laboratories and Stanford University will demonstrate some physics teaching modules which he is using to answer the above question.

22 SEP 1986 PHYSICAL OCEANOGRAPHY AND THE ANTARCTIC OCEAN

Dr. Theodore Foster of the University of California, Santa Cruz will discuss the physical processes of bottom water formation.

29 SEP 1986 FROM THE CYCLOTRON TO THE SSC

Dr. J. D. Jackson of the University of California, Berkeley and the SSC Central Design Group will describe how particle physicists have reached the point of needing and being able to construct the proposed Superconducting Supercollider.

6 OCT 1986 EXPLORING THE SOLAR WIND

Dr. Karl Hufbauer, a historian of science at the University of California, Irvine, will describe solar wind

research since Eugene Parker predicted the phenomenon in 1958.

13 OCT 1986 THE CHARGE COUPLED DEVICE

Dr. John Vallerga of the Space Sciences Laboratory of the University of California, Berkeley will explain how CCDs work and how they are used to efficiently detect photons in astronomy and high energy physics.

20 OCT 1986 IRREVERSIBILITY?

Dr. Alexander Pines of the University of California, Berkeley will discuss the notion of irreversibility and some surprising NMR experiments in which systems which have seemingly decayed irreversibly to equilibrium are shown to spontaneously reorder.

27 OCT 1986 GROWING SINGLE CRYSTALS FOR SEMICONDUCTOR DEVICES Dr. Edith Bourret of the UC Lawrence Berkeley Laboratory will discuss different techniques for growth of silicon and gallium arsenide single crystals and how crystal properties are determined.

3 NOV 1986 LECTURE CANCELLED

10 NOV 1986 HOW STARS ARE MADE

Dr. Steven Stahler of NASA Ames Research Center and the University of California, Berkeley will present results of supercomputer simulations of the expanding universe of galaxies.

17 NOV 1986 LARGE SCALE STRUCTURE OF THE UNIVERSE

Dr. Garrett Jernigan of the Space Sciences Laboratory of the University of California, Berkeley will present results of supercomputer simulations of the expanding universe of galaxies.

24 NOV 1986 APPLICATIONS OF LASER SPECTROSCOPY

Dr. Roger M. MacFarlane of IBM Almaden Research Center will discuss how an understanding of the behavior of atoms and molecules in solids can lead to new ways of storing information at ultra-high density.

1 DEC 1986 PROSPECTS FOR THE DETECTION OF DARK MATTER

Dr. Bernard Sadoulet of the University of California, Berkeley will describe attempts using cryogenic detectors to detect previously unseen forms of matter which may fill the universe.

9 FEB 1987 MAGNETISM AND SUPERCONDUCTIVITY

Dr. Oystein Fischer of the University of Geneva and Stanford University will describe experiments in which

superconductivity is induced by a strong magnetic field.

23 FEB 1987 SOLAR OSCILLATIONS AND QUIVERING WIMPS

Dr. John Faulkner of the University of California, Santa Cruz will explain how Weakly Interacting Massive Particles (WIMPs) can help solve the long-standing solar neutrino problem and also fit details of recently observed solar oscillations. [Available on VHS in the SSU library.]

2 MAR 1987 LECTURE CANCELLED

9 MAR 1987 STRINGS

Dr. Leonard Susskind of Stanford University will describe the evolution of the theory that the most fundamental laws of nature describe microscopic string-like objects.

16 MAR 1987 THE PHYSICS OF SUPER-TWIST LCD'S

George Morrow of Intelligent Access will delve into the tough question: Will we ever be able to make lowenergy displays readable?

23 MAR 1987 SPECTROSCOPIC MEASUREMENTS OF COMBUSTION EMISSIONS

Nancy J. Brown of the UC Lawrence Berkeley Laboratory will describe tunable atomic line molecular spectroscopy, a technique based upon the Zeeman effect which has been applied to the measurement of air pollutants and emissions from oil shale retorting.

30 MAR 1987 THE MODERN ANCIENT ART OF WINDMILLS

Louis V. Divone, Director of the Office of Solar Electric Technologies, U.S. Department of Energy, will discuss the evolution of the windmill from early times through the modern wind turbines now in use.

6 APR 1987 SEMICONDUCTOR LASERS FOR SPACE COMMUNICATIONS

Dr. Richard K. DeFreez of Oregon Graduate Center and Portland State University will discuss recent developments in diode laser research that apply to direct satellite-to-satellite communications.

20 APR 1987 LISE MEITNER AND THE INTERPRETATION OF NUCLEAR FISSION

Dr. Patricia Rife of National University and Sonoma State University will trace Meitner's education, assistantship under Panck, and research leading to the discovery of nuclear fission.

27 APR 1987 THE MICROCHANNEL PLATE IMAGING DETECTOR SYSTEM

Dr. Oswald Siegmund of the Space Sciences Laboratory of the University of California, Berkeley will discuss types of microchannel plate photon counting imaging detectors for use in visible, ultraviolet, and x-ray astronomy.

4 MAY 1987 THE QUANTUM HALL EFFECT

Dr. Robert B. Laughlin of Stanford University and Lawrence Livermore National Laboratory will discuss the significance and review the history of this revolutionary discovery in solid state physics.

11 MAY 1987 HAVE YOU SEEN THE BIG BANG LATELY?

Distinguished University Professor Edward R. Harrison of the University of Massachusetts, Amherst will explore the intricacies of modern cosmology from a scientific and philosophical viewpoint.

14 SEP 1987 EXTREME AND FAR ULTRAVIOLET AERONOMY

Dr. Supriya Chakrabarti, a Senior Fellow at the UC Berkeley Space Sciences Laboratory, will review recent experimental and theoretical results in this newest branch of solar-terrestrial physics, which describes the interaction of the sun on the earth's atmosphere.

21 SEP 1987 HOLOGRAPHY: LIGHT WAVES AREN'T HEAVY

Steve McGrew of Light Impressions, Inc. in Santa Cruz, CA will discuss holography, current commercial applications and the future of this rapidly growing technology.

28 SEP 1987 QUASARS AND ACTIVE GALACTIC NUCLEI: PAST AND PRESENT

Dr. Herman Marshall of the Space Sciences Laboratory and the University of California, Berkeley, will describe quasar searches employing optical and X-ray telescopes which test theories of quasar energy supplies.

5 OCT 1987 IRREGULARITIES IN THE EXPANSION OF THE UNIVERSE

Dr. Sandra M. Faber of the Lick Observatory and the University of California, Santa Cruz will describe evidence that a large volume of the universe around our galaxy is moving rapidly sideways with respect to the local cosmic rest frame—an unexpected result that means the universe is much lumpier on large scales than previously thought. [Available on VHS in the SSU library.]

12 OCT 1987 MAGNETIC RESONANCE IMAGING: PHYSICS AT WORK FOR MEDICINE

Dr. Cherrill Spencer of Resonex, Inc. in Sunnyvale CA will describe the Magnetic Resonance Imaging technique which produces images of the insides of the human body without the dangers inherent in X-ray scans.

19 OCT 1987 THE GREAT RED SPOT OF JUPITER

Dr. Philip Marcus of the Department of Mechanical Engineering, University of California, Berkeley will explain everything you ever wanted to know about the red spot of Jupiter. He will describe a numerical model of the Jovian atmosphere which can account for the size, shape and location of the spot, as well as its interaction with other planetary features.

26 OCT 1987 HISTORICAL ANALYSES BY PARTICLE INDUCED X-RAY EMISSION (PIXE)

Dr. Bruce Kusko of the Crocker Nuclear Laboratory, University of California, Davis will describe the use of the PIXE technique for the elemental analysis of the papers, parchment and inks of historical documents such as the Gutenberg Bible, controversial Vinland Map and the Calov Bible owned by Johann Sebastian Bach. This technique has been used to solve historical and bibliographical issues.

2 NOV 1987 LONG PERIOD SUPERLATTICES IN BINARY ALLOYS

Dr. Joseph Kulik of Lawrence Berkeley Laboratory and the University of California, Berkeley will discuss modulated, ordered structures with wavelengths as large as 70 angstroms in FCC binary alloy systems. He has used high resolution electron microscopy and electron diffraction to study the atomic configuration of the alloys Ag-Mg and Cu-Pd.

9 NOV 1987 EXPLORING THE INVISIBLE UNIVERSE

Dr. George A. Seielstad, Assistant Director of the National Radio Astronomy Observatory in Green Bank, West Virginia, will comment on current significant areas of research in radio astronomy. He will also describe the operation of the NRAO and discuss the physical principles important in the interpretation of radio data. [Available on VHS in the SSU library.]

16 NOV 1987 RECENT PROGRESS IN X-RAY LASERS

Dr. Richard A. London of the Lawrence Livermore National Laboratory will discuss X-ray laser research in which the Nova high-powered optical laser is used to induce controlled X-ray lasing. This new technique was recently developed at LLNL.

23 NOV 1987 ADVANCES IN HIGH TEMPERATURE CERAMIC SUPERCONDUCTOR SYNTHESIS

Mr. Storrs Hoen, Physics Graduate Assistant at the Department of Physics, University of California, Berkeley, will discuss experiments with the synthesis and characterization of ceramic semiconductors at temperatures higher than 100 degrees Kelvin. [Available on VHS in the SSU library.]

30 NOV 1987 AMORPHOUS SILICON

Dr. William Imler, of the Hewlett Packard Corporation will discuss recent advances in the production of amorphous silicon using the technique of Laser Induced Chemical Vapor Deposition. Amorphous Silicon may someday be able to significantly reduce the price of solar power cells.

8 FEB 1988 MADELUNG, EWALD, AND 1-2-3

Senior physics student Kenneth A. Ritley of Sonoma State University will describe his summer research at Oak Ridge National Laboratory where he computed the Madelung energy of one of the new high-temperature ceramic superconductors.

22 FEB 1988 THE HUMAN VISUAL SYSTEM: SHOULD YOU BELIEVE WHAT YOU SEE?

Dr. Donald A. Glaser of the University of California, Berkeley will summarize what is known about the wiring diagram of the human visual system and give some examples of its impressive performance and equally impressive failures in the form of optical illusions. Professor Glaser was awarded the Nobel prize in physics in 1960. [Available on VHS in the SSU library.]

29 FEB 1988 IN QUEST OF THE FREE QUARK

Dr. Roger Bland of San Francisco State University will describe a series of experiments aimed at isolating single fractionally charged particles. Professor Bland received the American Physical Society Award for Research at an Undergraduate Institution in 1987.

7 MAR 1988 GIANT LUMINOUS ARCS AS GRAVITATIONAL MIRAGES

Dr. Vahé Petrosian of Stanford University will describe the discovery of giant luminous arcs and clusters of galaxies and the subsequent studies which show clearly for the first time that they are indeed mirages, images of distant galaxies gravitationally stretched into perfect circular arcs. [Available on VHS in the SSU library.]

14 MAR 1988 FRONTIERS IN PARTICLE PHYSICS

Dr. Ling-Lie Chau of the University of California, Davis will give an overview of such current problems as the physics of particles with charm and beauty, CP non-invariance, and attempts to unify all forces in a single theory. [Available on VHS in the SSU library.]

21 MAR 1988 PROBLEMS IN ROBOT DESIGN

Dr. Robert E. Steele of Motion Engineering, Santa Barbara, will discuss the uses of physics in designing robotic systems for manufacturing integrated circuits. Dr. Steele is a Sonoma State University physics graduate.

4 APR 1988 LICK OBSERVATORY: THE FIRST CENTURY

Dr. Donald E. Osterbrock of the Lick Observatory, University of California, Santa Cruz will describe the history of America's first big science research institution. Dr. Osterbrock is a former director of the Lick Observatory and president-elect of the American Astronomical Society.

11 APR 1988 CEPHEIDS ARE NOT JUST STANDARD CANDLES

Dr. Gordon G. Spear of Sonoma State University will describe the use of classical pulsating variable stars as probes of the structure and evolutionary status of stars in advanced stages of evolution and will explain how he uses Cepheids as probes of the chemical history of nearby galaxies.

18 APR 1988 EXPERIMENTAL SEARCH FOR A FIFTH FORCE

Dr. Paul E. Boynton of the University of Washington will discuss current experiments to test the possibility of

an intermediate-range, composition-dependent, fundamental force weaker than gravity. [Available on VHS in the SSU library.]

25 APR 1988 PHYSICS FIRST

Paul Robinson of Edison-Computech High School, Fresno, California's 1987 Presidential Awardee for Excellence in Science Teaching, will explain why he believes high school students should study physics before chemistry and biology. Mr. Robinson is California's 1987 Presidential Awardee for Excellence in Science Teaching.

2 MAY 1988 NEGATIVE CAPACITANCE?

Dr. Saeid Rahimi of Sonoma State University will present and discuss the results of experiments which reveal negative differential capacitance in the semiconductors gallium arsenide, silicon and germanium.

9 MAY 1988 SCIENCE AND TECHNOLOGY OF HIGH TEMPERATURE SUPERCONDUCTORS

Dr. Aharon Kapitulnik of Stanford University will discuss recent developments in the production of thin superconducting films and the analysis of their physical properties.

19 SEP 1988 COSMIC STRINGS AND LARGE SCALE STRUCTURES IN THE UNIVERSE

Dr. François Bouchet of the University of California at Berkeley and l'Institut d'Astrophysique de Paris will discuss recent developments in cosmic string theory and applications to understanding anisotropies in the universal microwave background.

26 SEP 1988 HOW MUSCLE WORKS

Dr. Manuel F. Morales of the University of California at San Francisco will describe research on the molecular mechanism of muscle contraction.

3 OCT 1988 BUILDING SCIENCE EXHIBITS FOR THE PUBLIC

Dr. Paul Doherty of the Exploratorium will explain how to teach physics painlessly with hands-on exhibits.

10 OCT 1988 MASS LOSS AND PHOTOSPHERIC ACTIVITY IN HOT STARS

Dr. Geraldine J. Peters of the University of Southern California will discuss new ultraviolet observations from the International Ultraviolet Explorer and other satellites which reveal hitherto unknown winds and variability in early-type stars.

17 OCT 1988 HOW LASER BEAMS CHANGE SURFACES

Dr. Frances A. Houle of IBM Almaden Research Center will explain how the unique characteristics of laser radiation affect chemical reactions at solid surfaces, leading to film growth, oxidation, and etching.

24 OCT 1988 TECHNICAL WRITING AS A CAREER

Dr. Lea Mason of PG&E will describe skills needed by technical writers, types of work technical writers do, and how to get more information about opportunities in the field.

31 OCT 1988 MAKING SOLAR CELLS WORK IN SPACE

Dr. James W. Seeser of Optical Coating Laboratory, Inc. will describe some of the problems associated with the use of solar cells in space and how physicists contribute to the solutions.

7 NOV 1988 DC TO DAYLIGHT

Dr. Robert Bray of the Hewlett-Packard Microwave Technology Division will discuss the explosion of lightwave communications and related test instrumentation.

14 NOV 1988 SHEDDING A LITTLE PHYSICS ON ENERGY-EFFICIENT LIGHTING

Dr. Samuel Berman of the Lawrence Berkeley Laboratory will explain that major increases in light source efficiency are possible and show that it takes a broad interdisciplinary team to make them acceptable.

21 NOV 1988 ELECTRON PARAMAGNETIC RESONANCE IN SOLID STATE PHYSICS

Dr. Eicke R. Weber of the University of California at Berkeley will introduce a powerful technique for characterization of semiconductors and high-temperature superconductors

28 NOV 1988 TEN YEARS OF PIONEER VENUS OBSERVATIONS

Dr. Lawrence Colin of the NASA Ames Research Center will describe our current knowledge of the environment of Venus based on U.S. and Soviet spacecraft missions.

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5 DEC 1988 THE FORMATION OF MASSIVE STARS

Dr. William J. Welch of the University of California at Berkeley will describe recent radio observations of dark dust clouds in which massive stars are forming.

6 FEB 1989 EARTHQUAKES AND PHYSICS

Dr. Robert Nason of New Quake Research will discuss earthquakes in California, how earthquakes damage buildings and other topics of audience interest.

13 FEB 1989 IMAGING MOLECULES ON SURFACES BY SCANNING TUNNELING Microscopy

Dr. Shirley Chiang of the IBM Almaden Research Center will show how the scanning tunneling microscope makes real space images of individual atoms and molecules on solid surfaces.

27 FEB 1989 COSMOLOGY, QUANTUM MECHANICS, AND THE NATURE OF TIME

Dr. Elizabeth A. Rauscher of Tecnic Research Laboratories of San Leandro will discuss non-linear evolutionary models of the universe, superstrings and the unification of the four force fields in physics.

6 MAR 1989 THE DISCOVERY OF PLUTO

Dr. Clyde Tombaugh of New Mexico State University will discuss his historic discovery of Pluto, the ninth planet in our solar system. [Available on VHS in the SSU library.]

13 MAR 1989 PROBING THE DYNAMICS OF SPACE TIME: THE SEARCH FOR GRAVITATIONAL RADIATION

Dr. Peter Michelson of Stanford University will describe research on gravitational wave detectors and astrophysical sources that produce gravitational waves.

20 MAR 1989 AURORAS ON THE EARTH AND THE OUTER PLANETS

Dr. Randy Gladstone of the University of California at Berkeley will discuss ultra-violet wavelength observations and physical mechanism that produce auroras in planetary atmospheres.

3 APR 1989 THEORETICAL PHYSICS MEETS EXPERIMENTAL NEUROBIOLOGY

Dr. William Bialek of the University of California at Berkeley will describe the collaborative efforts of physicists and biologists to understand the nervous system, culminating in the recent discovery that humans and animals can perform nearly noiseless processing of important visual signals.

10 APR 1989 RADIO OBSERVATIONS OF THE ATMOSPHERE OF JUPITER

Dr. Imke de Pater of the University of California at Berkeley will discuss her radio observations of Jupiter and how they help to determine the structure of the clouds surrounding the planet.

17 APR 1989 NEUTRON TRANSPORT THROUGH MATERIALS OF INTEREST TO FUSION REACTORS

Dr. Luisa Hansen of the Lawrence Livermore National Laboratory will discuss measurements and calculations designed to test the cross sections, the computer models, and the physical assumptions used in the conceptional design of blankets for fusion reactor.

24 APR 1989 COMPUTER HOLOGRAPHY AND IMAGE RECOGNITION

Dr. Don M. Cottrell of San Diego State University will show how to construct small holograms on a MacIntosh and will discuss computerized image recognition.

1 MAY 1989 SPACE ASTRONOMY – IN PERSON

Dr. Loren Acton of the Lockheed Palo Alto Research Laboratory will describe research in astronomy and show a movie of his experiences using Spacelab 2 on the Space Shuttle Challenger in the summer of 1985.

8 MAY 1989 SOUNDPROOFING FOR SANITY

Dr. Tom Barnebey, Principal Consultant for Sound Solutions Acoustical Consulting Services, and sometime lecturer in physics at Sonoma State University, will discuss methods of soundproofing which help provide livable environments outdoors and within buildings.

15 MAY 1989 THE PARADOX OF PREDICTION

Dr. Rob Shaw, MacArthur Fellow, will discuss the new physics of chaos theory.

18 SEP 1989 EXPLOSIONS IN SPACE

Dr. Kevin Hurley of the University of California at Berkeley will discuss his studies of cosmic gamma ray bursts, one of the outstanding mysteries of modern astrophysics.

25 SEP 1989 A TOUR THROUGH SPACESHIP EARTH

Dr. Raymond Jeanloz of the University of California at Berkeley will describe how to use lasers and diamonds to see what is happening deep inside our planet.

2 OCT 1989 DISCOVERY OF THE OPTICAL PULSAR IN SUPERNOVA 1987A

Dr. Carl Pennypacker of the Lawrence Berkeley Laboratory will describe recent observations of the rotating neutron star inside the Large Magellenic Cloud supernova remnant and will discuss the implications of these unprecedented observations for nuclear physics and astrophysics.

9 OCT 1989 HOW CHILDREN AND THE REST OF US LEARN SCIENCE

Dr. Douglas Martin of Sonoma State University will discuss how our ideas about the world develop from initially naive concepts into those accepted by professional scientists.

16 OCT 1989 PHYSICS OF BRASS MUSICAL INSTRUMENTS

Dr. Brian Holmes of San Jose State University will provide a physical and musical answer to the question, What do horn players do with their right hands anyway?. The lecture will be held in the Student Union Multipurpose Room. [Available on VHS in the SSU library.]

23 OCT 1989 SYNCHROTRON RADIATION - X-RAY BEAMS OF UNPRECEDENTED BRIGHTNESS

Dr. Jay Marx of the Lawrence Berkeley Laboratory will describe how undulator and wiggler magnetic arrays are used to generate powerful X-ray beams which can be used as experimental probes in biological, chemical and physical systems.

30 OCT 1989 THE ARCTIC AND THE ANTARCTIC OZONE EXPERIMENTS

Estelle Condon of the NASA Ames Research Center will present an overview of the airborne experiments conducted in the polar stratospheric regions.

6 NOV 1989 RADIO OBSERVATIONS OF SUPERNOVA REMNANTS

Dr. Robert Becker of the University of California at Davis will describe Very Large Array observations of supernova remnants and how they relate to pulsars.

13 NOV 1989 VISUALIZING MUSIC

Dr. Ronald Pellegrino, president of Electronic Arts Productions and lecturer at Sonoma State University, will demonstrate the use of affordable technology (including the Macintosh) for an audio and visual integration of spectral wavefields.

20 NOV 1989 PARTICLE PHYSICS AT THE STANFORD LINEAR COLLIDER

Dr. Jonathan Dorfan of the Stanford Linear Accelerator will discuss the role of the Linear Collider in particle physics research with specific reference to the Z-zero physics program now underway at the Stanford Linear Accelerator.

27 NOV 1989 FROM HUBBLE TO HUBBLE: A CENTURY OF ASTRONOMY

Dr. Joseph Tenn of Sonoma State University will describe the changes that have occurred in astronomy from 1889, when Edwin Hubble was born, to 1989, when we are preparing for the launch of the Hubble Space Telescope.

4 DEC 1989 DISTORTIONS OF THE COSMIC MICROWAVE BACKGROUND

Dr. Isabel Hawkins of the University of California at Berkeley will discuss how pregalactic stars and fractal dust grains could account for observed distortions in the spectrum of the microwave background.

5 FEB 1990 THREE-DIMENSIONAL DISPLAY AND EVALUATION OF SCIENTIFIC DATA

Dr. Lambertus Hesselink of Stanford University will use stereo slides and video animation to show how recent advances in computer graphics allow improved analysis of complicated fluid flow data sets.

12 FEB 1990 THE SUPERCONDUCTING SUPER COLLIDER

Dr. Robert Cahn of the Lawrence Berkeley Laboratory will discuss the ninety kilometer accelerator under construction in Texas and will explain how this device will be used to answer questions about the fundamental nature of matter.

26 FEB 1990 PURSUING WHISTLERS IN ANTARCTICA

Dr. Robert A. Helliwell of Stanford University will describe the triggering of very low frequency emissions from plasma in the earth's magnetosphere.

5 MAR 1990 DETERMINATION AND CHAOS

Dr. Max Dresden of Stanford University and the Stanford Linear Accelerator Center will discuss relationships between microscopic and macroscopic physics and some curious questions which arise in that connection.

12 MAR 1990 THE FIRST HIGH ENERGY NEUTRINO EXPERIMENT

Dr. Melvin Schwartz of Digital Pathways, Inc. will describe the background and implementation of the experiment in which it was demonstrated that the muon neutrino and the electron neutrino differ. (Dr. Schwartz and his co-workers were awarded the 1988 Nobel prize in physics for this experiment.)

19 MAR 1990 NEPTUNE: EXPLORATION OF THE MOST DISTANT GIANT PLANET

Dr. Heidi Hammel of the Jet Propulsion Laboratory will present an overview of results from the Voyager 2 spacecraft encounter with the Neptune system, describing the planet's atmosphere, satellites, rings, and magnetosphere. [Available on VHS in the SSU library.]

26 MAR 1990 CHALLENGES AND OPPORTUNITIES IN OPTICAL STORAGE

Dr. Edward Engler of the IBM Almaden Research Center will describe the scientific issues that need to be resolved to make this important storage technique a reality and discuss the promise that it holds for the future.

2 APR 1990 GLOBAL CHANGE AND ATMOSPHERIC PERSPECTIVE

Dr. Aslam Khalil of the Oregon Graduate Institute of Science and Technology will describe methods of monitoring and modelling changes in the earth's atmosphere caused by human activities and will discuss how these changes may affect us.

9 APR 1990 SCIENCE AT THE EDGE

Dr. Marjorie Olmstead of the University of California at Berkeley will describe the unique phenomena that occur at semiconductor surfaces and interfaces.

23 APR 1990 SUPERNOVA 1987A: COSMIC FIREWORKS

Dr. Alex Filippenko of the University of California at Berkeley will discuss the brightest supernova seen in nearly 400 years and the many ways in which it has influenced our understanding of stellar death, nucleosynthesis, and the formation of neutron stars.

30 APR 1990 CRYSTAL GROWTH IN SPACE; HIGH TECH RESEARCH IN A TEST Tube

Dr. Heinz K. Henisch of Pennsylvania State University will present an overview of crystal growth by diffusion, as observed in the laboratory and in the mind of his trusty computer. (Prof. Henisch will also speak at noon in the Art Building, Room 108, on the beginnings of photography.)

7 MAY 1990 OBSERVATIONAL COSMOLOGY WITH COBE

Dr. George Smoot of the Lawrence Berkeley Laboratory will present maps of the early universe obtained since

the November 18, 1989, launch of the Cosmic Background Explorer satellite.

10 SEP 1990 WHAT HAPPENS NEAR ABSOLUTE ZERO?

Dr. Douglas Osheroff of Stanford University will describe current research in the properties of helium three near absolute zero, including superfluidity and nuclear antiferromagnetism.

17 SEP 1990 QUANTUM REALITY

Dr. Nick Herbert, author of *Quantum Reality* and *Faster than Light*, will discuss one of the skeletons in the closet of physics.

24 SEP 1990 THE SUN, STARS, AND CLIMATE: WHY LOUIS XIV HAD COLD FEET

Dr. Sallie Baliunas of the Harvard-Smithsonian Center for Astrophysics will discuss work at Mt. Wilson Observatory on starspot cycles and what they tell us about the sun's impact on climate change.

1 OCT 1990 ION SOURCERY, MATERIALS, AND DIAMONDS

Dr. Ian Brown of the Lawrence Berkeley Laboratory will describe a program to develop superhard materials using ion source and plasma techniques.

8 OCT 1990 OBSERVATIONS OF YOUNG SUNS WITH PROTOPLANETARY DISKS

Dr. Gibor Basri of the University of California at Berkeley will describe observations of newly forming sunlike stars and the discovery that many of them are surrounded by vast disks of dust and gas out of which planets could form.

15 OCT 1990 RELATIVISTIC TRAVEL TO THE STARS

Dr. Art Huffman of the University of California, Los Angeles will discuss using relativistic time dilation to shorten interstellar travel time, construction of Star Trek-type transporters, space warps, and time warps.

22 OCT 1990 SCIENTIFIC COMPUTATION: THE THIRD WAY

Dr. Robert Borchers of Lawrence Livermore National Laboratory will describe how computation has joined theory and experiment as an additional methodology for scientific research.

29 OCT 1990 BINARY X-RAY PULSARS

Dr. Lynn Cominsky of Sonoma State University will give an overview of our current understanding of binary systems containing highly magnetized X-ray emitting neutron stars, with specific emphasis on the recent work at SSU.

5 NOV 1990 ARE STARS OLDER THAN THE UNIVERSE?

Dr. Edwin Salpeter of Cornell University will describe the cosmological controversy over the rate of expansion of the universe and discuss the implications of dark matter.

12 NOV 1990 ENERGY EFFICIENCY IN BOMBAY

Dr. Ashok Gadgil of the Lawrence Berkeley Laboratory will discuss one approach toward reducing global warming.

19 NOV 1990 ORGANIC PHOTO RECEPTORS

Dr. Geoff Owen of Flex Products, Santa Rosa, will describe the basic elements of electrophotography and review recent advances made in the development of organic photo receptors for photocopier and laser printer applications.

26 NOV 1990 SURFACES ILLUMINATED BY LIGHT

Dr. Yuen-Ron Shen of the University of California at Berkeley will discuss how nonlinear optical techniques can be used to explore many new areas of research in surface science.

3 DEC 1990 THE PHYSICS OF BEAUTY

Dr. Natalie Roe of the Lawrence Berkeley Laboratory will present an overview of research into the nature of the beauty quark and will discuss some of the measurements which could be made at a beauty factory.

11 FEB 1991 SUPERNOVA EXPLOSIONS AND INTERSTELLAR CLOUDS

Dr. Richard I. Klein of the University of California, Berkeley, and the Lawrence Livermore National Laboratory will discuss how novel approaches to hydrodynamics on supercomputers allow us to understand the physics of blasted clouds in galaxies, the final fate of the clouds, and the radio hot spots observed in supernova remnants.

25 FEB 1991 THE SEARCH FOR DARK MATTER IN OUR GALAXY

Dr. Charles Alcock of the Lawrence Livermore National Laboratory will discuss the evidence that 90% of our galaxy is invisible to astronomers, and will describe the search for this dark matter that he and his collaborators have started. [Available on VHS in the SSU library.]

4 MAR 1991 TESTING ACTION AT A DISTANCE IN QUANTUM MECHANICS

Dr. Raymond Y. Chiao of the University of California, Berkeley, will discuss how new geometrical and topological aspects of optics reveal non-local aspects of quantum mechanics.

11 MAR 1991 NEARBY STARS WITH CIRCUMSTELLAR MATERIAL

Dr. Dana Backman of the NASA Ames Research Center will discuss infrared observations made with space and ground-based telescopes that yield indirect evidence of planetary formation.

18 MAR 1991 MORE HEAT THAN LIGHT

Dr. Helen V. Gourley of the System Sciences Group, San Francisco, will discuss why you should call a physicist when your optical system begins to smoke, smolder and sizzle.

25 MAR 1991 THE BEGINNING AND THE END OF TIME

Dr. Joel Primack of the University of California, Santa Cruz, will explain how the universe might have begun, what might have come before, and how it might end. [Available on VHS in the SSU library.]

8 APR 1991 HIGH RESOLUTION IMAGING FROM THE GROUND

Dr. Carol Christian of the University of California, Berkeley, will discuss current instrumentation and techniques for obtaining sharper astronomical images.

15 APR 1991 IS PHYSICS A RELIGION?

Dr. Lewis Carroll Epstein of the City College of San Francisco will discuss a question often contemplated in private but seldom discussed in public.

22 APR 1991 COMPARISON OF ENERGETIC THIN FILM DEPOSITION PROCESSES

Dr. Bryant Hichwa of Optical Coating Laboratory, Inc., Santa Rosa, will describe how Rutherford backscattering experiments can be used to determine the density and composition of thin films. [Available on VHS in the SSU library.]

29 APR 1991 X-RAY DIFFRACTION AT SSU

Dr. John Dunning of Sonoma State University will present insights gained during the first eight months of operation of the new Rigaku X-ray diffractometer and explain why X-ray diffraction is the analytic technique of choice for many crystalline materials.

6 MAY 1991 DO TRANSISTORS CONSERVE CHARGE?

Dr. David E. Root of Hewlett-Packard, Santa Rosa, will discuss the controversy involving conservation laws and the implications of symmetry for modeling the nonlinear behavior of microwave transistors.

13 MAY 1991 WHAT WE TEACH AND WHAT IS LEARNED-CLOSING THE GAP

Dr. Lillian McDermott of the University of Washington will describe some recent investigations of student difficulties in physics and will discuss how the results can be used to guide instruction. [Available on VHS in the SSII library]

the SSU library.]

16 SEP 1991 NEUTRINO PHYSICS AND ASTRONOMY

Dr. Eric Norman of the Lawrence Berkeley Laboratory will discuss research on Nature's most elusive and enigmatic particles, neutrinos, and will describe recent experiments which indicate neutrinos may be much heavier than previously thought.

23 SEP 1991 WHY DOES LIGHT SLOW DOWN IN MATTER?

Dr. Mary James of Reed College will explain the interaction of light and matter which results in reflection, transmission, and a reduction in the velocity of light.

30 SEP 1991 VERY-LONG-BASELINE INFRARED INTERFEROMETRY

Dr. William Danchi of the University of California at Berkeley will describe the recently developed Infrared Spatial Interferometer, and will discuss dust formation around stars and how atmospheric fluctuations affect the design of large ground-based telescopes.

7 OCT 1991 DETECTING CELESTIAL 21-CENTIMETER RADIO EMISSION

Bruce Erickson of Hewlett Packard, Rohnert Park, will discuss the theory and design of the integrating receiver in use at Sonoma State University.

14 OCT 1991 THE 21-CENTIMETER RADIO SKY

Dr. Carl Heiles of the University of California at Berkeley will discuss radio observations of the 21-cm line of neutral hydrogen and their relation to the general physics of the interstellar medium and to galactic evolution.

21 OCT 1991 STATISTICAL MECHANICS AND PROTEIN FOLDING

Dr. Hue Sun Chan of the University of California, San Francisco will describe simple physical models for the self-assembly of biomolecules.

28 OCT 1991 WHAT BOUNCING NEUTRONS CAN REVEAL ABOUT POLYMER SYSTEMS

Dr. Anne Mayes of the IBM Almaden Research Center will discuss neutron reflectivity studies of phaseseparating polymers.

4 NOV 1991 THE SONOMA STATE UNIVERSITY VERY SMALL ARRAY

Greg Sprehn of Sonoma State University will discuss the history and present the most recent observations with the radio interferometer on the roof of Darwin Hall.

11 NOV 1991 OPERATORS AND ENGINEERS: TWO VIEWS OF NUCLEAR POWER PLANT OPERATIONS

Dr. Gene Rochlin and Ms. Alexandra Suchard will discuss methods and results of social and organizational research on complex, highly technical organizations faced with the dilemma of delivering efficient services while maintaining high levels of performance and public safety.

18 NOV 1991 LECTURE CANCELLED

20 110 1 1771	Dr. Sam Greene of Sonoma State University will discuss LabView—a computer program that uses virtual instruments for digital equipment control, data collection and data analysis—and its use in recent experiments in the Lasers and Holography Laboratory.
2 DEC 1991	STALKING THE WILY HACKER
	Dr. Cliff Stoll, author of <i>The Cuckoo's Egg</i> , will tell the true story of how a 75-cent accounting error led him to track down a German computer programmer spying for the Soviets.
10 FEB 1992	POKING THE PAST WITH POWERFUL TELESCOPES
	Dr. David C. Koo of the Lick Observatory, University of California, Santa Cruz, will explore some current paradoxes on the number, nature, and large-scale distribution of galaxies at distances of billions of light years.
24 FEB 1992	FUSION: PHYSICS, PROGRESS, AND PROMISES
	Dr. Don Correll of the Lawrence Livermore National Laboratory will describe the physics of fusion research, recent progress toward achieving net fusion energy, and the promises from the fusion research community.
2 MAR 1992	SCIENTIFIC RESULTS FROM THE HUBBLE SPACE TELESCOPE WIDE-FIELD PLANETARY CAMERA
0 M + D 1000	Dr. Sandra M. Faber of the Lick Observatory, University of California, Santa Cruz, will discuss the optical problems of the HST, methods for circumventing them, and recent observations of galaxies.
9 MAR 1992	RADIOISOTOPE PRODUCTION FOR POSITIRON EMISSION TOMOGRAPHY
	Allyson Bishop of the University of California, Los Angeles will discuss some interesting medical applications of nuclear physics.
16 MAR 1992	ART AND PHYSICS: PARALLEL VISIONS OF SPACE, TIME, AND LIGHT
	Dr. Leonard Shlain, surgeon and author of <i>Art and Physics</i> , will discuss the integration of modern art and twentieth century physics.
23 MAR 1992	THE HUNT FOR IRAQI NUCLEAR WEAPONS
	Dr. Jay C. Davis of the Lawrence Livermore National Laboratory will discuss the political and technical aspects of the United Nations inspections of Iraqi nuclear facilities.
30 MAR 1992	PHYSICS AND CONGRESS: LOOKING AT SDI, TERRORISTS, AND OTHER SPECIES
	Dr. Anthony Fainberg of the U.S. Office of Technology Assessment and Stanford University will discuss some issues he has worked on as an advisor to Congress on technical matters.
6 APR 1992	THE BIG PROMISE IN SMALL SYSTEMS
20 A DD 1002	Dr. Richard S. Muller of the University of California, Berkeley will describe how micromechanics can team with microelectronics to bring about a new era of integrated microsystems.
20 APK 1992	A SELF-REPRODUCING UNIVERSE
	according to the inflationary theory.
27 APR 1992	PHYSICS APPLICATIONS OF QUANTUM WELL OPTOELECTRONICS
	Dr. Daniel S. Chemla of the University of California at Berkeley and the Lawrence Berkeley Laboratory will present recent investigations of semiconductor quantum well structures and their applications to novel optoelectronics devices.
4 MAY 1992	NEUTRONS AT LOS ALAMOS IN THE NINETIES
	Dr. John R. Dunning of Sonoma State University will describe the production of neutrons, diffraction from stressed metals, and small-angle scattering from thin films.
11 MAY 1992	DETECTING EXPLOSIVES WITH NUCLEAR PHYSICS
	Dr. Peter Ryge of Science Applications International Corp. will discuss techniques for detecting contraband in airline baggage using prompt gamma neutron activation analysis.
14 SEP 1992	AEROGELS: THE WORLD'S LIGHTEST SOLIDS
	Thomas M. Tillotson of Lawrence Livermore National Laboratory will discuss the synthesis, characterization, properties, and applications of some remarkable materials.
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21 SEP 1992 SEEING THE UNIVERSE THROUGH INFRARED GLASSES

Ben Owen of Sonoma State University will describe the discovery of large numbers of new variable stars and other objects while cataloging and analyzing data from the Infrared Astronomy Satellite (*IRAS*).

28 SEP 1992 COMETS DISGUISED AS ASTEROIDS

Dr. Jane Luu of the University of California at Berkeley will describe how comets can evolve to appear asteroidal and how these comets might be identified.

5 OCT 1992 PERMAFROST AND CLIMATE CHANGE

Francis Moraes ('90) of the Oregon Graduate Institute will discuss climate models and how changes in the permafrost region can tell us about past and future climate changes.

12 OCT 1992 NEW DIAMOND SCIENCE

Dr. Maurice Landstrass of Crystallume Engineered Diamond Products will describe recent advances in the art and science of diamond growth and discuss the applications of this new technology.

19 OCT 1992 OBSERVING ATOMS AND MOLECULES WITH POWERFUL NEW MICROSCOPES

Dr. Miquel Salmeron of the Lawrence Berkeley Laboratory will describe observation and manipulation of atoms, small molecules, and large biological structures (DNA and viruses) with scanning tunneling and atomic force microscopes.

26 OCT 1992 DOLPHINS, SOUND, AND SUPERCOMPUTERS

James Aroyan ('87) of the University of California, Santa Cruz, will discuss the biophysics of dolphin echolocation and the numerical simulation of echolocation beam formation.

2 NOV 1992 THE EXTREME ULTRAVIOLET SKY

Dr. Isabel Hawkins of the University of California at Berkeley will present early results from the all-sky survey being carried out by the Extreme Ultraviolet Explorer satellite.

9 NOV 1992 MICROMACHINING, SILICON STRUCTURES, AND SENSORS

Dr. Patricia Ann Beck of Hewlett-Packard Co. will discuss the use of silicon's mechanical properties as well as its electrical ones in fabricating microchip sensors.

16 NOV 1992 THE THEORY OF IDEAL METALS

Dr. Herbert B. Shore of San Diego State University will show how simple electron gas models provide a basis for understanding these properties universal properties that all metals have in common.

23 NOV 1992 THERMOACOUSTIC REFRIGERATION

Dr. Thomas J. Hofler of the Naval Postgraduate School will discuss a totally new kind of refrigerator that runs on sound waves.

30 NOV 1992 ENERGETIC JETS AND OUTFLOWS FROM YOUNG STARS

Dr. Steven Stahler of the University of California at Berkeley and NASA Ames Research Center will discuss how radio and optical astronomy have revealed hot jets streaming from young stars still forming out of dense interstellar clouds.

7 DEC 1992 A COMPLETE MOTION LABORATORY ON A COMPUTER

Gregory Baszucki of Knowledge Revolution will demonstrate Interactive Physics II, a complete and easy to use physics simulation laboratory.

8 FEB 1993 SO MANY GALAXIES, SO LITTLE TIME

Dr. John Huchra of the Harvard-Smithsonian Center for Astrophysics will discuss galaxy red shift surveys, maps of the nearby universe and their consequences for cosmology.

22 FEB 1993 CRYSTAL ACOUSTIC DETECTORS AND SEARCHES FOR DARK MATTER

Dr. Barbara Neuhauser of San Francisco State University will discuss a new kind of elementary particle detector which senses sound waves rather than electricity.

1 MAR 1993 PULSAR SHOCK WAVES

Dr. Roger Romani of Stanford University will show how observations of pulsars interacting with their environment provide a new probe of these spinning neutron stars.

8 MAR 1993 THE ENVIRONMENTAL LEGACY OF THE NUCLEAR ARMS RACE

Scott Saleska of the University of California at Berkeley and the Institute for Energy and Environmental Research in Washington, D. C. will describe some of the hazards remaining in the U. S. and the former Soviet Union resulting from the production of nuclear weapons.

15 MAR 1993 THE STATUS OF SEARCHES FOR EXTRA-SOLAR PLANETS

Dr. Geoff Marcy of San Francisco State University and the University of California at Berkeley will review the many efforts currently underway to detect other solar systems, along with suggestive evidence of their formation around young stars.

22 MAR 1993 MODERN LINEAR ACCELERATORS AND THE BUSINESS OF PHYSICS

Drs. Robert and Marianne Hamm of AccSys Technology, Inc. will describe the company they founded (with two other physicists), and the radio-frequency ion linear accelerators they are building for several physics applications, including the Superconducting Super Collider.

29 MAR 1993 GLOBAL CHANGE AND THE DARK OF THE MOON

Dr. Steven E. Koonin of the California Institute of Technology will discuss how changes in the Earth's climate system can be monitored by observing the ghostly glow of the face of the moon.

5 APR 1993 POSITRONIUM ON THE LIGHT CONE

Dr. Ovid Jacob of the Stanford Linear Accelerator Center and Sonoma State University will discuss a new way to solve for the mass of strongly interacting systems of elementary particles.

19 APR 1993 ULTRA-VIOLET AND SOFT X-RAY DIAGNOSTICS OF CATACLYSMIC VARIABLES

Dr. Christopher Mauche of the Laboratory for Experimental Astrophysics at the Lawrence Livermore National Laboratory will discuss observations of the winds and disks in interacting white dwarf binary systems.

26 APR 1993 QUANTUM CONDENSATION THEORY OF SUPERCONDUCTIVITY

Dr. Mario Rabinowitz of the Electric Power Research Institute will present the world's simplest and most general theory of superconductivity.

3 MAY 1993 COMPACT DISCS: WHAT IT TAKES TO BE ERASABLE

Dr. Carmen Ortiz of the IBM Almaden Research Center will discuss the future of compact discs and other optical storage applications.

10 MAY 1993 RADIATION THERAPY IN THREE DIMENSIONS

Dr. Lynn Verhey of the University of California at San Francisco will discuss an array of new technologies in medical physics which can be used to plan, implement and verify three dimensional radiation dose distributions in cancer patients.

13 SEP 1993 ALBERT EINSTEIN: HOW I SEE THE WORLD

Actor William Hurt narrates this insightful video on the physicist who developed the theories of special and general relativity, Brownian motion, the photoelectric effect, and much more.

20 SEP 1993 TRANSPORTATION AND ITS LINKS TO ENERGY AND THE ENVIRONMENT

Senior transportation analyst Deborah Gordon of the Union of Concerned Scientists will discuss the role transportation plays in the environment and will review innovative policy-making efforts underway.

27 SEP 1993 SPECTROSCOPIC DETERMINATIONS OF STELLAR LUMINOSITIES

Dr. Dorrit Hoffleit of Yale University will discuss the history of the discovery of luminosity criteria in stellar spectra and their application to stellar distance determinations.

4 OCT 1993 MODELING THE EARTH'S DEEP INTERIOR

Dr. Louise Kellogg of the University of California at Davis will describe how recent computer simulations reveal the dynamics and structure of the Earth's mantle.

11 OCT 1993 TEN FEMTOSECOND LASER PULSES AND THE FIRST STEP IN VISION

Dr. Robert W. Schoenlein of the Lawrence Berkeley Laboratory will discuss techniques for producing laser pulses of only a few optical cycles in duration, and the use of these pulses to study such ultrafast events as the first step in vision.

18 OCT 1993 INTERVENTIONAL MRI: TOWARDS MINIMALLY INVASIVE SURGERY

Dr. Keyvan Farahani ('85) of the University of California, Los Angeles will discuss current applications of magnetic resonance imaging in guidance and monitoring of minimally invasive tumor therapy.

25 OCT 1993 GOD PLAYS DICE: A PHYSICAL DEMONSTRATION

Dr. Marvin Chester of the University of California, Los Angeles will discuss and illustrate the quantum theory result that nature herself doesn't know her own course of action; she is the victim of chance.

1 NOV 1993 LARGE AREA AMORPHOUS SILICON TECHNOLOGY

Dr. Warren B. Jackson of Xerox Palo Alto Research Center will discuss present and future applications of large area electronic technology for displays, printing, imaging, and neural processing.

8 NOV 1993 LASER GUIDE STARS AND ADAPTIVE OPTICS FOR ASTRONOMY

Dr. Claire E. Max of the Lawrence Livermore National Laboratory will describe techniques for greatly improving the angular resolution of ground-based astronomical telescopes by removing the blurring due to turbulence in the Earth's atmosphere.

15 NOV 1993 LIGHTWAVE TECHNOLOGY

Dr. Waguih Ishak of Hewlett-Packard Laboratories will describe recent advances in photonics, devices, and subsystems for optoelectronic and lightwave communication.

22 NOV 1993 THE EXTREME ULTRAVIOLET: A NEW WINDOW ON THE UNIVERSE

Dr. Roger F. Malina of the University of California at Berkeley will describe some of the discoveries made by NASA's Extreme Ultraviolet Explorer satellite, including extremely hot white dwarf stars, hot coronae of relatively cool stars, supernova remnants, and other interstellar gas.

29 NOV 1993 THE OPTICS OF EYEGLASS LENSES

Mary Howland ('86) of Signet Armorlite, Inc. will discuss the design and evaluation of aspheric and progressive lenses, including bifocals without lines.

6 DEC 1993 ROBOTS FOR PEOPLE WITH SEVERE IMPAIRMENT

Dr. Larry Leifer of the Stanford University Center for Design Research will review the issues and demonstrate the use of robotics technology in assistive devices that help persons with severe physical disabilities gain a measure of independence.

7 FEB 1994 BUCKMINSTERFULLERENES: SELF-ASSEMBLING GEODESIC SHELLS OF CARBON

Dr. Robert D. Johnson of the IBM Almaden Research Center will discuss the discovery, structure and dynamics of carbon fullerenes and fullerene cages with atoms or metal clusters trapped inside.

14 FEB 1994 ACTIVE STARS IN THE SOLAR NEIGHBORHOOD

Dr. Sallie Baliunas of the Harvard-Smithsonian Center for Astrophysics will describe studies of magnetic activity in sunlike stars—observations which may reveal their ages and the past, present and future of the sun's magnetism and its influence on the earth.

28 FEB 1994 DEEP FOCUS EARTHQUAKES AND THE COMMON COLD

Dr. Keith Brister ('82) of Cornell University will discuss experiments performed at the Cornell High Energy Synchrotron Source, including high pressure geophysics experiments and virus crystallography.

7 MAR 1994 THE OTHER LARGE LASER AT LIVERMORE

Dr. Isaac L. Bass of the Lawrence Livermore National Laboratory will describe the diverse laser technologies used in the Atomic Vapor Laser Isotope Separation program.

14 MAR 1994 THE IONOSPHERE AND THE AURORA

Dan Nottingham ('89) of Boston University will describe his worldwide travels, images of the whole sky, and the significance of stable auroral red arcs.

21 MAR 1994 THE EVOLUTION OF GALAXIES

Dr. Paul Hodge of the University of Washington will describe how recent study of nearby galaxies has revealed a complicated and puzzling pattern of galaxy evolution, which apparently includes episodes of violent gravitational interaction and galaxy mergers.

28 MAR 1994 MIND, MATTER, AND QUANTUM MECHANICS

Dr. Henry P. Stapp of Lawrence Berkeley Laboratory will explain how one can use quantum theory to integrate causally effective conscious thoughts into the brain as described in neurophysiology and physics.

11 APR 1994 SQUID MAGNETOMETRY

Dr. Robin Cantor of Conductus, Inc. will discuss applications of Superconducting Quantum Interference

Devices (SQUIDS) in such magnetic field-sensing applications as biomagnetism, geophysics, and laboratory instrumentation.

18 APR 1994 X-RAY OUTBURSTS FROM NEUTRON STARS IN BINARY SYSTEMS

Mallory Roberts of Sonoma State University will discuss observations of binary star systems in which neutron stars interact with massive main sequence companions.

25 APR 1994 THE TRAVELING SALESMAN, RANDOM NETWORKS, AND THE STRUCTURE OF AMORPHOUS SILICON

Dr. Frederick Wooten of the University of California, Davis/Livermore, will demonstrate the connection between a simple mathematical problem and the characteristics of an important semiconductor material.

2 MAY 1994 ENVIRONMENTAL HEALTH: WHAT IT IS AND ISN'T

Lauren J. Novatne ('89) of the Monterey County Department of Health will describe how the immediate and long-term health and safety of the public and the environment are protected.

9 MAY 1994 DUMAND: A NEW WINDOW ON THE UNIVERSE

Dr. John G. Learned of the University of Hawaii will describe the Deep Underwater Muon and Neutrino Detector, a bold attempt to see the cosmos from the bottom of the sea.[Dr. Hank Crawford of the Lawrence Berkeley Laboratory gave this lecture.]

12 SEP 1994 DARK MATTER, MICROLENSING AND MACHOS

Dr. Kem Cook of the Lawrence Livermore National Laboratory will discuss the evidence that most of the mass of the universe is in a currently undetected form, and will describe the MACHO project, which is attempting to define the dark matter component of our galaxy.

19 SEP 1994 ADVANCED ELECTRICITY TECHNOLOGY: FROM PHYSICS TO COMMERCIALIZATION

Jim Eyer, '83, of the PG&E Research and Development Department will describe how physics is affecting development of selected advanced power technologies, and the value of business acumen for physicists working in today's commercial environment.

26 SEP 1994 HOW TO BE A GOOD ENGINEER

Joseph Wujek of the University of California, Berkeley, will explore some of the ethical issues in engineering and science and furnish some guidance in resolving them.

3 OCT 1994 A PHYSICIST IN AIR POLLUTION RESEARCH

Dr. Walter John, recently retired from the California Department of Health Services, will explain his mid-career change from nuclear physics to the study of airborne particles, and will discuss the technical challenges and rewards in the field of environmental health.

10 OCT 1994 YOUNG PULSARS: GREAT LIGHTHOUSES OF THE UNIVERSE

Ion-Alexis Yadigaroglu of Stanford University will discuss recent advances in understanding the geometry of pulsar emission zones, illustrated by a computer animation of these powerful beams of radiation that sweep out our galaxy.

17 OCT 1994 INERTIAL CONFINEMENT FUSION

Dr. Roger Bangerter of the Lawrence Berkeley Laboratory will discuss recent progress in the use of lasers and accelerators to ignite inertial fusion targets.

24 OCT 1994 COMETS, FREE RADICALS AND LASERS

Dr. William Jackson of the University of California, Davis, will discuss the nature and origin of comets and relate how lasers can be used to confirm different mechanisms for the production of observed free radicals in comets.

31 OCT 1994 STYLES AND PERSONALITIES OF PHYSICISTS

Dr. Max Dresden of the Stanford Linear Accelerator Center will discuss the ways in which personal attitudes and scientific expectations influence the type of physics research, the way that research is carried out and in particular, the way that results are interpreted.

7 NOV 1994 WERE BOHR, FERMI, SZILARD AND OPPENHEIMER REALLY SPIES?

Dr. David Holloway of Stanford University will discuss the recent allegations that Bohr, et al, knowingly passed secret information about the Manhattan Project to the Soviet Union.

14 NOV 1994 THE NUCLEAR BOMB PUMPED X-RAY LASER

Dr. Thomas Ramos of the Lawrence Livermore National Laboratory will discuss the history of the research and the uses for one of the bigger defense projects of the 1980s.

21 NOV 1994 FLASH AND FIRE: COMET COLLIDES WITH JUPITER

Dr. Garrett Jernigan of the University of California, Berkeley will discuss observations of Comet Shoemaker-Levy 9 and Jupiter, illustrated with images from the Keck Observatory in Hawaii.

28 NOV 1994 A BRIEF HISTORY OF TIME

This remarkable film explores the life and theories of physicist Stephen Hawking.

5 DEC 1994 THE STANFORD LINEAR COLLIDER

Dr. Nan Phinney of the Stanford Linear Accelerator Center will describe the challenge of building and operating the first electron-positron linear collider and the recent success in producing a record number of Z particles.

6 FEB 1995 ASTRONOMY AND EMPIRE: THE INCA

Dr. David Dearborn of the Lawrence Livermore National Laboratory will discuss the sky watching practices of the Inca, who considered themselves to be the children of the sun.

13 FEB 1995 MERCEDES' "STUDY-A" – AN ELECTRIC CAR FOR THE FUTURE?

Nickolas Mota Melville ('93) of the University of California, Davis will discuss the development of a dynamic vehicle simulation program used to model power train performance for the Daimler-Benz Study A electric car.

27 FEB 1995 GROWING SUPER-AND SEMI-CONDUCTORS

Dr. Valerie Leppert ('87) of Northwestern University will discuss recent developments in the use of nanosecond pulsed lasers to grow electronic thin films with complex stoichiometry and architecture.

6 MAR 1995 FASCINATION WITH A COLD WORLD

Dr. Douglas Osheroff of Stanford University will recount moments of discovery and challenge in his quest to understand the novel ordered phases of Helium-3 near absolute zero.

13 MAR 1995 PRODUCING AND STUDYING THE ULTIMATE IONS IN A TABLE-TOP DEVICE

Dr. Peter Beiersdofer of the Lawrence Livermore National Laboratory will discuss the production of bare uranium ions in an electron beam ion trap and describe the type of experiments enabled by this ion source.

20 MAR 1995 PROBING THE INTERIOR OF A STAR: HELIOSEISMOLOGY FROM SPACE

Dr. Philip Scherrer of Stanford University will describe the Solar Oscillations Investigation which will examine the Sun's interior as part of the NASA/ESA *SOHO* mission.

27 MAR 1995 A GUIDED TOUR OF CHESS

Dr. Keith Brister ('82) of Cornell University will describe the Cornell High Energy Synchrotron Source (CHESS) facility and will discuss various experiments that use its resulting X-rays.

3 APR 1995 THE ANATOMY OF A HIGH ENERGY PARTICLE DETECTOR

Eric Weiss ('91) of the University of Washington will present an overview of the SLD detector, its subsystems and how they detect and reconstruct particle physics events.

10 APR 1995 RINGS OF FIRE: THERMONUCLEAR COMBUSTION ON NEUTRON STARS

Dr. Lars Bildsten of the University of California, Berkeley will describe the thermonuclear fires that burn freshly accreted matter on neutron star surfaces and relate how the luminosity from this burning is observed.

24 APR 1995 AESTHETICS OF A DISCRETE ELEMENT TORSIONAL TRANSMISSION LINE

Dr. Marvin Chester, Emeritus Professor at UCLA, will demonstrate an activatable sculpture and will explore what its varied and visually captivating response says about nature.

1 MAY 1995 PHYSICS OF THE VIOLIN

Dr. William Atwood of the Stanford Linear Accelerator Center, who has been studying and making violins and violas for over 10 years, will present a physicist's perspective as to what makes great violins.

8 MAY 1995 CLEA-COMPUTERS IN ASTRONOMY EDUCATION

Dr. Mia Luehrmann of Gettysburg College will show how computers can be used to simulate the universe.

11 SEP 1995 AND NOW FOR SOMETHING COMPLETELY DIFFERENT: GRAVITY WAVES

Ben Owen ('93) of the California Institute of Technology will present an overview of gravity wave astronomy.

	emphasizing theoretical issues related to LIGO, the Laser Interferometer Gravitational-wave Observatory
18 SEP 1995	WHAT IS THE DARK MATTER IN THE UNIVERSE?
	Dr. Joel Primack of the University of California, Santa Cruz, will will discuss "Cold" and "Hot" (neutrino) dark
	observations
25 SEP 1995	AN EXERCISE SYSTEM FOR QUADRIPLEGICS
	Dr. Curtis Gleason of the University of California, San Francisco, will describe the hardware and software
	developed at Mt. Zion Hospital to enable quadriplegics to pedal an exercise bicycle with their own paralyzed leg muscles.
2 OCT 1995	PROBING THE GAMMA-RAY SKY
	Dr. Kevin Hurley of the <u>University of California at Berkeley</u> will describe what the universe would look like through gamma ray-colored glasses.
9 OCT 1995	OTHER THINGS A PHYSICIST CAN DO
	Dr. Jay C. Davis of the <u>Lawrence Livermore National Laboratory</u> , a former nuclear physicist who has spent the last decade applying physics tools to problems in climate change, biodosimetry of carcinogens, arms control, and archaeology, will describe his search for new problems.
16 OCT 1995	PREDICTING NEW MATERIALS: ALCHEMY WITH COMPUTERS
	University Professor <u>Marvin L. Cohen</u> of the <u>University of California at Berkeley</u> and the <u>Lawrence Berkeley</u> National Laboratory will describe how physical models, quantum mechanics, and modern computers have
	replaced the alchemists' magic, frogs, and potions and have made it possible to predict such new materials as
	superhard diamonds and nanometer-size tubes.
23 OCT 1995	CONCEPTUAL PHYSICS – LIVE
	Paul Hewitt will give a personal account of what prompted him to write <u><i>Conceptual Physics</i></u> in 1969, its subsequent editions, the making of videos, and his present aspirations with CD-ROM.
30 OCT 1995	THE SILICON CHIP AS A NEW FRONTIER FOR NANOMETER STRUCTURES
	Dr. Calvin F. Quate of <u>Stanford University</u> will discuss the fabrication of nanometer-size structures on silicon wafers, a technology that may continue the computer revolution for many more years.
6 NOV 1995	SIMULATING CHEMICAL PROCESSES IN THIN FILMS
	Dr. Frances Houle of the <u>IBM Almaden Research Center</u> will describe applications of stochastic modelling techniques to the very complex chemical and physical changes which occur during processing of organic and inorganic thin films
13 NOV 1995	COHERENT LASER RADAR APPLICATIONS
1011011000	Dr. Geoffrey A. Wilson ('84) of Coherent Technologies, Inc. will discuss the use of laser radar in remote detection of the motion of atmospheric aerosols and solid objects.
20 NOV 1995	WHAT PHYSICISTS DO WHEN THEY ARE UNEMPLOYED
	Is there life after quantum mechanics? Best-selling author, Internet guru, and yo-yo tyro Cliff Stoll tells all.
27 NOV 1995	FRONTIERS IN PARTICLE PHYSICS
	Dr. Ling-Lie Chau of the University of California, Davis, will present the latest understanding of particles and
	forces.
4 DEC 1995	FROM PHOTONS TO PERCEPTION
	Dr. William Bialek of the <u>NEC Research Institute</u> will explore the mechanism of photon counting and the computations which the brain does to make sense out of noisy visual data.
29 JAN 1996	THE SCIENCE AND TECHNOLOGY OF SMART SWITCHABLE GLASS
	Dr. Carl M. Lampert of the <u>Lawrence Berkeley National Laboratory</u> will describe the applied physics, device construction, and potential applications of <u>electronically switchable glass</u> for use in buildings and vehicles.
5 FEB 1996	THE SOLAR NEUTRINO PROBLEM AND HOW WE KNOW STARS RUN ON NUCLEAR ENERGY; COBE AND HOW WE KNOW THE UNIVERSE WENT THROUGH A BIG BANG; GAMMA RAY BURSTERS AND HOW SOMETIMES WE DON'T KNOW ANYTHING

	Dr. virginia Trimole of the University of California, Irvine, and the University of Maryland will attempt to
12 EED 1004	THE SCIENCE AND ADT OF LASED LICHT SHOWS
12 FED 1990	THE SCIENCE AND ART OF LASER LIGHT SHOWS
	will discuss the physical process of making laser light dance to music
26 FEB 1996	VIRTUAL ENVIRONMENTS AND SCIENTIFIC VISUALIZATION
	Steve Bryson of NASA Ames Research Center will discuss the application of virtual reality techniques to the
	investigation of simulated air flow.
4 MAR 1996	IT'S JUST A BUNCH OF ONES AND ZEROS
	Nancy Kunnari ('90) of National Semiconductor will describe the physics behind testing memory-intensive
	semiconductor products and designing for testability and failure analysis.
11 MAR 1996	PHYSICS AND ASTRONOMY ON THE WORLD WIDE WEB
	Dr. Joseph S. Tenn of Sonoma State University will demonstrate how anyone with a computer and access to the
	Internet can obtain an enormous amount of up-to-date information.
18 MAR 1996	DIELECTRON PRODUCTION IN HEAVY-ION COLLISIONS
	Dr. R. Jefferson Porter ('83) of the <u>Lawrence Berkeley National Laboratory</u> will discuss the use of electron- positron pairs produced in heavy ion collisions as probes into the hot and highly compressed states of nuclear
	matter.
25 MAR 1996	COMMERCIALIZING HOLOGRAPHIC DATA STORAGE: RISKS AND REWARDS
	Dr. Matthew Bashaw of Stanford University will describe how holographic data storage has the potential to
	meet many of our future storage needs and will discuss the technical hurdles which must be resolved to bring it
	to market.
1 APR 1996	HOW NEW MEASURES OF QUASARS AND GALAXIES SUPPORT A CHANGED PICTURE OF
	THE UNIVERSE
	<u>DI. Halton C. Arp</u> of the <u>Max Planck Institute for Astrophysics</u> will show how recent observations from the ROSAT X-ray satellite support an ejection origin for quasars and call into question Big Bang cosmological
	models.
15 APR 1996	PHYSICISTS TAKE ON GLOBAL WARMING
	Dr. David B. Goldstein of the Natural Resources Defense Council will describe what the NRDC and other
	nonprofit and for-profit organizations are doing to improve energy efficiency and encourage use of renewable
00 A DD 1007	energy sources.
22 APR 1996	WRITING ABOUT GLOBAL WARMING AND OTHER SCIENTIFIC TOPICS
	Dr. Barbara G. Levi of <u><i>Physics Today</i></u> will describe some scientific issues with implications for society and ner experiences in reporting on them
29 APR 1996	THE GALILEO PROBE MISSION TO IUPITER
	Dr. Richard E. Young of NASA Ames Research Center will present results from the first entry into the
	atmosphere of an outer planet.
16 SEP 1996	WIRING THE BRAIN - A PHYSICIST LOOKS AT DEVELOPMENT
	Dr. Marla Feller of the University of California, Berkeley will explain how the immature circuitry of the
	developing retina creates the patterns necessary for proper wiring of the adult visual system.
23 SEP 1996	A QUANTUM BROOM SWEEPS CLEAN
	Dr. Bernhard Haisch of the Lockheed Martin Solar and Astrophysics Laboratory will describe a new unified
	theory that suggests that inertia and gravitation may be electromagnetic in origin.
30 SEP 1996	UNVEILING A SUPERNOVA REMNANT
	Dr. James Graham of the University of California, Berkeley will show wide-field X-ray and optical images of
	the Cygnus Loop that illustrate the effects of the blastwave on interstellar clouds.
7 OCT 1996	HANDS ON UNIVERSE
	Dr. Susana Deustua of the E.O. Lawrence Berkeley National Laboratory will describe an interactive astronomy
	program for high school students using automated telescopes.

14 OCT 1996	FINDING THE QUARKS
	Dr. Richard Taylor of <u>Stanford University</u> will describe electron-proton scattering experiments that led to the
A1 OCT 1007	Nobel prize winning demonstration of the existence of quarks.
21 OCT 1996	REVERSALS OF THE EARTH'S MAGNETIC FIELD: A WINDOW INTO THE DEEP INTERIOR
	Dr. Ken Hoffman of <u>California Polytechnic State University</u> , <u>San Luis Obispo</u> will discuss what paleomagnetic records from rocks tell us about the process by which the Earth's north and south magnetic poles exchange positions.
28 OCT 1996	OPTICAL POSITION SENSORS FOR ROBOTS AND OTHER APPLICATIONS
	Dr. Jeffrey Koch of the FANUC Berkeley Laboratory will discuss the physical basis of interferometric position sensors, with particular application to the design and development of industrial machines.
4 NOV 1996	THE PAULI-JUNG DISCUSSION AND QUANTUM REALITY
11 NOV 1996	Dr. Kai Woehler of the <u>United States Naval Postgraduate School</u> will discuss recent findings in quantum mechanics and their implications for the nature of reality in light of the recently published dialogue between the Nobel prize winning physicist <u>Wolfgang Pauli</u> and the psychologist <u>Carl Gustav Jung</u> in the 1930's to 1950's. WEIGHING THE UNIVERSE WITH SUPERNOVAE
11 110 1 1770	Dr. Soul Derlmutter of the E. O. Lewrence Perkeley National Laboratory, will discuss modern techniques that
	are used to measure the expansion of the universe.
18 NOV 1996	AN ADAPTIVE OPTIC
10110 1 1070	Greg Sprehn ('93) of Massie Research Laboratories. Inc. will discuss the design and fabrication of a small
	adaptive optic that would enhance the planet-searching capabilities of the Hubble Space Telescope in a 2002
	upgrade mission.
25 NOV 1996	GETTING TO THE BOTTOM OF A VOLCANO WITH GPS
	Susan Owen of <u>Stanford University</u> will discuss the active fault that lies beneath Hawaii's Kilauea Volcano and how she uses Global Positioning Satellites to characterize both the fault and Kilauea's rift system.
2 DEC 1996	ICE AGES AND THE EARTH'S ORBIT
	Dr. Richard Muller of the University of California at Berkeley will discuss recent findings about the controversial mechanism that may link our climate to astronomy.
3 FEB 1997	WHEN DID PHYSICS BEGIN?
	Dr. C.W. Francis Everitt of <u>Stanford University</u> will discuss some of the surprising results that emerge when one asks this provocative question.
10 FEB 1997	APPLICATIONS OF HIGH TEMPERATURE SUPERCONDUCTIVITY
	Dr. Christine E. Platt of the <u>U.S. Department of Energy</u> will describe recent outstanding successes in the development of high temperature superconductivity applications, including world-record demonstrations of electrical equipment, the continual improvement of wire performance and cost, and others.
24 FEB 1997	THE DISCOVERY OF LIQUID METALLIC HYDROGEN
	Dr. William Nellis of the <u>Lawrence Livermore National Laboratory</u> will describe how he and his colleagues discovered the material believed to make up most of the solar system outside the sun.
3 MAR 1997	BREAKTHROUGH TECHNOLOGY IN SOLID STATE LASERS
	Jason Alexander ('92) of Lightwave Electronics will discuss the latest developments in laser devices and explore the potential impact of these devices on our everyday lives.
10 MAR 1997	SONOLUMINESCENCE: A TABLE-TOP ENIGMA
	Dr. Michael J. Moran of the <u>Lawrence Livermore National Laboratory</u> will describe his work studying sonoluminescence, light generated by an acoustic interaction, which has defied physicists' attempts both to characterize its behavior and to find convincing explanations for its unusual properties.
17 MAR 1997	COMET HALE-BOPP IS UPON US
	Dr. Donald K. Yeomans of the Jet Propulsion Laboratory will discuss why impressive comets like Hale-Bopp have had such an extraordinary impact upon life on Earth.
24 MAR 1997	EINSTEIN'S BIGGEST BLUNDER WASN'T

'hat Physicists Do all	l past presentations	7/24/14, 6:22 PM
	Kevin Krisciunas of the University of Washington will discuss the possibility that completely empty pure vacuum, actually has energy, and that this leads to a repulsive force that will cause the universe forever. [Available on VHS in the SSU library.]	y space, a e to expand
7 APR 1997	THE EVOLUTION OF GALAXIES IN THE DISTANT UNIVERSE	
	Dr. Nicole P. Vogt of the <u>University of California Observatories/Lick Observatory</u> and the <u>University</u> <u>California, Santa Cruz</u> will discuss galaxies recently observed with the <u>Hubble Space Telescope</u> and <u>10-meter telescopes</u> , exploring their evolution back to half the age of the universe. [<u>Available on VI SSU library.</u>]	t <u>y of</u> 1 the <u>Keck</u> <u>HS in the</u>
14 APR 1997	X-RAY MICROSCOPY AND EXTREME ULTRAVIOLET LITHOGRAPHY	
	Dr. David Attwood of the University of California at Berkeley and the Lawrence Berkeley National will discuss new applications of short wavelength electromagnetic radiation.	Laboratory
21 APL 1997	THE PHYSICS OF MAGNETIC RECORDING	
	Dr. Alison Chaiken of <u>Lawrence Livermore National Laboratory</u> will describe how physicists contr design and manufacture of disk drives with ever-increasing storage capacity.	ibute to the
28 APR 1997	EXPLORING JUPITER'S MOONS WITH GALILEO	
	Dr. Jeffrey M. Moore of NASA Ames Research Center will present recent discoveries on the geolog	gy and

surface properties of the Galilean satellites of Jupiter.

SOLAR ENERGY, SUSTAINABILITY, AND THE LAWS OF PHYSICS 5 MAY 1997 Geoffrey Syphers ('93) of Eley Associates will propose a scientific definition for sustainability and will explore resource dynamics in a solar economy.

ATOMIC RESOLUTION MICROSCOPY 8 SEP 1997

Dr. Ronald Gronsky of the University of California at Berkeley and the Lawrence Berkeley National Laboratory will describe how scientists are able to look at the building blocks of matter using modern electron microscopes.

15 SEP 1997 WHAT IS A B FACTORY AND WHAT IS IT GOOD FOR? Dr. Helen Quinn of the Stanford Linear Accelerator Center will describe the new facility under construction at SLAC and what physicists hope to learn with it.

22 SEP 1997 **GLAST: A KEENER EYE FOR THE GAMMA-RAY SKY**

Dr. Lynn R. Cominsky of Sonoma State University will describe plans for the Gamma-ray Large Area Space Telescope, which is being designed to study nature's highest energy particle accelerators.

29 SEP 1997 AN EDUCATION IN PHYSICS: THE TECHNICAL PATH TO CAREER AGILITY

Kimberly Wiefling of Hewlett-Packard Company's Chemical Analysis Group will discuss her experience of the diversity of career opportunities available to those with an education in physics.

6 OCT 1997 **FLYWHEELS AND FLYING CARPETS**

Dr. Richard F. Post of the Lawrence Livermore National Laboratory will describe work on electromechanical batteries and magnetic levitation.

13 OCT 1997 **AMORPHOUS SILICON ELECTRONICS FOR IMAGING AND DISPLAY**

Dr. Robert A. Street of Xerox Palo Alto Research Center will describe how a new material, amorphous silicon, developed from a research curiosity to a ten billion dollar industry.

AN ILLUMINATING DISCUSSION OF THE DISPLAY INDUSTRY 20 OCT 1997

David Lamb ('94) of the University of Alabama in Huntsville will demonstrate efficient means of illuminating common displays such as automobile dashboards and radios using thick optical waveguides.

COMETS, METEORITES, AND THE ORIGIN OF LIFE 27 OCT 1997

Dr. Scott Sandford of NASA Ames Research Center will review the collection of cosmic dust from comets and asteroids, the analysis of meteorites from Antarctica, and NASA's forthcoming mission to retrieve a sample of a comet.

3 NOV 1997 USING MATHEMATICA IN PHYSICS EDUCATION

Dr. Patrick Tam of Humboldt State University, the author of A Physicist's Guide to Mathematica, will discuss the usefulness and pitfalls of Mathematica in learning and teaching physics.

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<u>Dr. Arthur B.C. Walker II</u> of <u>Stanford University</u> will present recent high-resolution images of the <u>solar</u> chromosphere and corona and discuss efforts to understand their anomalously high temperatures.

17 NOV 1997 <u>NEW CHEAP AND EFFICIENT FUEL CELLS</u>

Dr. Steven J. Visco of the <u>Lawrence Berkeley National Laboratory</u> will discuss the development of thin ceramic membranes for fuel cells and oxygen generation technologies.

24 NOV 1997 EARTH INVADES MARS! DETAILS AT 11:00

<u>Dr. Mark Adler</u> of the <u>Jet Propulsion Laboratory</u> will lay out NASA's ambitious plans for the robotic exploration of <u>Mars</u> and the preparation for eventual human missions to the red planet.

1 DEC 1997 X-RAY DIFFRACTION FROM TECHNOLOGICALLY IMPORTANT INTERFACES

Dr. Michael F. Toney of the <u>IBM Almaden Research Center</u> will describe what a physicist can do in the computer industry and will focus on experiments to understand materials used in flat panel displays and magnetic recording heads.

2 FEB 1998 PHYSICS IN THE VINEYARDS

Michael A. Porter of Mike Porter Vineyards Consulting, Inc. will review applications of high tech instrumentation and remote sensing in the premium wine industry.

9 FEB 1998 FUNDAMENTAL PHYSICS AND REAL LIFE

Dr. Richard R. Freeman of the Lawrence Livermore National Laboratory and the University of California, Davis/Livermore will discuss the physics behind extreme ultraviolet lithography.

23 FEB 1998 THE INVENTION OF THE TRANSISTOR

Dr. Michael Riordan of the <u>Stanford Linear Accelerator Center</u> and the <u>Santa Cruz Institute for Particle Physics</u> will describe how the transistor was born at Bell Telephone Laboratories in 1947-48, recounting the contributions of John Bardeen, Walter Brattain, and William Shockley in achieving this stunning breakthrough. (Dr. Riordan will autograph <u>Crystal Fire: The Birth of the Information Age</u> and The Shadows of Creation : Dark Matter and the Structure of the Universe afterward.)

2 MAR 1998 LEARNING PHYSICS THROUGH INQUIRY

Dr. Barry Kluger-Bell of the Lawrence Hall of Science and the Exploratorium's Institute for Inquiry will describe how inquiry-based science teaching can lead to deep understanding of content.

9 MAR 1998 FROM COMPUTER CHIPS TO POTATO CHIPS: HOW PLASMA PHYSICS AFFECTS OUR EVERYDAY LIFE

Dr. Francis F. (Frank) Chen of the University of California, Los Angeles will discuss the challenges of plasma processing, especially of fast computer chips.

16 MAR 1998 THE INTEGRATED MATERIAL CHIP

<u>Dr. Xiao-Dong Xiang</u> of the <u>Lawrence Berkeley National Laboratory</u> will describe a new approach to the discovery and optimization of solid state materials.

23 MAR 1998 EXPERIENCES OF A NEOPHYTE PHYSICS TEACHER

Matthew Davis ('93) of <u>Santa Rosa High School</u> will discuss the challenges, triumphs, and rewards of teaching physics to today's students.

30 MAR 1998 SMALL PARTICLES AND LARGE COMPUTERS

Dr. Gregory Kilcup of the <u>Ohio State University</u> will describe how physicists are using the most powerful supercomputers to study the <u>interactions of quarks</u>. [Available on VHS in the SSU library.]

6 APR 1998 SPACE TELESCOPES AND THE SEARCH FOR ORIGINS

<u>Dr. Alan Dressler</u> of the <u>Observatories of the Carnegie Institution of Washington</u> will discuss the quest with the <u>Hubble Space Telescope</u> and future space observatories to understand the origins of our Galaxy, our planet, and life. [Available on VHS in the SSU library.]

20 APR 1998 RECENT DEVELOPMENTS IN FIBER OPTIC COMMUNICATIONS

Dr. Dennis Derickson of <u>Hewlett Packard</u> will describe how erbium-doped fiber amplifiers and wavelength division multiplexing have changed the way fiber optic systems are designed.

27 APR 1998 HOW THE UNIVERSE GOT ITS SPOTS

nat Physicists Do all	past presentations 7/24/14, 6:22 PM
	<u>Dr. Janna Levin</u> of the <u>University of California at Berkeley</u> will discuss how the global shape of the universe can induce patterns in the sky reminiscent of a leopard's spots or even a zebra's stripes. [Available on VHS in the SSU library.]
4 MAY 1998	THE AGE OF THE UNIVERSE
	Dr. Michael Bolte of the UCO/Lick Observatory and the University of California, Santa Cruz will describe our current understanding of stars and their life cycles and explain how stellar observations can be used to set limits on the values of the expansion rate and average density of the universe.
14 SEP 1998	E=MC ² , REALLY
A1 CED 1000	Dr. Glenn Horton-Smith of Stanford University will describe an experiment at the Stanford Linear Accelerator Center which, among other things, created tiny amounts of matter and anti-matter by colliding light with light.
21 SEP 1998	USING X-RAY EMISSION FROM COMPACT OBJECTS TO STUDY GRAVITY (PART I)
	Dr. Lynn Cominsky of Sonoma State University will summarize the gravitational processes that produce X-ray emission in neutron stars and black holes, and review their observational status.
28 SEP 1998	USING X-RAY EMISSION FROM COMPACT OBJECTS TO STUDY GRAVITY (PART 2)
	Dr. Lynn Cominsky of Sonoma State University will explain how X-ray observations are used to determine fundamental physical parameters of neutron stars and black holes, and how these measurements can be used to test some predictions of General Relativity.
5 OCT 1998	THE NETWORKED SCIENCE MUSEUM
	Dr. <u>Robert Semper</u> of the <u>Exploratorium</u> will discuss new developments using the Internet to extend the museum's role in the public understanding of science.
12 OCT 1998	QUANTUM WHISTLES FROM SUPERFLUID HELIUM-3
	Dr. Richard Packard of University of California, Berkeley will describe the discovery of effects in a neutral quantum liquid similar to those seen in superconducting Josephson junctions.
19 OCT 1998	FEMTOSECOND X-RAYS AT THE ADVANCED LIGHT SOURCE
	Dr. Robert Schoenlein of the Lawrence Berkeley National Laboratory will discuss how femtosecond x-ray pulses can be generated using lasers and relativistic electrons, and how such pulses can be used to measure ultrafast events such as the motion of atoms in materials.
26 OCT 1998	LITTLE GREEN MEN AND ALL THAT
	Dr. Leo Blitz of the University of California, Berkeley will describe how radio telescopes are evolving into huge arrays that are capable of measuring the rate of expansion of the Universe, how stars and solar systems are born and whether there is intelligent life out there after all.
2 NOV 1998	SEARCHING FOR EXTRATERRESTRIAL INTELLIGENCE (SETI): PROGRESS AND PROSPECTS
	Dr. Peter Backus of the <u>SETI Institute</u> will describe recent observations at the <u>Arecibo Observatory</u> by <u>Project</u> <u>Phoenix</u> and plans for even more powerful searches in the future.
9 NOV 1998	THE MILKY WAY'S GAMMA-RAY HALO: FIRST LIGHT FROM DARK MATTER?
	Dr. Dave Dixon of the <u>University of California, Riverside</u> will discuss the discovery of a gamma-ray "glow" which appears to surround the Milky Way galaxy, and its possible relationship to Galactic dark matter.
16 NOV 1998	NEUTRINO ASTRONOMY: LOOKING DOWN TO SEE INTO THE HEART OF GALAXIES
	Dr. David Nygren of the <u>Lawrence Berkeley National Laboratory</u> , will discuss an emerging branch of science that couples the techniques of elementary particle physics with the goals of astronomy to provide a new way of seeing.
23 NOV 1998	DNA AND PROTEIN STRUCTURES
	Monika Ivancic ('93) of <u>Oregon State University</u> will discuss how Nuclear Magnetic Resonance spectroscopy can be used to determine the structure and conformation of macromolecules.
30 NOV 1998	THE NATIONAL IGNITION FACILITY: STATUS AND APPLICATIONS
	Dr. Jeff Koch of the <u>Lawrence Livermore National Laboratory</u> will discuss the next generation of high-power lasers and applications to fusion energy and national security.
1 FEB 1999	IMAGING THE EARTH'S MAGNETOSPHERE Maria Marakwardt (205) of the University of California at Parkalay will discuss a relatively new method of

INIARIO INIARCKWORUL (93) OF THE UNIVERSITY OF CAMOUNA AL DELKERCY WITH DISCUSS A TERATIVELY NEW INCLUOU OF imaging using medium energy neutral atoms that will be employed by the *IMAGE* spacecraft. THE HUNT FOR BROWN DWARFS 8 FEB 1999 Dr. Gibor Basri of the University of California at Berkeley will describe the discovery in 1995 of the first substellar objects (intermediate in mass between stars and planets), and the great progress in the field since then. 22 FEB 1999 NANOCOMPUTERS IN A BOTTLE Dr. Stan Williams of Hewlett Packard Laboratories will describe how the combination of physics, chemistry and computer architecture may provide the platforms on which computation will be performed in the next century. PINCHING THE DOUGHNUT: QUANTUM BLACK HOLES AND THE GLOBAL STRUCTURE OF THE UNIVERSE Dr. Raphael Bousso of Stanford University will describe how quantum gravity leads to the production of tiny black holes in the early universe, and how they may have caused space to disintegrate into many daughter universes. [Available on VHS in the SSU library.] MAGNETIC FIELDS IN THE SOLAR SYSTEM, or. **DON'T LEAVE EARTH WITHOUT A MAGNETOMETER!** Dr. Margaret Galland Kivelson (also here) of the University of California, Los Angeles will discuss the generation and properties of magnetic fields of planets and moons and explain how one can use spacecraft magnetometer measurements to learn about the interiors of these bodies. THE RENEWABLE ENERGY TRANSITION Dr. Donald Aitken of the Union of Concerned Scientists will present a pictorial overview and discussion of the technologies and economics of the forthcoming major societal shift. Dr. Robert Sargent of Optical Coating Laboratory, Inc. will review recent improvements in the performance of precision optical interference filters, and will describe how such filters are employed in fiber-optic communications systems.

1 MAR 1999

8 MAR 1999

15 MAR 1999

22 MAR 1999 RECENT ADVANCES IN PRECISION OPTICAL COATINGS

29 MAR 1999 OPTICAL METROLOGY FOR FUTURE GENERATIONS OF LITHOGRAPHY

Dr. Gary Sommargren of the Lawrence Livermore National Laboratory will describe the development of visible light interferometers to measure aspheric mirrors with sub-nanometer accuracy.

12 APR 1999 **IMAGING OF OUANTIZED VORTICES IN HIGH-TEMPERATURE SUPERCONDUCTORS**

Dr. J.C. Séamus Davis of the University of California at Berkeley will describe studies using low temperature scanning tunnelling microscopy of the surfaces of several materials, measurements which yield much information about the quantum mechanics of a phenomenon which holds the promise of revolutionizing electronics, power transmission and transport.

19 APR 1999 WHAT CAN WE KNOW ABOUT THE UNIVERSE?

Dr. Andreas Albrecht of the University of California, Davis will describe how modern cosmologists seek to understand not just how the Universe evolved, but its "initial conditions" as well. [Available on VHS in the SSU library.]

26 APR 1999 THE PHYSICS OF FORENSIC SCIENCE

Dr. Ian D. Hutcheon of the Lawrence Livermore National Laboratory will discuss how applications of state-ofthe-art analytical tools, such as high sensitivity mass spectrometry, are moving forensic science from the crime scene to the laboratory.

PLASTIC ELECTRONICS: FROM SOLAR CELLS TO TRANSISTORS 3 MAY 1999

Dr. Sue A. Carter of the University of California, Santa Cruz will describe studies of printable polymer-based semiconductor electronics, including light emitting devices, solar cells, and transistors.

13 SEP 1999 AN OVERVIEW OF PHYSICS EDUCATION RESEARCH Dr. Bruce Birkett of the University of California, Berkeley will describe the rapidly growing field of research that investigates how to best help students learn physics.

DOLLARS AND STAMPS, X-RAY DIFFRACTION AND FLUORESCENCE 20 SEP 1999

	Dr. John Dunning of Sonoma State University will demonstrate the striking differences seen when comparing five dollar bills from Australia and the US using both X ray diffraction and fluorescence
27 SEP 1999	OWL'S AIRWATCH: DETECTING THE HIGHEST ENERGY COSMIC RAYS
	Dr. David Lamb ('94) of the University of Alabama, Huntsville, will describe some of fundamental mysteries
	that are presented by the highest energy cosmic rays and his role in designing the optical system for OWL, a
	proposed giant air-shower observatory.
4 OCT 1999	ARE SOLAR NEUTRINOS OSCILLATING?
	Dr. Peter Sturrock of <u>Stanford University</u> will present data from two experiments which measure solar neutrinos
11 007 1000	and will explain now the data provide evidence for neutrino oscillations. (<u>http://ndar.stanford.edu/sturrock/</u>)
11 OC 1 1999	ISAAC NEW ION AND BEN FRANKLIN WEREN' I ALWAYS RIGHI
	research.
18 OCT 1999	PARTICLE ASTROPHYSICS WITH THE SUPER-KAMIOKANDE OBSERVATORY
	Dr. Kenneth Ganezer of CSU, Dominguez Hills will discuss new results from neutrino observations that go
	beyond the standard model of particle physics.
25 OCT 1999	THE RIGHT STUFF ON LIFT
	Dr. Lewis Carroll Epstein, author of <i>Thinking Physics</i> , explains why the airplane wing's lift does not require a
	downdraft, believe it or not! (<u>http://www.appliedthought.com/InsightPress/ThinkingPhysics.html</u>)
1 NOV 1999	SCRUTINIZING STAR CLUSTERS WITH SPACE OBSERVATORIES
	<u>Dr. Adrienne Cool</u> of <u>San Francisco State University</u> will discuss current and future developments in the understanding of globular star clusters in the Milky Way based on satellite observations.
8 NOV 1999	OUANTUM GRAVITY IN FLATLAND
	Dr. Steven Carlip of the University of California, Davis will describe the lessons we can learn about quantum
	gravity from looking at a simple model of general relativity in two dimensions of space plus one of time.
15 NOV 1999	STELLAR SEISMOLOGY USING A RECYCLED SPACECRAFT
	Dr. Derek Buzasi of the University of California, Berkeley will describe how he has converted the failed WIRE
AA NIGAT 1000	mission into an astroseismology mission.
22 NOV 1999	YOU SAY SCIENCE, MATH, LANGUAGE ARTS, AND HISTORY, I SAY ASTRONOMY:
	<u>Dr. Laura w nitiock</u> of <u>Sonoma State University</u> will demonstrate now just about everything can be taught using astronomy and astronomical concepts.
29 NOV 1999	EINSTEIN'S LABORATORY: THE FAST WORLD OF X-RAY ASTRONOMY
	Dr. Garrett Jernigan of the University of California, Berkeley, will explain how recent observations of black
	holes and neutron stars with NASA's Rossi X-ray Timing Explorer can be used to test General Relativity.
7 FEB 2000	GALILEO'S NEW VIEWS OF IO
	Dr. Rosaly Lopes-Gautier of the Jet Propulsion Laboratory will present the results of the recent close flyby of
14 FEB 2000	the solar system's most volcanically active body.
14 FEB 2000	THE UBIQUITY AND POWER OF ANALOGIES IN PHYSICS
	<u>Dr. Douglas Hoistadter</u> of <u>Indiana University</u> and <u>Stanford University</u> will show how the cognitive mechanism of borrowing of previous ideas in physics (and often blending two or more ideas in what seems to be an utterly
	incoherent fashion) has repeatedly enabled physicists to come up with radically new and deeply right insights
	and thus to leapfrog ahead at amazing speeds.
28 FEB 2000	ELECTRON TRANSFER IN BIOLOGICAL MOLECULES
	Dr. Daniel L. Cox of the University of California, Davis will give a simple overview of the physical ideas of
	electron transfer and the relevance of quantum mechanical tunneling and magnetic moments to processes in DNA and other biological molecules
6 MAR 2000	ASTRONOMV IN THE TWENTIETH CENTURV
V 111111 2000	Dr. Joseph S. Tenn of Sonoma State University will describe progress in solar system stellar and extragalactic
	astronomy and show how the oldest science has become a branch of physics.
13 M A D 2000	ACTDONOMICAL INCTDIMENTS FOD DEMOTE ORSEDVATODIES

13 MIAN 2000	AS I ROIVOINTCAL HAS I RUIVILIATS FOR REIVIOTE ODSERVATORILS
	<u>Tom McMahon</u> ('85) of the <u>University of Arizona</u> will describe the design and construction of instrumentation for observatories at the <u>South Pole</u> and in space, including the <u>Space Infrared Telescope Facility</u> , <u>Terrestrial</u>
	Planet Finder, and gossamer optics.
20 MAR 2000	COMPUTER SIMULATIONS OF GEOMAGNETIC FIELD REVERSALS
	Dr. Gary Glatzmaier of the University of California, Santa Cruz will present three-dimensional, time-dependent computer simulations of the geodynamo which help us understand the generation of the Earth's magnetic field in the outerfluid core, the super-rotation of the solid inner core, and magnetic dipole reversals.
27 MAR 2000	THE SEARCH FOR WIMPS
	Dr. Blas Cabrera of Stanford University will describe the use of a new generation of superconducting detectors in the search for dark matter in the form of weakly interactive massive particles.
3 APR 2000	A PHYSICS STUDENT'S TOOL KIT FOR INDUSTRY
	<u>Angela Duprez</u> of <u>Sonoma State University</u> will explain how a little knowledge of thin films, fiber optics, and LabVIEW helped her to complete an automated test station at <u>Optical Coating Laboratory, Inc.</u> for her summer internship.
17 APR 2000	ELECTRONIC PAPER: THE PHYSICS AND THE HUMAN ISSUES
	Nicholas Sheridon of <u>Xerox Palo Alto Research Center</u> will present the technology of the Gyricon and other approaches to electronic paper and will discuss the forthcoming impact on human culture.
24 APR 2000	COSMIC DARK MATTER AND OPTICAL COMMUNICATION
	Dr. J. Anthony Tyson of Lucent Bell Laboratories will show how opportunities in pure and applied physics are often related through <u>new technologies</u> .
1 MAY 2000	GO WITH THE MICROFLOW
	Dr. Dawn Kataoka of <u>Sandia National Laboratories</u> will discuss recent developments in microfluidic devices and the trend toward smaller is better.
8 MAY 2000	SOAP BUBBLES, RAINDROPS AND INKJETS
	Dr. Lynn Orr of Stanford University will demonstrate some of the magical physics of phenomena controlled by surface tension.
11 SEP 2000	THE CROOKES RADIOMETER: HOW A TOY PUSHED THE FRONTIERS OF PHYSICS
	<u>Dr. Andrés Larraza</u> of the <u>Naval Postgraduate School</u> will present the history of the radiometer as an example of how science develops, two ways to reverse the direction of its spin, and <u>a radiometer that responds directly to acoustic radiation pressure</u> .
18 SEP 2000	STAR CLUSTERS: GALACTIC ASTROPHYSICAL LABORATORIES
	Dr. Randy L. Phelps of California State University, Sacramento will discuss the use of star clusters to investigate a wide variety of astrophysical questions in the fields of star formation, stellar evolution, Galactic structure and the distance scale and age of the Universe.
25 SEP 2000	SPECTACULAR IMAGES WITH ADAPTIVE OPTICS
	Dr. Imke de Pater of the <u>University of California at Berkeley</u> will present new images of Titan, <u>Neptune</u> , and Io obtained with the <u>Keck 10-meter telescope</u> .
2 OCT 2000	A COSMIC SOUP OF QUARKS AND GLUONS
	Dr. Iwona Sakrejda of the <u>Lawrence Berkeley National Laboratory</u> will describe an unusual state of matter, the Quark-Gluon Plasma, which filled the early universe for approximately 10 microseconds after the Big Bang, and which is now being recreated in <u>laboratories</u> around the world.
9 OCT 2000	ENVIRONMENTALLY SAFE PHOSPHORS
	Dr. Michael Ansell of Sonoma State University will discuss current phosphor technologies and the prospects for improved materials that glow in the dark.
16 OCT 2000	FIRST, KILL A PHYSICIST
	Dr. Camille Minichino of Lawrence Livermore National Laboratory (retired) will describe how she writes mystery novels with science in the foreground, introducing physicists with engaging personalities—ones who don't want to take over the world, don't leave the house with two different socks on, and aren't social misfits.
23 OCT 2000	τμε λ Μλ 7ΙΝΟ ΤΑΙ Ε ΟΕ ΤΗΕ ΤΙΝΥ ΝΕΠΤΟΙΝΙΟς

	Dr. Giorgio Gratta of Stanford University will discuss the study of neutrinos in deep mines, the depths of the
	ocean, the Antarctic icecap, and the world's largest particle accelerators and nuclear reactors, and the implications of the recent reports that some neutrinos have finite mass.
30 OCT 2000	OUANTUM MIRACES
30 001 2000	Dr. Donald Figler of IBM Almoden Research Center will show how electrons trapped in custom built
	nanometer structures called quantum corrals exhibit all of the nice properties of waves in confining structures.
6 NOV 2000	THE LONG SOUGHT SUPERHEAVY ELEMENTS
	Dr. Darleane Hoffman of the University of California at Berkeley and Lawrence Berkeley National Laboratory
	will discuss the long search for SuperHeavy Elements and the recently reported discoveries of elements 114,
	116, and 118 at Berkeley and 114 in Russia.
13 NOV 2000	THOROUGHLY MODERN MEASUREMENTS OF THE DENSITY AND CURVATURE OF THE
	UNIVERSE
	Dr. Andrew Jaffe of the University of California at Berkeley will show how recent measurements of the Cosmic Microwave Background Radiation allow cosmologists to determine the curvature of the Universe and the distribution of its contents.
20 NOV 2000	AI MOST ABSOLUTE ZERO, THE STORY OF LASER COOLING AND TRAPPING OF ATOMS
201107 2000	Dr. William D. Phillips of the National Institute of Standards and Technology will discuss the work which won
	him a share of the <u>1997 Nobel Prize in physics</u> in this videotaped lecture.
27 NOV 2000	BIO-PARTICLE THREAT DETECTION USING LASER INDUCED AUTOFLUORESCENCE
	Dr. Richard DeFreez ('80) of Pacific Scientific Instruments will discuss the development of state-of-the-art
	realtime bio-particle detectors for defense against biowarfare and bioterrorist attacks.
5 FEB 2001	LOW TEMPERATURE RESEARCH ON THE INTERNATIONAL SPACE STATION
	Dr. Melora Larson of the Jet Propulsion Laboratory will discuss the development of the Low Temperature
	<u>Microgravity Facility</u> for the <u>International Space Station</u> , the first experiments that will fly in this facility, and the challenges involved in performing a high precision experiment in the space environment.
12 FEB 2001	THE ATOMIC HARD DISK
12 FEB 2001	Interational Allowice many bisk
	<u>submit fory</u> of <u>solitonia state Oniversity</u> will tak about his summer research at the <u>Oniversity of Waryland</u> ,
	where he worked on spin-polarized scanning tunneling microscopy and reading atomic spin.
26 FEB 2001	RENEWABLE ENERGY: NOW A REALISTIC CHALLENGE TO OIL
	Dr. Daniel M. Kammen of the University of California at Berkeley will explain how renewable energy resources and technologies — including solar, wind, small-scale hydro, and biomass based energy — have
	recently undergone a revolution in technological innovation, cost improvements, and understanding and
	analysis of appropriate applications.
5 MAR 2001	FAST FLOW: HOW BASAL WATER CONTROLS THE MOTION AND STABILITY OF GLACIERS
	Dr. Jeffrey Kavanaugh ('94) of the University of California at Berkeley will discuss how hydrological conditions beneath a glacier govern ice motion and can lead to surprisingly rapid flow — and potential
12 MAD 2001	INSTADILITY.
12 MAK 2001	FIGHTING COUNTERFEITING WITH INTERFERENCE OPTICS
	counterfeiters of international currencies.
19 MAR 2001	MATTER, ANTIMATTER, AND CP VIOLATION
	Dr. Vasilli Shelkov of the Lawrence Berkeley National Laboratory will discuss the latest results from the BaBar
	experiment at <u>SLAC</u> , where a fundamental asymmetry between matter and antimatter is being studied by a large international team of physicists in an effort to provide some clues as to why we live in a matter-dominated universe.
26 MAR 2001	TRACKING AIR POLLUTION IN CALIFORNIA
	Siana Hurwitt Alcorn ('97) of Sonoma Technology, Inc. will discuss the method used for characterizing pollutant transport in the atmosphere.

2 APR 2001	EXTRASOLAR PLANETS – DIVERSE NEW WORLDS
	Dr. Greg Laughlin of NASA Ames Research Center will describe how extrasolar planets are discovered and how the accumulation of new planets is giving us insight into the formation and evolution of our own Solar System.
16 APR 2001	MAKING MOLECULES THINK: AN INTRODUCTION TO MOLECULAR QUANTUM COMPUTING
	Dr. Mark Kubinec of the University of California at Berkeley will explain how the nuclei of simple molecules can be used to perform a search algorithm in a way that can exceed the speed of a classical computer.
23 APR 2001	WHAT HAPPENED TO THE KEPLER-BOHR ORBITS IN QUANTUM MECHANICS?
	Dr. Michael Nauenberg of the University of California, Santa Cruz will describe some remarkable properties of Rydberg atoms which have deepened our understanding of the correspondence between quantum and classical mechanics.
30 APR 2001	QUANTUM DOT OPTOELECTRONICS
	Dr. Valerie Leppert ('87) of the University of California, Davis will discuss the synthesis, characterization, properties and applications of quantum dots.
7 MAY 2001	MYSTERIES OF DEEP SPACE: EXPLODING STARS AND BLACK HOLES
	This PBS video includes suspense-filled sequences in which astronomers peer into the heart of a black hole and discover the most distant supernovas ever seen
14 MAY 2001	THE DARK UNIVERSE: THE AGE AND ULTIMATE DEATH OF THE COSMOS
	Dr. Nicholas Suntzeff of the Cerro Tololo Inter-American Observatory will discuss how the recent results from the High Z Supernova Sourch Team have led complexiste to the improbable conclusion that the Universe is
	geometrically flat vet filled with a "dark energy" which is so powerful that it has overcome gravity and is
	driving the Universe into an exponential acceleration.
10 SEP 2001	BIOMOLECULAR PHOTONICS: WORKING WITH PHOTONS AND ORGANIC MATERIALS
	<u>Dr. Enrique Izaguirre</u> of <u>Sonoma State University</u> will present recent advances and challenges in understanding the optical and quantum properties of proteins, organic thin films, and copolymers, and will discuss their applications in novel photonic devices.
17 SEP 2001	LECTURE CANCELLED
24 SEP 2001	SOLID STATE PROTON CONDUCTORS FOR FUEL CELL AND OTHER APPLICATIONS
	Dr. Sossina M. Haile of the <u>California Institute of Technology</u> will present a brief overview of current fuel cell technologies and describe recent breakthroughs in the design and implementation of proton conducting solids as fuel cell electrolytes.
1 OCT 2001	NANOTECHNOLOGY: WHAT IS ALL THE HYPE?
	<u>Dr. Brock Weiss</u> of <u>Sonoma State University</u> will present the past, present and future of nanotechnology, a field which may bring the next revolutionary age in science and society.
8 OCT 2001	NANOSCALE ELECTRONICS FROM CARBON NANOTUBES
	Dr. Phil Collins of <u>Covalent Materials</u> will explain the unique properties of carbon nanotubes and present
15 OCT 2001	OPCANIC MOLECULES FROM SPACE AND THE OPICIN OF LEF
15 0C1 2001	Dr. Max Bernstein of the SETI Institute and the astrochemistry lab at NASA Ames Research Center will talk
	about how molecules older than the solar system come to Earth every day, and what role they may have played
	in the origin and evolution of life.
22 OCT 2001	NEUTRON STAR EVOLUTION AND MILLISECOND PULSARS
	Dr. Norman K. Glendenning of the Lawrence Berkeley National Laboratory will describe how the hot, rapidly- rotating remains of supernovae become cold inert objects, and how some are rejuvenated by companions to become the fastest spinning objects in the universe.
29 OCT 2001	THE MOST ANCIENT OBJECTS EVER STUDIED
	<u>Dr. Ben R. Oppenheimer</u> of the <u>University of California at Berkeley</u> will discuss the recent discovery of ancient remnants of the Galaxy's first generation of stars, the interesting atmospheric physics of those stars, and their

role in the elusive answer to "What is the dark matter?" 5 NOV 2001 **BAD ASTRONOMY** Dr. Philip Plait of Sonoma State University will give a light-hearted talk about the many ways astronomy is spun, folded, and mutilated by the media, including big-budget Hollywood movies, newscasts and TV documentaries. 12 NOV 2001 PHYSICS IN BUILDINGS: A CASE STUDY OF SSU'S ENVIRONMENTAL TECHNOLOGY **CENTER** Dr. Alexandra von Meier of Sonoma State University will explain how physics and common sense can combine to solve the energy crisis, using as an example SSU's Environmental Technology Center, which uses 80% less energy than a normal building its size without sacrificing comfort or aesthetic appeal. ATOMS AND PHOTONS IN A BOX: WAVE PROPERTIES OF LASER COOLED ATOMS 19 NOV 2001 Dr. Vladan Vuletic of Stanford University will describe how atoms at ultralow temperatures behave as quantum mechanical waves, and will discuss applications such as the storage of light and coherent waveguides for matter waves. 26 NOV 2001 DEEP SPACE ONE: EXPLORING THE SOLAR SYSTEM ON AN ION DRIVE Steve Collins of the Jet Propulsion Laboratory will relate some of the exciting adventures he's had fixing and flying NASA's new technology spacecraft. **OBSERVING THE SUN FROM 6800 FT UNDERGROUND: THE SUDBURY NEUTRINO** 4 FEB 2002 **OBSERVATORY** Dr. Kevin Lesko of Lawrence Berkeley National Laboratory will describe the SNO collaboration's observations of solar neutrinos and their impact on particle and solar physics. [Available on VHS in the SSU library.] THE OPTICAL COATING ENGINEER - FROM STAR WARS TO TELECOMMUNICATIONS 11 FEB 2002 Dr. Charles Carniglia of Optical Coating Laboratory, Inc. will discuss some of his experiences in designing a wide range of optical systems, including laser reflectors, narrow band wavelength selection filters, and reflection-reducing coatings. ORGANIC LIGHT EMITTING DIODES FOR FLAT PANEL DISPLAYS 25 FEB 2002 Dr. J. Campbell Scott of IBM Almaden Research Center will describe the chemistry, physics and engineering behind an emerging new display technology, based on generating light by passing an electric current through luminescent organic materials. 4 MAR 2002 **QUASI-ELECTRIC FIELDS AND BAND OFFSET: TEACHING ELECTRONS NEW TRICKS** Dr. Herbert Kroemer of the University of California, Santa Barbara will discuss the ideas behind semiconductor heterostructures, which are dominating compound-semiconductor devices, and even much of semiconductor basic physics research. 11 MAR 2002 GLASS AND ITS NOVEL APPLICATIONS IN PHOTONICS Dr. Denise M. Krol of the University of California, Davis and Lawrence Livermore National Laboratory will discuss how ultra-short lasers and high electric fields alter the optical properties of glass and how these techniques can be used to fabricate novel integrated optical devices. 18 MAR 2002 THE UNIVERSE REVEALED: THE TWO MICRON ALL SKY SURVEY Dr. Thomas H. Jarrett of the Infrared Processing and Analysis Center at Caltech's Jet Propulsion Laboratory will describe the NASA mission to survey the sky with infrared telescopes, unveiling the Universe that is hidden by the Milky Way. [Available on VHS in the SSU library.] 25 MAR 2002 THE NATURE AND NURTURE OF BLACK HOLES Dr. Wallace Tucker of the Harvard-Smithsonian Center for Astrophysics and University of California, San Diego will discuss what the Chandra X-ray Observatory and other powerful new telescopes are telling us about black holes and their effects on their environment. **ULTRAFAST LIGHT PULSES – LIFE IN THE FAST LANE** 8 APR 2002 Dr. Margaret Murnane of the University of Colorado and JILA will explain how she uses shaped light pulses to observe and control nature.

15 APR 2002 LECTURE CANCELLED

22 APR 2002	PHYSICS AS SYMMETRY
	Dr. Marvin Chester of UCLA (emeritus) will confront the question: How is it that symmetry, something we
	associate with the shape of objects, is connected to mathematical theories about the workings of the physical
20 A DD 2002	world? [<u>Available on VHS in the SSU library.</u>]
29 APR 2002	DOING PHYSICS AT THE SOUTH POLE
	<u>R. Allan Baker</u> of <u>Sonoma State University</u> will discuss the science being done and some of his adventures
	during his year at the South Pole.
6 MAY 2002	ARE WE STARDUST? CRYSTALS, COMETS, AND THE FORMATION OF SOLAR SYSTEMS
	Dr. Diane Wooden of <u>NASA Ames Research Center</u> will discuss the formation of cosmic dust grains and their
	possible path from stars to interstellar space to our bodies.
9 SEP 2002	FAMOUS PHYSICISTS I HAVE KNOWN
	Dr. Ferdinand Cap of the University of Innsbruck (emeritus) will describe some of his conversations with Louis de Broglie, Erwin Schrdinger, Werner Heisenberg, Wolfgang Pauli, Peter Kapitza, Alfred Kastler, and Hideki
	Yukawa.
16 SEP 2002	THE USE OF LIGHT TO MEASURE NANOMETER SCALE GEOMETRIES
	Dr. Pablo Rovira of Nanometrics, Inc. will discuss how basic properties of light can be used as a tool to obtain
	accurate dimensions and geometries of subnanometer devices.
23 SEP 2002	EXTENDING THE SENSES
	Dr. Kent Cullers of the <u>SETI Institute</u> will explain how the natural intent of physics, at least experimental
	enabled people of various abilities to share the Universe
30 SEP 2002	ATMOSPHERIC WONDERS: LIGHT AND COLOR. FIRE AND ICE IN THE SKY
	Joe Jordan of NASA Ames Research Center and the SETI Institute will discuss the science behind such sky
	phenomena as rainbows, haloes, sundogs, glories, mirages, the "green flash," noctilucent and mother-of-pearl
	clouds, and the twilight shadow of the earth's horizon on the air.
7 OCT 2002	THE ALLEN TELESCOPE ARRAY AND THE NEXT GENERATION OF RADIO TELESCOPES
	Dr. Geoffrey C. Bower of the University of California at Berkeley will discuss the prospects and challenges for
	development, and the Square Kilometer Array.
14 OCT 2002	EXTRAGALACTIC GLOBULAR CLUSTERS: INSIGHTS INTO GALAXY FORMATION
	Dr. Jean Brodie of the University of California Observatories/Lick Observatory and the University of
	California, Santa Cruz will describe work with the Hubble Space Telescope and the Keck Telescope which
	seeks to explore the origin and evolution of galaxies.
21 OCT 2002	THE DEVELOPMENT AND APPLICATIONS OF COMPACT NEUTRON SOURCES
	<u>Dr. Ka-Ngo Leung</u> of the <u>Lawrence Berkeley National Laboratory</u> will describe the newly-developed <u>compact</u> neutron generator which can produce either D-D or D-T fusion neutrons with numerous applications
28 OCT 2002	OPTICAL MEMS: AN ENABLING TECHNOLOGY FOR NEXT GENERATION SWITCHING
	DEVICES
	Dr. Bryant Hichwa of Sonoma State University will talk about the exciting world of Optical Micro-Electro-
	Mechanical Systems, devices which have allowed the development of miniaturized next-generation display and
4 NOV 2002	PLAVING WITH SINGLE ATOMS AND MOLECULES
4 NOV 2002	Dr. Miquel Salmeron of the Lawrence Berkeley National Laboratory will describe how he and his colleagues
	manipulate atoms and molecules one by one, make movies of them, and use them to build new structures and to
	study chemical reactions.
11 NOV 2002	NASA'S MISSION TO SEEK EXTRATERRESTRIAL LIFE
	Dr. Claudia Alexander of the Jet Propulsion Laboratory will present some current ideas on the possibility of life
	in extreme environments in the solar system and some <u>current and forthcoming missions</u> to seek such life.

18 NOV 2002	THE CERENT LABORATORIES AT SONOMA STATE UNIVERSITY
	Dr. Saeid Rahimi of Sonoma State University will describe the makeup and functions of eight new science and
	engineering laboratories which have been been built through a public-private partnership.
25 NOV 2002	MEASURING THE SIZE OF SUBATOMIC COLLISIONS
	Dr. Thomas D. Gutierrez of the University of California, Davis (in residence at Lawrence Berkeley National Laboratory) will discuss how optical methods, originally developed to measure the angular sizes of stars, are used to help understand how quarks form particles measured in the lab. [The lecture in PowerPoint]
2 DEC 2002	A FEW ELECTRONS IN A BOX
	Dr. David Goldhaber-Gordon of <u>Stanford University</u> will describe how electrons can be confined to tiny regions of space ("quantum dots"), and how that confinement affects their behavior.
10 FEB 2003	ASTROPHYSICS FROM SPACE
	Dr. Greg Madejski of the <u>Stanford Linear Accelerator Center</u> will describe observations of great explosions, dark matter, and black holes made from the <u>Chandra X-ray Observatory</u> and <u>Compton Gamma Ray Observatory</u> and planned for the forthcoming <u>Gamma-ray Large Area Space Telescope</u> .
24 FEB 2003	ROCKS IN THE PHYSICS LABORATORY
	Dr. Katherine McCall of the University of Nevada, Reno will discuss some of the ways physicists and physics tools contribute to our understanding of how rocks and the fluids in them behave.
3 MAR 2003	EXPANDING THE SOLAR SYSTEM: MOVING BEYOND QUAOAR TO SUPER-PLUTOS
	Dr. Chad Trujillo of the California Institute of Technology will describe the 2002 discovery of the largest Kuiper Belt Object, Quaoar (half the diameter of Pluto), what we have learned from it, and what we should expect to find in the next two years.
10 MAR 2003	SQUIDS, BUGS, BRAINS, AND HEARTS
	Helene Grossman (more) of the University of California at Berkeley will discuss the use of Superconducting
	Quantum Interference Devices (SQUIDs), the most sensitive detectors of magnetic field known, to identify <u>magnetically-tagged pathogens</u> , obtain ultra-low field magnetic resonance images of the brain, and diagnose electrical function of the heart.
17 MAR 2003	GRABBING THE CAT BY THE TAIL
	Dr. Carlos Bustamante of the University of California at Berkeley will describe studies of the packaging of DNA by a virus using optical tweezers (more).
24 MAR 2003	MEASURING HOW THE UNIVERSE BEGAN
	Dr. Mark Halpern of the University of British Columbia will describe what the Microwave Anisotropy Probe's careful measurements of thermal radiation from the Big Bang tell us about the structure and dynamics of the universe.
14 APR 2003	BALLISTIC MISSILE DEFENSE: TECHNICAL FRONTIER OR TECHNICAL FOLLY?
	<u>Dr. Dean Wilkening</u> of <u>Stanford University</u> will discuss recent technical developments regarding ballistic missile defense and will provide a logical framework for thinking about whether such systems will work and whether they are worth deploying.
21 APR 2003	QUANTUM LOGIC: WHAT'S IT GOOD FOR?
	Dr. Steve Selesnick of the University of Missouri, St. Louis (emeritus) will present an elementary introduction to the proposition (held by some) that quanta have their own logic, that this logic differs from the logic we are used to in the macroworld, and that we imperil our understanding of physics if we ignore these differences.
28 APR 2003	QUANTUM CRYPTOGRAPHY WITH FIBER-OPTIC INTERFEROMETERS
5 MAY 2003	Dr. William P. Risk of <u>IBM Almaden Research Center</u> will describe <u>the use of extremely faint light pulses to</u> <u>carry quantum information between two parties</u> , allowing them to generate a shared secret cryptographic key. A BIOMOLECULAR SENSOR BASED ON NANOPARTICLES
	Dr. Daniel Roitman of <u>Agilent Technologies</u> will explain how to transform titanium dioxide, widely used in paints and sunscreen creams, into sensitive biomolecular sensors and possibly into phototherapeutic "silver bullets."
12 MAY 2003	MAKING A PLASMA ACT LIKE A CRYSTAL

Dr. John Goree of the University of Iowa will explain how the coldest and most orderly state of matter, a crystal, can be imitated by its extreme opposite, an ionized gas called a plasma. **DID THE GREAT MASTERS "CHEAT" USING OPTICS?** 8 SEP 2003 Dr. David G. Stork of Ricoh Innovations and Stanford University will describe the mysterious rise in naturalism in Renaissance painting and the claim that Renaissance artists employed optical devices such as concave mirrors to project images onto their canvases, which they then traced or painted over. THE FASCINATING PHYSICS AND APPLICATIONS OF HYDROGEN IN MATERIALS 15 SEP 2003 Dr. Chris Van de Walle of the Palo Alto Research Center will discuss how quantum-mechanical studies of hydrogen are contributing to technological progress in areas as diverse as silicon integrated circuits, blue lasers, and fuel cells. PROBES OF EXTRA SPACETIME DIMENSIONS 22 SEP 2003 Dr. JoAnne L. Hewett of the Stanford Linear Accelerator Center will describe the rationale for postulating the existence of additional spacetime dimensions, how present and future experiments search for their presence, and

how we would determine their geometry once discovered. THE VERTICAL DIMENSION OF FUTURE MARS EXPLORATION 29 SEP 2003

Dr. Geoffrey Briggs of NASA's Ames Research Center will describe progress in developing an automated lightweight drill to acquire samples from deep beneath the surface of Mars where water may once have been available in liquid form and where micro-organisms may have been preserved in permafrost.

THINGS MY MOTHER NEVER TOLD ME ABOUT THE UNIVERSE 6 OCT 2003

Dr. Lynn Cominsky of Sonoma State University will explain some basic physical science concepts that seem deceptively simple but are commonly misunderstood.

13 OCT 2003 THE GAMMA-RAY BURST-SUPERNOVA CONNECTION

Dr. Daniel E. Reichart of the University of North Carolina will review evidence, both direct and indirect, collected over the past six years that now strongly indicates that the long-duration/soft-spectrum gamma-ray bursts are the death cries of massive stars and the birth cries of black holes.

20 OCT 2003 **PROBING HIGH-TEMPERATURE SUPERCONDUCTORS**

Dr. Gey-Hong Gweon and Dr. Alessandra Lanzara of the Lawrence Berkeley National Laboratory will describe the fascinating world of high temperature superconductors and describe some of the technological applications where superconductors are used today.

27 OCT 2003 FLYING MAGNETS

Dr. Paul Doherty of the Exploratorium will describe how he and exhibit builder Shawn Lani created new magnetism exhibits to demonstrate eddy currents and other phenomena.

3 NOV 2003 CAN SCIENTISTS DESCRIBE REALITY WITH COMPUTER SIMULATIONS?

Dr. Jennifer Young Vandersall of the Lawrence Livermore National Laboratory and Sonoma State University will explore how computer simulations are currently being used to unite our understandings of physical processes, thereby providing better understandings of physical phenomena and predictive capabilities of materials properties.

10 NOV 2003 **CRAWLING AND SEARCHING: RESEARCH ROBOTS AT JPL**

Robert Hogg of the Jet Propulsion Laboratory will discuss several different kinds of robots being developed at JPL, from the six legged Micro-Robot Explorer to the Mars Exploration Rovers that are currently on their way to Mars.

THE DYNAMIC LIFE OF ATOMS IN MATERIALS 17 NOV 2003

Dr. Roger W. Falcone of the University of California at Berkeley will describe how the movement of atoms in solids and liquids can be observed on ultrafast time scales and ultrashort distance scales.

NEUTRINOS AND NOBELS 24 NOV 2003

Dr. Joseph S. Tenn of Sonoma State University will recount some history of the mysterious neutrinos and the scientists who have been honored in Stockholm for discovering their properties.

INTO THE DEPTHS OF THE UNIVERSE: THE SLOAN DIGITAL SKY SURVEY 1 DEC 2003

Dr. Stephanie Snedden ('83) of New Mexico State University and the Sloan Digital Sky Survey will describe

	how positions and absolute brightnesses of more than 100 million celestial objects and distances to more than a million galaxies and quasars are being measured in the short span of five years.
2 FEB 2004	EINSTEIN'S DREAM
	<u>Dr. Brian Greene</u> of <u>Columbia University</u> describes superstring theory and discusses the possibility that it might hold the key to unifying the four forces of nature in the first part of the NOVA program " <u>The Elegant Universe</u> .
9 FEB 2004	THE SEARCH FOR PLANET X: THE SOLAR SYSTEM BEYOND NEPTUNE
	Dr. Eugene Chiang of the University of California at Berkeley will describe what we know of the newly discovered Edgeworth-Kuiper Belt, a disk of planetesimals of which Pluto is but one member.
23 FEB 2004	FIRST RESULTS FROM THE SPITZER SPACE TELESCOPE [pdf version (7.2 MB)]
	Dr. Luisa Rebull of the Spitzer Science Center, Caltech will discuss the very first results from the Spitzer Space Telescope (formerly known as SIRTF), NASA's fourth and final great observatory.
1 MAR 2004	RECENT ADVANCES IN SOLAR ELECTRIC POWER AND 21ST CENTURY APPLICATIONS
	Dr. Charlie Gay of SunPower will discuss the latest advances in solar cell manufacturing and the exciting range of uses seeing commercial success around the world.
8 MAR 2004	THE QUEST TO DETECT GRAVITATIONAL WAVES
	Dr. Peter Shawhan of the California Institute of Technology will describe the current effort to study distant,
	massive astrophysical objects by measuring incredibly tiny distortions of the geometry of space-time, using unique Forth based detectors which make up the Leaser Interforemeter Crewitational Wave Observatory (IICO)
15 MAD 2004	DETECTING AIDRODNE PATHOGENS WITH DIODE I ASEDS
15 MAR 2004	Dr. Geoffrey A. Wilson ('84) of Hach Homeland Security Technologies will describe how pathogens which
	might be dispersed in biological warfare or terrorism <u>can be detected rapidly using laser-induced fluorescence</u> .
22 MAR 2004	GALAXIES LIKE TO LIVE TOGETHER
	Dr. Roy R. Gal of the University of California, Davis will describe how galaxies are distributed throughout the
	universe and what surveys of galaxy clusters can teach us about cosmology.
29 MAR 2004	MEMS-BASED FUEL CELLS: MEETING THE NEED FOR NEXT GENERATION PORTABLE POWER REQUIREMENTS
	Dr. Jeffrey Morse of Lawrence Livermore National Laboratory will describe how fuel cells will replace battery
	technologies for next generation personal electronics and will present a novel approach to forming a fuel cell
	using micro-circuit fabrication methods. (more)
12 APR 2004	THE DEEP CIRCULATION OF THE OCEANS
	Dr. Christopher A. Edwards of the University of California, Santa Cruz will discuss the historical development
	of the theory of abyssal ocean circulation along with recent developments and observations.
19 APR 2004	BLACK HOLES IN THE CORES OF NEARBY GALAXIES
	Dr. Claire Max of the University of California, Santa Cruz and Lawrence Livermore National Laboratory will describe how adaptive optics removes blurring from turbulence in the Earth's atmosphere and reveals
	supermassive black holes in the cores of nearby galaxies.
26 APR 2004	NANOTECHNOLOGY: THE ART AND SCIENCE OF MAKING SMALL THINGS
	Dr. Regina Ragan of Hewlett-Packard Laboratories will describe how the miniaturization of electronic
	components may reach the length scale of atoms and molecules.
3 MAY 2004	ARTIFICIAL MUSCLE AND BEYOND
	Dr. Ronald E. Pelrine of <u>SRI International</u> will discuss the quest for " <u>artificial muscle</u> " and how recent discoveries in electroactive polymers may be applied to a myriad of modern devices
13 SEP 2004	MAGNETIC RECORDING
	Dr. Hongtao Shi of Sonoma State University will discuss the history of magnetic recording and the novel
	materials which promise to dramatically increase the density of magnetic data storage in the near future.
20 SEP 2004	SETI: PULLING SIGNALS OUT OF COSMIC NOISE
	<u>Dr. Jill Tarter</u> of the <u>SETI Institute</u> will describe the status of the Search for ExtraTerrestrial Intelligence with telescopes today and with the new <u>Allen Telescope Array</u> being built in partnership with <u>UC Berkeley</u> to do SETI and radio astronomy 24×7

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27 SEP 2004	FIRST RESULTS FROM THE CASSINI-HUYGENS MISSION AT SATURN
	Dr. Linda Spilker of the Jet Propulsion Laboratory, Caltech will discuss the first results from the <u>Cassini-Huygens</u> mission, a joint undertaking by NASA and the <u>European Space Agency</u> (ESA) to study the Saturn system.
4 OCT 2004	BRIGHTNESS ENHANCEMENT FILMS FOR LCD BACKLIGHTING
	Dr. David J. Lamb ('94) of <u>3M Company's Optical Systems Division</u> will discuss the consumer liquid crystal display (LCD) industry and how 3M's microreplication and multilayer technologies have revolutionized the manner in which these displays are illuminated.
11 OCT 2004	SCIENCE ON MARS WITH SPIRIT AND OPPORTUNITY
	Dr. Albert Haldemann of the Jet Propulsion Laboratory, Caltech will review the adventures and discoveries made by the twin Mars Exploration Rovers Spirit and Opportunity on Mars.
18 OCT 2004	CLIMATE CONTROL: REDUCING THE ROLE OF CARS IN GLOBAL WARMING
	<u>Dr. Louise Bedsworth</u> of the <u>Union of Concerned Scientists</u> will discuss currently available technologies to greatly reduce the impact of automobiles on global warming emissions and current policy opportunities to realize them.
25 OCT 2004	TESTS FOR NEWTON'S LAW OF GRAVITY AT SUB-MILLIMETER DISTANCES
	<u>Dr. Aharon Kapitulnik</u> of <u>Stanford University</u> will discuss the motivation for testing Newton's inverse-square law at short distances and will describe novel devices that are used to measure possible deviations from this law.
1 NOV 2004	VISUALIZING HUMAN HEALTH AND DISEASE WITH MEDICAL IMAGING
	Dr. Bruce Hasegawa of the University of California, San Francisco and the University of California at Berkeley will show how the principles of physics and engineering guide the development of medical imaging techniques that use radiation to assess human health and disease.
8 NOV 2004	RECOVERING HISTORICAL SOUND RECORDINGS USING OPTICAL METHODS
	Dr. Carl Haber of <u>Lawrence Berkeley National Laboratory</u> will describe <u>new methods to recover old</u> <u>mechanical sound recordings</u> based upon <u>optical measurements and image processing techniques</u> .
15 NOV 2004	"LIGHT BRINGS US NEWS OF THE UNIVERSE"
	<u>Professor Emeritus Tony Siegman</u> of <u>Stanford University</u> will describe how the striking phrase in the title—the opening words of a 1931 Christmas Lecture on astronomy by Sir William Bragg for the Royal Institution of London—might be extended today to include recent advances in science and technology made possible by lasers and fiber optics.
22 NOV 2004	BIOMATERIALS AND BIOSENSORS
	Dr. Enrique Izaguirre of the <u>University of California, San Francisco</u> (formerly of <u>Sonoma State University</u>) will describe the work done in biomaterials and organic biosensors with several students from the SSU departments of Chemistry and Physics & Astronomy during the past three years.
29 NOV 2004	ROBOTIC TELESCOPES AT SONOMA STATE UNIVERSITY
	Dr. Gordon Spear of Sonoma State University will describe the nature of robotic telescope systems, describe how they are likely to change the way astronomy is done, and provide some preliminary results and experiences with such telescopes at SSU.
8 FEB 2005	SOFIA: STRATOSPHERIC OBSERVATORY FOR INFRARED ASTRONOMY
	Dr. Eric Becklin of the <u>University of California</u> , Los Angeles will describe the project to develop and operate <u>a</u> 2.5-meter infrared telescope in a Boeing 747-SP and examples of the science programs to be carried out when it goes into operation in 2006.
15 FEB 2005	COSMIC TENNIS
	Dr. Roger Blandford of Stanford University will describe how physicists observe Ultra High Energy Cosmic Rays with energies as great as those of a well-struck tennis ball and how astrophysicists are trying to explain how they are accelerated.
22 FEB 2005	NOVEL FRICTION PROPERTIES OF QUASICRYSTALS
	Dr. Jeong Park of the Lawrence Berkeley National Laboratory will describe the nanomechanical properties of

hat Physicists Do all	past presentations 7/24/14, 6:22 PM
	<u>quasicrystals probed with a scanning probe microscope</u> , and discuss how their low friction is correlated with their exotic atomic structure.
1 MAR 2005	THE SPIN ON ELECTRONICS
	Dr. Stuart Parkin of the IBM Almaden Research Center will discuss novel sensor, memory, and logic devices based on manipulating the flow of spin-polarized electrons in magnetic nanostructures.
8 MAR 2005	FRONTIERS OF NANOLITHOGRAPHY: THE SCIENCE OF MAKING THE SMALL STUFF
	Dr. Keith Jackson of the Lawrence Berkeley National Laboratory will explore the use of photons and electrons for lithographic applications and the devices fabricated at the <u>Center for X-ray Optics</u> for diffractive optics used in the extreme ultraviolet (EUV) portion of the electromagnetic spectrum.
15 MAR 2005	NEW EYES ON THE EXPANDING UNIVERSE: THE SNAP SATELLITE
	Dr. Natalie Roe of the Lawrence Berkeley National Laboratory will describe a proposed new space telescope designed to chart the expansion of the universe, using both supernovae and gravitational weak lensing.
22 MAR 2005	EINSTEIN AND THE RIDDLE OF HIS CREATIVITY
	Dr. Tilman Sauer of the Einstein Papers Project at Caltech will discuss some of Einstein's scientific achievements and offer some thoughts as to how a study of his papers and manuscripts can give us a better understanding of his exceptional creativity.
5 APR 2005	DEEP DOWN BEAUTY: PARTICLE PHYSICS, MATHEMATICS, AND THE WORLD AROUND US
	Dr. Bruce Schumm of the <u>University of California, Santa Cruz</u> , author of <u>Deep Down Things: The Breathtaking</u> <u>Beauty of Particle Physics</u> , will talk about the profound and surprising connection between the worlds of physics and higher mathematics, and how the latter casts light on why the universe is a worthwhile place in which to spend time. [The lecture in PowerPoint (1 MB)]
12 APR 2005	PHYSICS AND NATIONAL DEFENSE
	Tom Ramos of the Lawrence Livermore National Laboratory will discuss some research he has been involved in as a physicist at LLNL—from design of the x-ray laser that was part of Star Wars in the 1980s to developing technologies for fighting nuclear proliferation today.
19 APR 2005	HIGH RESOLUTION SURFACE MICROSCOPY OF CHEMICAL REACTIONS AND PHASE TRANSITIONS
	Dr. Shirley Chiang of the University of California, Davis will discuss scanning tunneling microscopy imaging of molecular scale chemical reactions and low energy electron microscopy measurements of phase transitions in a metal-on-semiconductor system.
26 APR 2005	NEW DEVELOPMENTS IN FIBER LASERS AND ULTRAVIOLET LASERS
	<u>Dr. Laura Smoliar</u> of <u>Lightwave Electronics</u> will describe the growing space of applications opened up by new laser technology, including such developments as a 10-Watt fiber laser source with high repetition rate and extremely narrow pulse width.
3 MAY 2005	CATCHING GAMMA RAY BURSTS ON THE FLY
	Dr. Lynn Cominsky of Sonoma State University will present the latest results from NASA's <i>Swift</i> mission and describe the Education/Public Outreach program conducted at SSU.
10 MAY 2005	DIGGING FOR THE FOSSILS OF GALAXY FORMATION
	Dr. Katherine Rhode ('89) of Wesleyan and Yale Universities will describe the properties of the globular cluster systems of massive galaxies and explain what they tell us about the galaxies' origins.
12 SEP 2005	EXTREME NEUTRINOS: USING A CUBE OF 50,000-YEAR-OLD SOUTH POLE ICE TO PEER INTO SPACE
	Dr. Kurt Woschnagg of the University of California at Berkeley will explain how and why physicists go to the end of the world to build the world's largest and strangest telescope (IceCube, successor to AMANDA) in hopes of seeing nearly undetectable cosmic neutrinos.
19 SEP 2005	TITAN RESULTS FROM THE HUYGENS PROBE
	Dr. Chris McKay of NASA Ames Research Center will present results from the probe that landed on the largest moon of Saturn — the only moon in our Solar System with an atmosphere.

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26 SEP 2005 NANO Y MANO: THE BASICS OF NANOSCALE SCIENCE 4

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<u>Dr. Ramamoorthy Ramesh</u> of the <u>University of California at Berkeley</u> will talk about the exciting field of nanoscale materials and phenomena.

3 OCT 2005 COOLING THE CITIES TO REDUCE ENERGY USE AND IMPROVE URBAN AIR QUALITY Dr. Hashem Akbari of the Lawrence Berkeley National Laboratory will provide a detailed discussion of methods to reduce urban heat islands and their effects in reducing urban cooling energy use and improving ozone air quality.

10 OCT 2005 ARTIFICIAL SIGHT: AN OPTOELECTRONIC RETINAL PROSTHESIS

<u>Dr. Daniel Palanker</u> of <u>Stanford University</u> will describe development of a <u>prosthetic system</u> for restoration of sight in patients who have lost vision due to retinal degeneration.

17 OCT 2005 VORTICES LARGE AND SMALL: STUDYING CYCLONES THROUGH SUPERFLUIDS Dr. Rena Zieve of the University of California, Davis will discuss her work on superfluid helium, a low-temperature quantum mechanical liquid, and the connections to classical fluids.

24 OCT 2005 ALBERT EINSTEIN THE PEACENIK

Dr. Lawrence Badash of the University of California, Santa Barbara (emeritus) will describe Einstein's pioneering of social responsibility by scientists.

31 OCT 2005 WHAT CAN GRAVITATIONAL LENSING TELL US ABOUT THE UNIVERSE?

<u>Dr. Chris Roat</u> of the <u>University of California, Davis</u> will explain how the bending of light by matter, correctly described by Einstein's General Theory of Relativity, informs us about the dark matter and dark energy that fill the universe.

7 NOV 2005 FIRST LOOK INSIDE A COMET

<u>Dr. Karen Meech</u> of the <u>University of Hawaii</u> will present highlights of what was learned when the <u>Deep Impact</u> spacecraft sent a probe into comet Tempel 1 in July 2005.

14 NOV 2005 BLACK HOLES: THE SCIENCE BEHIND THE SCIENCE FICTION

<u>Dr. Eliot Quataert</u> of the <u>University of California at Berkeley</u> will describe what black holes are, how they are discovered, and how they give rise to some of the most energetic and remarkable phenomena in the universe.

21 NOV 2005 NANOPARTICLES IN EARTH'S ATMOSPHERE

Dr. Susanne Hering of <u>Aerosol Dynamics Inc.</u> will talk about a new instrument for determining the concentration of nanometer-sized airborne particles, and why these particles are important to urban air pollution and global climate change.

28 NOV 2005 TESTING EINSTEIN: THE GRAVITY PROBE B RELATIVITY MISSION

Bruce Clarke of <u>Stanford University</u> will describe the 18-month <u>general relativity satellite experiment</u> and the 40-year development effort that went into it.

6 FEB 2006 SEEING THE INVISIBLES: THE CHALLENGE TO PARTICLE PHYSICS IN THE NEW MILLENNIUM

<u>Dr. Hitoshi Murayama</u> of the <u>University of California at Berkeley</u> will discuss the challenges in <u>attempting to</u> <u>understand the 95% of the universe that is not made up of ordinary matter</u>. [Available on DVD in the SSU <u>library.</u>]

13 FEB 2006 CREATING MINI BIG BANGS IN THE LABORATORY

Brooke Haag ('01) of the <u>University of California, Davis</u> will discuss how observing collisions between relativistic nuclei at the <u>Relativistic Heavy Ion Collider</u> has implications for understanding conditions at the earliest stages of the universe. [Available on DVD in the <u>SSU library.</u>]

27 FEB 2006 EVIDENCE FOR THE WARMING OF THE WORLD'S OCEANS

Dr. Tim Barnett of the University of California, San Diego will describe recent evidence for human-induced warming of the world's oceans. [SLIDES (6.2 MB)]

6 MAR 2006 ROTATING GALAXIES: CLUES TO GALAXY FORMATION

<u>Dr. Anne Metevier</u> of the <u>University of California, Santa Cruz</u> will describe her efforts to measure how fast distant disk-shaped galaxies rotate, and what this information can tell us about how galaxies formed. [Available on DVD in the SSU library.]

13 MAD 2006 FINSTEIN'S UNIVEDSE AND REVOND

10 MAR 2000 ENGLENN 5 UNITERSEAND BETOND

<u>Dr. Lynn Cominsky</u> of <u>Sonoma State University</u> will show how high-energy observations of radiation from exploding stars, blazing galaxies and monstrous black holes illuminate Einstein's vision in ways that Einstein could only imagine. [STREAMING VIDEO]

20 MAR 2006 NANOWIRING THE FUTURE

Dr. Peidong Yang of the University of California at Berkeley will discuss how semiconductor nanowires will impact photonics, energy conversion, nanoelectronics, and other areas.

27 MAR 2006 OPTICS WITH SLOW LIGHT

<u>Dr. Mukund Vengalattore</u> of the <u>University of California at Berkeley</u> will discuss the basics of "slow light" and present some <u>recent results</u> on using laser-cooled atoms to create optic elements such as amplifiers, switches and slow light waveguides. [STREAMING VIDEO]

3 APR 2006 STARDUST: CATCHING A COMET AND BRINGING A BIT OF IT HOME

<u>Dr. Donald Brownlee</u> of the <u>University of Washington</u> will describe the insights gained into the materials that initiated the formation of the solar system from the <u>mission</u> which brought back samples of the remarkably active comet Wild 2.[STREAMING VIDEO]

10 APR 2006 STEREO 3D

Jerilynn Schisser ('03) of <u>Real D</u> will describe the techniques used for creating stereo three-dimensional images and their applications in movies, Mars exploration, medicine, and more. [STREAMING VIDEO]

24 APR 2006 NEUTRONS IN MY FAMILY

Dr. John R. Dunning, Jr. of Sonoma State University will illustrate the excitement felt by two generations of experimental physicists: <u>his father</u>, who participated in the first U.S. experiment to observe uranium fission and who led the group developing gaseous diffusion to separate U-235, and himself as SSU's nuclear physicist since 1969. [STREAMING_VIDEO]

1 MAY 2006 NANOSCALE TRANSPORT OF HEAT, LIQUIDS, AND MACROMOLECULES

<u>Dr. Arun Majumdar</u> of the <u>University of California at Berkeley</u> will describe how he and his colleagues combine the science and engineering of nanometer scales to develop novel systems and technologies. [STREAMING VIDEO]

8 MAY 2006 SPIN ELECTRONICS: MAGNETS AND SEMICONDUCTORS

<u>Dr. Frances Hellman</u> of the <u>University of California at Berkeley</u> will discuss the science and technology of using both the spin and charge of the electron in modern solid state electronics, focussing particularly on how to make a magnetic semiconductor. [STREAMING VIDEO]

11 SEP 2006 MAKING THE WORLD SAFER: NUCLEAR TERRORISM AND WHAT PHYSICISTS CAN DO

<u>Dr. Simon Labov</u> of the <u>Lawrence Livermore National Laboratory</u> will discuss the challenges of detecting nuclear threats.

18 SEP 2006 CLIMATE CHANGE: OBSERVATIONAL EVIDENCE, THE ROLE OF HUMANS, AND SOCIETAL IMPACTS

<u>Dr. Philip Duffy</u> of the <u>Lawrence Livermore National Laboratory</u> and the <u>University of California, Merced</u> will give an overview of scientific evidence for global warming and for a human role in this process, and will discuss possible consequences for society.

25 SEP 2006 IS IT TIME TO REVIVE THE NUCLEAR ENERGY OPTION?

<u>Dr. Jasmina Vujic</u> of the <u>University of California at Berkeley</u> will review recent advances in nuclear energy technologies, reprocessing and spent fuel management, safety considerations, and economics, and will address the possibility of new nuclear power plant construction in the United States by 2010.

2 OCT 2006 BEYOND THE LIMITS OF MAGNETIC RECORDING

<u>Dr. Mason Williams</u> of the <u>Hitachi San Jose Research Lab</u> (retired) will discuss physical limits to future progress in areal density of magnetic disk drive storage. This lecture is presented by the <u>IEEE Magnetics</u> <u>Society</u> Distinguished Lecturer Program.

9 OCT 2006 THE PLUG-IN HYBRID

Dr. Andrew Frank of the University of California, Davis will describe a way to transition from oil-powered transportation without a disturbance in our social structure.

16 OCT 2006 RIOMINED AT 17 ATION_NATUDE'S WAV OF ODVSTATI 171NO

10 00 1 2000	DIVININERALIZATIVN—NATURE 5 WAT OF URISTALLIZING
	Dr. Christine Orme of Lawrence Livermore National Laboratory will describe how she and her colleagues
	image moving atomic steps and how these movies hint at the way bones, teeth, and kidney stones grow.
23 OCT 2006	THE SEARCH FOR TERRESTRIAL PLANETS
	Dr. Debra Fischer of San Francisco State University will discuss new directions in the search for Earth-like
	planets orbiting nearby stars.
30 OCT 2006	IS HYDROGEN THE FUEL OF THE FUTURE?
	Dr. Joan Ogden of the University of California, Davis will present new studies of the prospects for using
	hydrogen energy in vehicles, buildings and power plant.
6 NOV 2006	NEW VIEWS OF HIDDEN WORLDS
	Dr. Kevin Baines of the Jet Propulsion Laboratory will present new images of Venus and Saturn obtained by the <u>Venus Express</u> and <u>Cassini</u> orbiters, showing how the depths of these cloud-enshrouded worlds are being revealed by modern near-infrared spectral-imaging techniques.
13 NOV 2006	THE VIEW FROM THE CENTER OF THE UNIVERSE
	Dr. Joel Primack of the University of California Santa Cruz and Nancy Abrams will describe the scientific
	revolution that is creating humanity's first picture of the universe that might actually be true.
20 NOV 2006	EXPLORING AND MANIPULATING NANOSTRUCTURES AT THE SINGLE MOLECULE LEVEL
20110 / 2000	Dr. Michael Crommie of the University of California at Berkeley will discuss recent progress in investigating
	the electronic, magnetic, and mechanical properties of molecular structures using scanning tunneling
	microscopy.
27 NOV 2006	THE COSMIC LANDSCAPE: STRING THEORY AND THE ILLUSION OF INTELLIGENT DESIGN
	Dr. Leonard Susskind of Stanford University will discuss the question, "Why does the world appear to be so
	well-designed for our own existence?"
5 FEB 2007	HOW ATOMS DANCE AND JOIN TOGETHER IN THE ULTRACOLD
	Dr. Chris Greene of the University of Colorado will discuss recent studies of the strongly-interacting limit for
	dilute quantum gases, emphasizing some unusual states just observed within the past year.
12 FEB 2007	SECRETS IN THE ANCIENT GOATSKIN: ARCHIMEDES' MANUSCRIPT UNDER X-RAY VISION
	Dr. Uwe Bergmann of the <u>Stanford Linear Accelerator Center</u> will present <u>x-ray imaging results of the</u> <u>"Archimedes Palimpsest,"</u> the oldest surviving document of writings by the ancient Greek genius.
26 FEB 2007	ISLANDS IN THE SKY
	Dr. Adam Stanford of the University of California, Davis will describe the way that clusters of galaxies are like
	cities and what they can teach us about galaxy formation and cosmology.
5 MAR 2007	ULTRAFAST LASERS AND ULTRAFAST SCIENCE
	Dr. Jim Kafka of Spectra-Physics, a division of Newport Corporation, will present the design of ultrafast
	<u>11:sapphire lasers</u> and describe several scientific and industrial applications for these lasers. This lecture is
	Science
12 MAR 2007	REDUCING I FAKING ELECTRICITY TO A TRICKLE
12 MAR 2007	Dr. Alan Majer of the Lawrence Berkeley National Laboratory will describe efforts to cut standby power use in
	appliances which are responsible for 1% of global CO ₂ emissions
10 MAD 2007	THE EIDST STADS IN THE UNIVEDSE
19 MAK 2007	THE FIRST STARS IN THE UNIVERSE
	<u>Dr. Apartia venkalesan</u> of the <u>University of San Francisco</u> will present current observations and theoretical ideas on the first stars in the universe — unique objects that strongly influenced their environment despite their
	brief existence.
26 MAR 2007	SPINTRONICS: FROM MATERIALS TO DEVICES
	Dr. Yuri Suzuki of the University of California at Berkeley will discuss the basics of how both spin and charge
	of the electron can be exploited in spin-based electronics and the fundamental and technological issues
	associated with incorporating novel magnetic materials into these next-generation devices.
2 APR 2007	THE COSMIC MICROWAVE BACKGROUND RADIATION AND THE ORIGIN OF THE UNIVERSE

	Dr. Sarah Church of Stanford University will discuss how measurements of the Cosmic Microwave Background radiation — the relict radiation from the Big Bang — have contributed to our understanding of the origin and evolution of the universe
16 APR 2007	ASTROMATERIAL SCIENCES
	Dr. Alexander Tielens of <u>NASA Ames Research Center</u> will discuss the behavior of small dust particles under the extreme conditions in space and the role of this dust in the formation of planets.
23 APR 2007	THE POWER OF THE SUN
	Nobel Laureates Alan Heeger and Walter Kohn of the University of California, Santa Barbara appear in this recent film on the science of the silicon solar cell.
30 APR 2007	TURBULENT FIELDS
	<u>Ned Kahn</u> , an artist whose works incorporate fluid dynamics, will present a series of videos and describe his recent work in visualizing turbulence on the scale of buildings.
7 MAY 2007	FROM ZERO TO ONE BILLION ELECTRON VOLTS IN 3.3 CENTIMETERS
27 AUG 2007	<u>Dr. wim Leemans</u> of the <u>Lawrence Berkeley National Laboratory</u> will describe a <u>new laser-driven accelerator</u> which may open the way to very compact high-energy experiments and superbright free-electron lasers. THE ATTRACTION AND DANGERS OF EXTREME MAGNETIC FIELDS
	Dr. Jeremy Qualls of Sonoma State University will discuss advances in high magnetic field technology, science opportunities, and the impact high magnetic fields have on biological systems.
10 SEP 2007	QUANTUM ENIGMA: REALITY, ENTANGLEMENT, AND CONSCIOUSNESS
	<u>Dr. Fred Kuttner</u> of the <u>University of California, Santa Cruz</u> will offer a <u>quantum-theory-neutral version</u> of the 2-slit experiment, which demonstrates observer-created reality and physics' encounter with consciousness, and will outline a non-mathematical derivation of Bell's inequality demonstrating quantum entanglement.
17 SEP 2007	FROM DEEP SPACE TO EARTH: PHOTOVOLTAIC CONCENTRATORS IMPACT THE FUTURE OF TERRESTRIAL SOLAR ENERGY PRODUCTION
	<u>Michael Fulton</u> , President of <u>Ion Beam Optics</u> , <u>Inc.</u> , will present the challenging development of space solar power concentrator technology that provides a lower cost solution for terrestrial photovoltaic energy production.
24 SEP 2007	TO THE TOP AND BEYOND: PARTICLE PHYSICS IN THE NEW CENTURY
	Dr. Robin Erbacher of the University of California, Davis will explain how forty years after the discovery of quarks we are now beginning to understand the heaviest one—the top quark—and its role in the origin of electroweak symmetry breaking.
1 ОСТ 2007	WILLIAM H PICKERING, AMERICA'S DEEP SPACE PIONEER
10012007	<u>Douglas J. Mudgway</u> will discuss America's response to the 1957 Soviet challenge for preeminence in space and the physicist who made it happen and won the race to explore the planets
8 OCT 2007	A SHARPER VIEW OF THE UNIVERSE
	<u>Dr. Scott Severson</u> of <u>Sonoma State University</u> will describe how astronomers use adaptive optics to gather high resolution images of the universe—from nearby planets to distant galaxies.
15 OCT 2007	THE SEARCH FOR PLANETS AROUND LOW MASS STARS
	Dr. Holland Ford of the Johns Hopkins University and the Space Telescope Science Institute will explain why low-mass stars may provide our best opportunity to find earthlike planets that could sustain life as we know it.
22 OCT 2007	CARBON AND METALS: THE DISCOVERY OF SINGLE-WALL CARBON NANOTUBES
	Dr. Donald S. Bethune of the IBM Almaden Research Center will describe the path that led from experiments looking for buckyballs to the discovery of single-wall carbon nanotubes.
29 OCT 2007	NANOSTRUCTURED ORGANIC SOLAR CELLS
	Dr. Mark Topinka of <u>Stanford University</u> will describe his research on the possibility of inexpensive, lightweight, flexible solar cells which include a nanostructured blend of C_{60} -buckyballs and conducting
- NOX7 200-	polymer.
5 NUV 2007	I HERMIUNIU ENERGY UUNVERSIUN FUR WASTE HEAT RECUVERY

	Dr. Ali Shakouri of the University of California, Santa Cruz will discuss the basics of direct thermal-to-electric energy conversion and how random motion of electrons could be converted into useful electrical energy using nanostructured semiconductors.
19 NOV 2007	THE HINODE SOLAR OPTICAL TELESCOPE: A SOLAR MICROSCOPE IN SPACE
	Dr. Thomas Berger of the Lockheed Martin Advanced Technology Center will present new observations of the solar atmosphere from the Japanese <u><i>Hinode</i></u> satellite.
26 NOV 2007	SUPERNOVAE: VIOLENT DEATHS OF STARS
	Dr. Maryam Modjaz of the University of California at Berkeley will discuss observations of exploding massive stars and their connection to Gamma-Ray Bursts, the most energetic explosions in the universe.
4 FEB 2008	MASSIVE SKY SURVEYS OF THE NEXT DECADE
	Dr. David Wittman of the University of California, Davis will describe how systematic imaging of the sky to much fainter levels than ever before is expected to reveal everything from 200-meter rocks in Earth-crossing orbits to very distant galaxies. [Available on DVD in the SSU library.]
11 FEB 2008	THE TUNGUSKA EVENT 100 YEARS LATER: FINDING NEAR EARTH OBJECTS BEFORE THEY FIND US
	<u>Dr. Donald K. Yeomans</u> of <u>Caltech's Jet Propulsion Laboratory</u> will discuss the daily bombardment of Earth by asteroid fragments and the <u>ongoing NASA programs</u> to understand and track Earth's nearest neighbors. [<u>Available on DVD in the SSU library.</u>]
25 FEB 2008	THE EVOLUTION OF GALAXIES IN DIFFERENT ENVIRONMENTS
	Dr. Jacqueline van Gorkom of Columbia University will show observations and simulations that suggest that the evolution of a galaxy may be seriously affected by its environment. [Available on DVD in the SSU library
3 M A D 2008	and <u>online</u> .]
3 MAK 2008	Dr. Raymond Hall of California State University Freeno will discuss the philosophical attempts to define a
	boundary between the scientific and its pretenders and the application of this distinction in the areas of law, public policy, and education policy. [Available on DVD in the SSU library.]
10 MAR 2008	THE ROLE OF ENERGY EFFICIENCY IN CALIFORNIA'S EFFORTS TO CURB GLOBAL WARMING
	Audrey Chang of the <u>Natural Resources Defense Council</u> will describe California's policies to spur energy efficiency, and its key role in cutting global warming pollution. [<u>Available on DVD in the SSU library.</u>]
17 MAR 2008	STUDIES OF THE TERRESTRIAL UPPER ATMOSPHERE WITH ASTRONOMICAL INSTRUMENTS
	Dr. Tom Slanger of <u>SRI International</u> will describe how the study of sky spectra collected at major telescopes is leading to new insights into atomic and molecular processes and important upper atmospheric phenomena as diverse as atom recombination and space weather. [Available on DVD in the SSU library.]
7 APR 2008	THE WARMING WILL ACCELERATE THE WARMING
	Dr. Inez Fung of the <u>University of California at Berkeley</u> will describe how climate change will alter the processes that store carbon in the land and the oceans, and hence accelerate climate change itself. [Available on DVD in the SSU library.]
14 APR 2008	LIGO: LASERS, OPTICS, AND INTERFEROMETRY IN THE SEARCH FOR GRAVITATIONAL WAVES
	Dr. Shailendhar Saraf of <u>Sonoma State University</u> will discuss the technological challenges in the detection of gravitational waves with a terrestrial instrument and describe the laser technology and interferometric techniques used in <u>LIGO</u> . [<u>Available on DVD in the SSU library.</u>]
21 APR 2008	A PHYSICIST'S PLAYGROUND: FROM DOLPHINS TO TOUCHSCREENS
	<u>Dr. James Aroyan</u> ('87) of <u>JRJ Simulation & Design</u> will discuss computational modeling applications ranging from marine mammal sound reception to Rayleigh wave scattering and solar cell design. [<u>Available on DVD in the SSU library.</u>]
28 APR 2008	FABRICATION AND STUDIES OF MAGNETIC NANOSTRUCTURES
	Dr. Hongtao Shi of Sonoma State University will discuss the fabrication of macroscopic masks with nanometer-

	scaled pores by anodization of aluminum. [Available on DVD in the SSU library.]
5 MAY 2008	LIGHTING UP THE DARK: GALAXIES AS PROBES OF THE DARK UNIVERSE
	Dr. Risa Wechsler of Stanford University will describe how the dark matter that pervades our Universe is connected to the galaxies observed with telescopes, and how galaxy surveys can be used to understand the contents of our Universe. [Available on DVD in the SSU library.]
8 SEP 2008	PHYSICS FOR FUTURE PRESIDENTS
	Dr. Richard Muller of the University of California at Berkeley, will tell us what every world leader needs to know, the subject of his course (voted "Best Class at Berkeley") and of his new book. [Available on DVD in the SSU library.]
15 SEP 2008	FIRST RESULTS FROM THE PHOENIX LANDER MISSION
	Dr. Carol Stoker of NASA Ames Research Center will present information obtained from the spacecraft that landed in the icy northern region of Mars in May 2008. [Available on DVD in the SSU library.]
22 SEP 2008	FUNDAMENTAL AND APPLIED ANTINEUTRINO PHYSICS
20 (FD 2000	Dr. Adam Bernstein of the Lawrence Livermore National Laboratory will discuss the surprising utility of antineutrinos for addressing practical and fundamental problems, including <u>cooperative monitoring of nuclear</u> reactors, mapping the Earth's crust and mantle distributions, sensitive detection of supernovae, and deepening our understanding of the mysterious nature of the neutrino. [Available on DVD in the SSU library.]
29 SEP 2008	STUDIES OF THE ELECTRONIC STRUCTURE OF LOW DIMENSIONAL NOVEL METALS
	Dr. Eli Rotenberg of the Lawrence Berkeley National Laboratory will describe how the electronic band structure of solids are measured using x-ray photoelectron spectroscopy at a third-generation light source, and what their visualization tells us about the ground states and many body interactions in atomically thin metal films. [Available on DVD in the SSU library.]
6 OCT 2008	THE SIMPLEST CHEMISTRY THERE IS: DOING REACTIONS ONE MOLECULE AT A TIME
	Dr. Miquel Salmeron of the Lawrence Berkeley National Laboratory will describe the use of simple, yet powerful microscopes to push and pull molecules and to stretch and bend their chemical bonds.
13 OCT 2008	MAKING AND USING "NUCLEAR" PHOTONS WITH LASERS
	<u>Dr. Chris Barty</u> of the <u>Lawrence Livermore National Laboratory</u> will describe how LLNL is creating the <u>world's brightest beams of gamma-rays</u> and then using them to identify, image and study isotopes for security, medical, and energy applications, [Available on DVD in the SSU library.]
20 OCT 2008	ADVANCED SOLAR CELLS FOR TERRESTRIAL CONCENTRATING PHOTOVOLTAIC SYSTEMS
	Dr. Bill Imler of Squirrel Hill Associates will describe the current status of high efficiency, multi-junction solar cells, their use in concentrating photovoltaic systems, and what steps the industry needs to take to rapidly drive down the cost of solar electricity. [Available on DVD in the SSU library.]
27 OCT 2008	EINSTEIN, NANOSCIENCE, AND SUPERCONDUCTIVITY
	Dr. Marvin L. Cohen of the University of California at Berkeley will describe the celebration of Einstein in the World Year of Physics in 2005, and will discuss some of the history and conceptual underpinnings of condensed matter physics with examples related to research on the electronic structure of solids. [Available on DVD in the SSU library.]
3 NOV 2008	CHEMISTRY OF PLANET FORMATION
	Dr. Sally Dodson-Robinson of the <u>California Institute of Technology</u> will describe how planets form, what they are made of, and how astronomers use that information to discover new planets.[<u>Available on DVD in the SSU</u> <u>library.</u>]
10 NOV 2008	THE MYSTERY OF THE MISSING ANTIMATTER
	<u>Dr. Helen Quinn</u> of the <u>Stanford Linear Accelerator Center</u> will tell us how physicists address the puzzle of how it came about that, with very similar laws of physics for matter and antimatter, the Universe is populated with matter but very little <u>antimatter</u> . [Available on DVD in the SSU library.]
17 NOV 2008	CALIFORNIA OBSERVATORIES AS LEADERS IN THE DEVELOPMENT OF VERY LARGE OPTICAL TELESCOPES
	Dr. Joseph & Miller of the University of California Santa Cruz will discuss the central role that California

observatories have played in the evolution of large optical telescopes, from the Crossley Reflector at Lick Observatory to the giant Keck Telescopes on Mauna Kea. [Available on DVD in the SSU library.]

24 NOV 2008 THE LARGE BINOCULAR TELESCOPE

Dr. Leonard Kuhi of the <u>University of Minnesota</u> (retired) will discuss the design and construction of a <u>telescope having twin 8.4-meter mirrors</u>, along with scientific expectations and various pitfalls encountered along the way. [Available on DVD in the SSU library.]

1 DEC 2008 MAKING GOOD USE OF THE LARGE BINOCULAR TELESCOPE

<u>Thomas McMahon</u> ('85) of the <u>University of Arizona</u> will describe his team's construction of a <u>nulling</u> <u>interferometer</u>, to be used with the <u>Large Binocular Telescope</u> to image planets in nearby star systems. [Available on DVD in the SSU library.]

2 FEB 2009 KEPLER'S HUNT FOR HABITABLE PLANETS

Dr. Natalie Batalha of San José State University and NASA Ames Research Center will describe the science objectives of NASA's Kepler Mission, scheduled to launch in March, and will also highlight some of the job opportunities that exist for physics majors in the space sciences. [Available on DVD in the SSU Library.]

9 FEB 2009 THE CONVERGENCE OF PARTICLE PHYSICS AND ASTROPHYSICS: THE LHC/FERMI ERA

<u>Dr. Michael Dine</u> of the <u>University of California, Santa Cruz</u> will explain the relation of some of the big questions in cosmology and particle physics and how the <u>Large Hadron Collider</u> currently being commissioned at CERN and the <u>Fermi Gamma-ray Space Telescope</u> may address them. [<u>Available on DVD in the SSU</u>] library.] [slides]

23 FEB 2009 THE LIGHT, THE DARK, AND THE HOT GAS: DISSECTING GALAXY CLUSTERS

Dr. Anja von der Linden of the <u>Kavli Institute for Particle Astrophysics and Cosmology</u> and <u>Stanford</u> <u>University</u> will explain how multi-wavelength observations of galaxy clusters can reveal the properties of dark matter, and how they can constrain cosmological parameters. [<u>Available on DVD in the SSU library.</u>]

2 MAR 2009 ULTRASHORT PULSE LASERS IN INDUSTRIAL APPLICATIONS

<u>Dr. Michael M. Mielke</u> of <u>Raydiance, Inc.</u> will describe how ultrashort pulse lasers work, what they can uniquely do, and where they are gaining traction as enabling tools for new processes. [<u>Available on DVD in the SSU library.</u>]

9 MAR 2009 IMAGING WITH X-RAY LASERS

<u>Dr. Stefano Marchesini</u> of the <u>Lawrence Berkeley National Laboratory</u> will describe how novel x-ray sources will be used for high resolution three dimensional tomographic imaging required for developing nanoscience and nanotechnology. [Available on DVD in the SSU library.]

16 MAR 2009 NANOMECHANICS: WHY THE STRENGTH OF A MATERIAL IS RELATED TO ITS SIZE

Dr. Andrew Minor of the University of California at Berkeley and Lawrence Berkeley National Laboratory will show results from mechanical testing experiments inside a transmission electron microscope, where we can observe the fundamental mechanisms of deformation in materials at nanoscale dimensions. [Available on DVD in the SSU library.]

23 MAR 2009 EXPLORING THE EXTREME UNIVERSE WITH FERMI

<u>Dr. Lynn Cominsky</u> of <u>Sonoma State University</u> will describe recent discoveries from NASA's <u>Fermi Gamma-ray Space Telescope</u>, which is observing black holes, exploding stars and more! [<u>Available on DVD in the SSU</u> library.]

30 MAR 2009 ENERGY RESEARCH IN DENMARK

Jeremy Hieb ('03) of the <u>University of California, Santa Cruz</u> and <u>Zero Motorcycles</u> will discuss renewable energy research in Denmark–including wind, solar, bioenergy, electric vehicles, hydrogen micro-grids, and smart grids for a sustainable biosphere. [Available on DVD in the SSU library.]

6 APR 2009 WHISPERS IN THE DARK

<u>Dr. Jodi Cooley</u> of <u>Stanford University</u> will tell us how a group of physicists from the U.S. and Canada are <u>searching for dark matter</u> by listening for faint whispers of their interactions in the <u>CDMS</u> detector located in the <u>Soudan Underground Laboratory</u> in Minnesota. [<u>Available on DVD in the SSU library.</u>]

20 APR 2009 COSMIC COLLIDERS

What Physicists Do all	past presentations 7/24/14, 6:22 PM
	Dr. Enrico Ramirez-Ruiz of the University of California, Santa Cruz will show how observations of the interplay between black holes, neutron stars and other objects in dense stellar systems allow us to draw firm conclusions about the properties of these extreme forms of matter. [Available on DVD in the SSU library.]
27 APR 2009	THE ACOUSTICS OF BAROQUE BASSOONS
	<u>Dr. Bryant Hichwa</u> of <u>Sonoma State University</u> will describe the physical acoustics of 250-year-old bassoons and show that mathematical models based on examination of museum bassoons reveal interesting societal cultural differences. [Available on DVD in the SSU library.]
4 MAY 2009	THIRTY-NINE YEARS OF PHYSICS AND ASTRONOMY AT SONOMA STATE UNIVERSITY
	Dr. Joseph S. Tenn of Sonoma State University will conclude his career with some reflections on his activities and the changes he has seen. [Available on DVD in the SSU library.]
31 AUG 2009	IMAGING A PLANET AROUND FOMALHAUT USING THE HUBBLE SPACE TELESCOPE
	Dr. Paul Kalas of University of California, Berkeley tells us how to spot an extrasolar planet from Earth.
14 SEP 2009	CONDENSED MATTER LIGHT SCATTERING
	Dr. Thomas Peter Devereaux of Stanford University is the head of the X-ray Science and Techniques Group at the Stanford Institute for Materials and Energy Sciences, which focuses on the scientific foundation related to the energy challenge facing our society. He will discuss using the tools of computational physics to understand quantum materials. [Available on DVD in the SSU library.]
21 SEP 2009	CULTIVATING SCIENTIST AND ENGINEER EDUCATORS
	Dr. Anne Metevier of the Center for Adaptive Optics at UC Santa Cruz will describe her work training early-
	career scientists and engineers to teach more effectively by using methods that promote inquiry and an equitable college classroom environment. [Available on DVD in the SSU library.]
28 SEP 2009	PEEKING AT THE YOUNGEST STARS
	Dr. Tom Greene of NASA's Ames Research Center will describe what infrared spectroscopic observations are telling us about very young sun-like stars while they are still accreting their last bits of mass and before their planetary systems have formed. [Available on DVD in the SSU library.]
5 OCT 2009	THE RICH PHYSICS OF NUCLEAR MUON CAPTURE
	Dr. Tom Banks of the University of California, Berkeley will describe recent efforts by the MuCap Collaboration to precisely measure the rate of nuclear muon capture in hydrogen, and how the process of muon capturewhich involves electromagnetism, the weak interaction, and the strong interactionis a unique confluence of a diverse range of physics. [Available on DVD in the SSU library.]
12 OCT 2009	FIRST RESULTS FROM THE KEPLER MISSION TO FIND EARTH-SIZED EXOPLANETS
	Dr. Gibor Basri, Professor of Astronomy and Vice Chancellor for Equity and Inclusion at the University of California at Berkeley, will discuss the latest from NASA's new exoplanet-hunting Kepler space telescope. [Available on DVD in the SSU library.]
19 OCT 2009	FORMATION AND EVOLUTION OF MASSIVE GALAXIES
	Dr. Mariska Kriek of Princeton University will discuss the formation and evolution of massive galaxies. [Available on DVD in the SSU library.]
26 OCT 2009	SOFIA – THE STRATOSPHERIC OBSERVATORY FOR INFRARED ASTRONOMY
	Dr. Dana Backman, the director of education and public outreach for SOFIA, will give us a status report NASA's new airborne observatory, a 2.5-meter telescope mounted in a Boeing 747. [Available on DVD in the <u>SSU library.</u>]
2 NOV 2009	THE MILKY WAY'S HIDDEN PAST
	Dr. Constance Rockosi of the University of California, Santa Cruz will talk about what we've discovered about our Galaxy's hidden past and how we can use that past to connect observations of the early universe with the galaxies we see today. [Available on DVD in the SSU library.]
9 NOV 2009	EXTREME PLANETARY ATMOSPHERES
	Dr. Jonathan Fortney of the University of California, Santa Cruz will show how our understanding of planetary atmospheres is being revolutionized by observations of the super-heated class of Jupiter-like planets that orbit

http://www.phys-astro.sonoma.edu/wpd/wpdpast.html

very close to their parent stars.

16 NOV 2009 THE SEARCH FOR THE HIGGS BOSON

Dr. John Conway of University of California, Davis will discuss the use of the Tevatron accelerator at Fermilab and the Large Hadron Collider at CERN to search for new particles such as the Higgs Boson. [Available on DVD in the SSU library.]

23 NOV 2009 PLUTONIUM, THE MOST ENIGMATIC OF ALL METALS

Dr. Per Soderlind of Lawrence Livermore National Laboratory will discuss some of the peculiarities of this metal and how quantum-mechanical electronic structure from density-functional theory attempts to explain them. [Available on DVD in the SSU library.]

8 FEB 2010 THE PHYSICIST'S DILEMMA: WHAT PHYSICISTS *REALLY* DO

Ransom Stephens, Ph.D., physicist and author of the novel, *The God Patent*, mixes hot topics in engineering physics - problems in the development of USB3, 100 Gb/s Ethernet, etc - into his argument that physics is not only the best high tech degree program, but the best field of study for achieving any aspiration whatsoever. [Available on DVD in the SSU library.]

22 FEB 2010 UNDERSTANDING THE FORMATION OF OUR SOLAR SYSTEM THROUGH THE STUDY OF COMET SAMPLES RETURNED BY THE STARDUST MISSION

Dr. Scott Sandford was a Co-Investigator and Science Team member on NASA's Stardust Sample Return Mission, which in 2006 successfully collected and returned samples from Comet 81P/Wild 2 to Earth for study. Analysis of the samples has confirmed some of the ideas we had about comets, but has also generated some big surprises that have greatly modified many aspects of our understanding of the origin of the Solar System. [Available on DVD in the SSU library.]

1 MAR 2010 INTRODUCTION TO EXTRA DIMENSIONS

Dr. Douglas Singleton of Fresno State University will discuss the renewed interest in theories with extra dimensions beyond the four (3 space plus one time) that are normally observed. In contrast to previous extra dimensional theories (Kaluza-Klein theories or Superstring theory) in these theories the extra dimensions are large or even infinite. [Available on DVD in the SSU library.]

8 MAR 2010 NANOSTRUCTURE MATERIALS: SYNTHESIS, CHARACTERIZATION, AND APPLICATIONS

Nanostructure materials can yield unique properties that are not manifested in macroscopic systems and have broad applications from chemical/biological sensors, hydrogen storage to nanorobotics. Dr. Daqing Zhang of Fresno State University will present his research synthesizing one dimensional nanowires and exploring their applications. [Available on DVD in the SSU library.]

15 MAR 2010 THE INFLATIONARY MULTIVERSE

Dr. Anthony Aguirre of the University of California, Santa Cruz, will discuss how our newly-won understanding of cosmology is pointing to the possibility that the observable universe is just a tiny part of a much larger and diverse "Multiverse". [Available on DVD in the SSU library.]

22 MAR 2010 MAGNETIC MATERIALS AT SSU

Magnetic materials exhibit a rich amount of physics and are heavily studied not only for the advancement of science but also for their commercial application. Dr. Jeremy Qualls of Sonoma State University will introduce his initiative to study new magnetic materials. He will also examine the general nature of magnetism and the challenges ahead for modern magnetic materials. [Available on DVD in the SSU library.]

29 MAR 2010 CREATING A STAR IN THE LABORATORY: THE NATIONAL IGNITION FACILITY

Dr. Richard N. Boyd of Lawrence Livermore National Laboratory, will discuss the National Ignition Facility. Completed in 2009, it is the world's largest laser. NIF plans to encourage programs in basic research, with nuclear astrophysics being part of that program. This presentation will describe the basic operation of NIF, as well as the motivation for and some details of several nuclear astrophysics experiments that might be conducted at NIF. Finally Dr. Boyd will discuss how NIF might impact the world's energy future. [Available on DVD in the SSU library.]

19 APR 2010 EYES ON THE SKIES

This movie, produced by the International Astronomical Union, explore the many facets of the telescope — the historical development, the scientific importance, the technological breakthroughs, and also the people behind this ground-breaking invention, their triumphs and failures. [Available on DVD or via download from the IAU.]

20 AFK 2010 FERMI GAMINIA-KAY SPACE IELESCUPE

Dr. Steven Ritz of University of California, Santa Cruz, is the Deputy Principal Investigator for the Fermi Gamma-Ray Space Telescope's Large Area Telescope (LAT) component. Dr. Ritz served as project scientist for the Fermi Gamma-ray Space Telescope from 2003-2009 and he will share the latest results from this uniquely capable space observatory. [Available on DVD in the SSU library.]

3 MAY 2010 NANOELECTROMECHANICAL DEVICES

Dr. Alex Zettl of the University of California, Berkeley is the leader of a an experimental solid state physics group that researches nanotechnology. Dr. Zettl will discuss the latest advances in nanoelectromechanical devices. [Available on DVD in the SSU library.]

10 MAY 2010 SCIENCE AND GLOBAL SECURITY

Dr. Raymond Jeanloz is a Professor of Astronomy and Earth & Planetary Science at the University of California, Berkeley and Chair of the United States National Academy of Sciences' Committee on International Security and Arms Control. Dr. Jeanloz will discuss the role of physics in shaping views on nuclear weapons public policy. [Available on DVD in the SSU library.]

13 SEP 2010 HIGH-SPEED CELL SORTING AND CYTOMETRY: APPLICATIONS FROM STEM CELL THERAPIES TO ENVIRONMENTAL MICROBIOLOGY

High-speed cell sorters are used in fields as disparate as vaccine development and global climate change. Dr. Timothy W. Peterson, from the Advanced Cytometry Group at Becton Dickinson Biosciences, will describe how high-speed cell sorters use lasers to measure, classify, and sort cells into constituent populations and share a few novel applications for this technology. [Available on DVD in the SSU library.]

20 SEP 2010 STUDYING THE UNIVERSE WITH GRAVITATIONAL LENSES

Dr. Phil Marshall of Stanford University will explain how we can perform astronomical calculations using gravitational lenses: these cosmic telescopes are rare, but they allow us to observe the most distant, faintest, and smallest objects; in calibrating their optics we learn the masses of galaxies and clusters, and even the rate of expansion of the Universe. [Available on DVD in the SSU library.]

27 SEP 2010 NEIGHBORHOOD PHYSICS AND THE SCIENCE OF SUSTAINABLE COMMUNITIES

Geof Syphers of Codding Enterprises will speak of how the practice of green building is beginning to evolve away from efficiency-based goals and toward absolute impacts, putting sustainability science to the test. [Available on DVD in the SSU library.]

4 OCT 2010 DARK MATTER SUBSTRUCTURE IN THE MILKY WAY

Dr. Michael Kuhlen of the University of California, Berkeley will discuss how the amount and spatial distribution of dark matter substructure in the Milky Way halo provide unique information and clues on the galaxy assembly process and the nature of the dark matter [Available on DVD in the SSU library.]

11 OCT 2010 MEASURING CLIMATE CHANGE USING EARTH-SENSING SATELLITES

Dr. Carl Mears, a Senior Scientist at Remote Sensing in Santa Rosa, will be speaking about how measurements made using microwave sensors on satellites monitor changes in Earth's climate and test the predictions of climate simulation models. [Available on DVD in the SSU library.]

18 OCT 2010 NANOPHOTONIC LIGHT-TRAPPING IN SOLAR CELLS

Dr. Zongfu Yu of Stanford University will be discussing his most recent work regarding a way of 'light-trapping' to enhance light absorption in conventional bulk silicon solar cells. This work may create more efficient solar cells for the future. [Available on DVD in the SSU library.]

25 OCT 2010 THE BUILDING BLOCKS OF MATTER

Dr. Maxwell Chertok from the University of California, Davis will discuss how the Compact Muon Solenoid experiment at the Large Hadronic Collider in Switzerland enables physicists to search for the Higgs Boson and investigate undiscovered principles of nature. [Available on DVD in the SSU library.]

1 NOV 2010 EXTREME ASTRONOMY: EYEING THE COSMOS THROUGH A CUBIC KILOMETER OF ICE

Dr. Kirill Filimonov of the University of California, Berkeley will explain how and why physicists are fishing for elusive cosmic neutrinos using IceCube, the world's largest telescope located on the harshest continent on the planet. [Available on DVD in the SSU library.]

8 NOV 2010 SCIENCE WITH SMALL SATELLITES DESIGNED, BUILT, AND OPERATED BY STUDENTS

Dr. Garrett Jernigan of the Space Science Laboratory at University of California, Berkeley will describe Danjon and PolOSat, two small satellite projects that can involve Sonoma State University students. [Available on DVD in the SSU library.]

15 NOV 2010 STUDY OF UNCONVENTIONAL SUPERCONDUCTIVITY IN $\mathrm{PrOs}_4\mathrm{Sb}_{12}$ VIA CHEMICAL SUBSTITUTION

Dr. Pei-Chun Ho, of Fresno State University, will discuss the properties of unconventional superconductor $PrOs_4Sb_{12}$, and her recent investigation of the effect of the ferromagnetism via Nd substitution on this superconductivity. In addition, Dr. Ho will show the facilities in her newly established Strongly Correlated Electron Laboratory at Fresno State. [Available on DVD in the SSU library.]

22 NOV 2010 EXPLORING NEURAL FUNCTION, STRUCTURE, AND DEVELOPMENT

Dr. Sasha Sher, of the University of California, Santa Cruz, will be discussing how understanding the brain is one of the most important scientific frontiers of our time. He will reveal a unique technology for detection of neural activity developed by a team of physicists, engineers, and biologists and discuss how this technology helps our understanding of the neural circuitry responsible for processing of visual information. [Available on DVD in the SSU library.]

21 FEB 2011 ADAPTIVE OPTICS/UNDERGRADUATE RESEARCH AT SSU

Dr. Scott Severson of Sonoma State University will describe some of the work he and his students are performing in adaptive optics.

28 FEB 2011 THE HUBBLE SPACE TELESCOPE

Two movies will be presented and discussed: <u>Hubble: Twenty Years of Discovery</u>, primarily on the telescope, and <u>Hubble: Two Decades of Discovery (1990-2010</u>), on the scientific discoveries made with it.

7 MAR 2011 EXOPLANETS/CARBON FIBER DEFORMABLE MIRRORS FOR TELESCOPES

Dr. Mark Ammons of the Lawrence Livermore National Laboratory will discuss exoplanets and carbon fiber deformable mirrors for telescopes. [Available on DVD in the SSU library.]

14 MAR 2011 THE GALAXY NEXT DOOR

Dr. Puragra Guhathakurta of the University of California, Santa Cruz will speak on the Andromeda Galaxy, or M31, our Milky Way's largest galactic neighbor. [Available on DVD in the SSU library.]

21 MAR 2011 THE ULTRAFAST QUANTUM WORLD OF ATOMS AND MOLECULES

Dr. Philip H. Bucksbaum of Stanford University and SLAC National Accelerator Laboratory will discuss ultrafast short-wavelength coherent radiation. [Available on DVD in the SSU library.]

28 MAR 2011 SALT FINGERING IN OCEANS AND STARS

Dr. Adrienne Traxler of the University of California, Santa Cruz will discuss astronomical fluid dynamics and physics education. [Available on DVD in the SSU library.]

4 APR 2011 RECREATING THE BIG BANG IN THE LABORATORY

Dr. Peter Jacobs of the Lawrence Berkeley National Laboratory will present news from the Large Hadron Collider at CERN. [Available on DVD in the SSU library.]

11 APR 2011 PRECISION TESTS OF GENERAL RELATIVITY WITH MATTER WAVES

Dr. Holger Müller of the University of California, Berkeley will describe measurements of fundamental quantities and tests of relativity. [Available on DVD in the SSU library.]

25 APR 2011 DARK SIDE OF THE UNIVERSE

Dr. Marusa Bradač of the University of California, Davis will discuss dark matter and gravitational lensing, revealing the invisible with two cosmic supercolliders, the "Bullet Cluster," 1EO567-56, and MACSJ0025-1222. [Available on DVD in the SSU library.]

2 MAY 2011 ATOMIC AND MOLECULAR MANIPULATION

Dr. Hari Manoharan of Stanford University will discuss the application of the "bottom-up" approach of atomic and molecular manipulation to a variety of outstanding problems in science and technology. The effort is interdisciplinary in nature, centering on physics and engineering but involving ideas, techniques, and conundrums from other fields such as chemistry, biology, materials science, and information technology. The primary experimental apparatus for these investigations are custom-built low-temperature scanning probe microscopes capable of both studying and controlling matter at atomic length scales. [Available on DVD in the SSU library.]

9 MAY 2011 TYPE IA SUPERNOVAE

Dr. Tony Piro of the California Institute of Technology will discuss Type Ia supernaovae. A Type Ia supernova is a sub-category of cataclysmic variable stars that results from the violent explosion of a white dwarf star. A white dwarf is the remnant of a star that has completed its normal life cycle and has ceased nuclear fusion. However, white dwarfs of the common carbon-oxygen variety are capable of further fusion reactions that release a great deal of energy if their temperatures rise high enough. [Available on DVD in the SSU library.]

12 SEP 2011 HOW THE MILKY WAY CAME TO BE

Dr. Brenda Frye of the University of San Francisco: Studying galaxies in the distant universe is an important problem for astrophysicists. This is because galaxies change over time in both size and composition to become galaxies today like our own Milky Way, and to have stars and planets like our own Sun and Earth. This talk will be concerned with using a tool called gravitational lensing to enable rare glimpses of galaxies back to early cosmic times. [Available on DVD in the SSU library.]

19 SEP 2011 CHARACTERIZATION OF ENERGY MATERIALS USING ADVANCED TECHNIQUES IN THE ELECTRON MICROSCOPE

Dr. Ilke Arslan of the University of California, Davis: In recent years, nanotechnology has become a major component of research in materials physics, placing rigorous demands on characterization methods to determine structure-property relationships. Since most energy materials are nanomaterials, understanding their morphology in three dimensions (3-D) is a key first step in their characterization, which is performed here using electron tomography in the scanning transmission electron microscope (STEM). The 3-D imaging is complemented with in-situ liquid stage and ex-situ gas assembly experiments for a more complete materials understanding. [Available on DVD in the SSU library.]

26 SEP 2011 GEOTHERMAL ELECTRICITY FROM THE GEYSERS: A 40 YEAR PERSPECTIVE

Dr. John Dunning of Sonoma State University: The potential of the Geysers seemed unbounded in 1973 when I gave the first WPD seminar on the subject. In the 80's the steam field turned out to be finite. Recharge using municipal sewage was initiated in the 90's. To expand the reservoir, hydraulic fracturing was attempted in 2009. How renewable does this energy source appear in 2011? [Available on DVD in the SSU library.]

3 OCT 2011 PLANNING FOR A BUSINESS CAREER WITH A PHYSICS DEGREE: THE BASICS TO SUCCEED THAT AN MBA MAY NOT TEACH YOU

Zee Hakimoglu ('75), President, CEO and Chariman of ClearOne, discusses the basics to succeed in planning for a business career with a physics degree that an MBA may not teach you. [Available on DVD in the SSU library.]

10 OCT 2011 CANCER+PHYSICS: MICE, DICE, AND FASTER THAN LIGHT PARTICLES

Nicole Ackerman of Stanford University explains how she is collaborating with colleagues in Stanford's Small Imaging Core Facility to develop a new imaging technology using Cerenkov radiation —the faint blue glow commonly emitted from radioactive materials when they're immersed in water. [Available on DVD in the SSU library.]

17 OCT 2011 GENERAL EDUCATION EARTH, ASTRONOMY AND SPACE SCIENCE: A STEM TRANSFORMATION VEHICLE THAT REALLY WORKS

Dr. Edward E. Prather of the Department of Astronomy and Steward Observatorry at the University of Arizona discusses astronomy education. [Available on DVD in the SSU library.]

24 OCT 2011 LOW COST MANUFACTURING OF HIGH QUALITY SOLAR GRADE SILICON FOR PHOTOVOLTAICS

Photovoltaics require a lower purity of silicon material than is used in the semiconductor industry, however to date nobody has been able to provide the required purity at a reasonable price. Dr. Bill Imler, from Squirrel Hill Associates, will describe a novel process to produce high-quality silicon optimized for photovoltaic applications, at extremely low cost. [Available on DVD in the SSU library.]

31 OCT 2011 DIMENSIONAL ANALYSIS

Joseph S. Tenn, Sonoma State University, will describe how physicists make use of the fact that physical quantities must have the right dimensions to reduce the number of equations in a problem or even to learn compating about the solution without solving the classical or quantum equation of motion. Attendees will

someting about the solution without solving the classical of quantum equation of motion. Attendees will encounter the most famous example—the yield of an early nuclear bomb test—and scientists Edgar Buckingham and Geoffrey I. Taylor. [Available on DVD in the SSU library.]

7 NOV 2011 CARBON REDUCTION WITH APPROPRIATE TECHNOLOGY

Dr. Peter Schwartz, California Polytechnic State University, San Luis Obispo, is exploring a collaborative development model where US students study in a developing country with local students, in this case in San Pablo, Guatemala—a village of 800 at elevation 3000 m near the Mexican Boarder. The Cal Poly summer study

abroad program "Guateca", to commence July 1, 2011, was jointly conceived with San Pablo leadership on August 2010, and has since grown through input from both Cal Poly and San Pablo communities. The program aims to build cross-cultural community and explore choices both societies have in the context of the rapidly changing energy landscape to develop in a way that preserves the environment and builds independence from increasingly expensive conventional energy sources. [Available on DVD in the SSU library.]

14 NOV 2011 EMMY NOETHER AND THE FABRIC OF REALITY

<u>Dr. Ransom Stephens</u> will discuss Emmy Noether, a female Jewish intellectual in Nazi Germany, who made perhaps the most significant discovery of the 20th century. Noether's Theorem ties the laws of nature directly to the geometry of space and time, the very fabric of reality. It is the basis for all modern theories of physics. Two things should bother you about Noether's Theorem: (1) how come so few people have heard of Emmy Noether? and (2) why isn't her theorem well known to lovers of science? [Available on DVD in the SSU library.]

6 FEB 2012 IMPACT OF MAGNETISM DOPING ON THE OPTICAL PROPERTIES OF ZINC OXIDE

Dr. Hongtao Shi, Sonoma State University.

13 FEB 2012 PRACTICING HEALTH PHYSICS AROUND THE WORLD

Dr. Carolyn MacKenzie, Lawrence Livermore National Laboratory.

27 FEB 2012 TARGETING CANCER: SIMULATION TOOLS TO IMPROVE RADIATION THERAPY

Dr. Joseph Perl of the SLAC National Accelerator Laboratory Scientific Computing Applications Group discusses how he and his colleagues are turning the simulation toolkit Geant4 into a powerful application for medical physicists. Originally designed to track subatomic particles in high-energy physics experiments, Geant4 can also map proton paths through patients' bodies during radiation treatment. [Available on DVD in the SSU library.]

5 MAR 2012 COSMIC VOYAGE

A video presentation from the National Air and Space Museum about the size and scale of the Universe. [Available online.]

12 MAR 2011 VISUALIZATION OF QUANTUM MECHANICS

Dr. Wilson Ho of the University of California, Irvine discusses how some of the problems that are routinely encountered in quantum mechanics, such as particle tunneling, Brownian motion, particle in a one-dimensional box, harmonic oscillators, and molecular orbitals, can be directly visualized by combining real-space imaging, atomic and molecular manipulation, and spatially resolved spectroscopy. It has also become possible to measure quantum phenomena and excitations arising from coupling of photon radiation and tunneling electrons with the molecular electronic states and vibrational motions. Results from these experiments provide a basic, visual understanding of atoms, molecules, and nanostructures. [Available on DVD in the SSU library.]

19 MAR 2012 SEARCHING FOR (AND OCCASIONALLY FINDING) THE MOST DISTANT GALAXIES

Dr. Bradford Holden of the University of California Observatories/Lick Observatory discusses the search for high redshift galaxies using the Hubble Deep Field (HDF) observations. [Available on DVD in the SSU library.]

2 APR 2012 A PHYSICIST'S WALK ON THE DARK SIDE

Dr. Karl van Bibber, University of California at Berkeley, takes a whirlwind tour through modern cosmology including the (hopefully) soluble problem regarding dark matter, some physical intuition on the axion, and the microwave cavity search of axionic dark matter. [Available on DVD in the SSU library.]

9 APR 2012 ADVANCED NANOPHOTONIC DEVICES FOR ULTRALOW POWER AND ULTRAFAST LASERS AND LEDS

Gary Shambat, Ph.D student at Stanford University, will show how Stanford's Nanoscale and Quantum Photonics Lab has demonstrated world record low power lasers and low power and fast LEDs using a technique

to electrically integrate nanonhotonic devices known as photonic crystal cavities. [Available on DVD in the
SSU library.]

16 APR 2012 TALES OF A PHYSICIST AND ENTREPRENEUR

Little did he know that life was going to be one big physics midterm, filled with problems he had never seen, but could solve from basic principles. This is the story of Andrew Leker, CEO, Electrified Games, Inc., and his career in game development, where his physics major was his edge. People and problems beware: here comes physics!

23 APR 2012 MATERIAL SCIENCE IN NUCLEAR APPLICATIONS

Material science in nuclear application is an integral part of nuclear engineering since any design or structure is only as good as the material it is build out of. Therefore, a thorough understanding of basic material science is required just as for any engineering field. Dr. Peter Hosemann, of the University of California Berkeley, will present an initial overview of the function of material scientists in engineering, as well as an introduction of what radiation does to materials.

10 SEP 2012 RECENT RESULTS FROM NASA'S KEPLER MISSION: GOOD PLANETS ARE HARD TO FIND AND VICE VERSA

Kepler vaulted into the heavens on March 6, 2009, initiating NASA's search for Earth-size planets orbiting Sunlike stars in the habitable zone, that range of distances for which liquid water would pool on the surface of a rocky planet. In the 1000+ days since Kepler began science operations, a flood of photometric data on upwards of 190,000 stars of unprecedented precision and continuity has provoked a watershed of 2300+ planetary candidates (most sub-Neptune in size and many comparable to or smaller than Earth). Dr. Jon Jenkins of the SETI Institute will expand on the resounding revolution in stellar asteroseismology the findings have caused.

17 SEP 2012 SOLAR NEUTRINOS IN 2012: THE END OF DAYS?

Huge strides have been made in the field of solar neutrinos in past decades, with the resolution of the solar neutrino problem providing clear evidence of neutrino oscillation. Measurements of the low-energy solar neutrinos can answer these questions for us, but such measurements require a large, ultra-low-background detector capable of making a precision measurement at low energy thresholds. This talk by Dr. Gabriel Orebi Gann of University of California at Berkeley will summarise the status of the field, and the experiments that will help us to shed light on these mysteries.

24 SEP 2012 The Geostationary Lightning Mapper

Dr. Samantha Edgington from Stanford University explains the Geostationary Lightning Mapper, a part of the GOES-R weather satellite, will detect lightning from geostationary orbit to provide early indication of severe storms and provide long term climate data. [Available on DVD in the SSU library.]

1 OCT 2012 GLOBAL WARMING

Dr. Rohde is lead scientist at Berkeley Earth, which analyzed land-surface temperature records going back 250 years, about 100 years further than previous studies. The analysis shows that global warming is real, and that the best explanation of the temperature increase is a combination of volcanoes and human greenhouse gas emissions. [Available on DVD in the SSU library.]

8 OCT 2012 NASA EDUCATION AND PUBLIC OUTREACH AT SONOMA STATE UNIVERSITY

Prof. Cominsky founded SSU's NASA Education and Public Outreach group in 1999 and has received over \$12 million in funding since that time. She will describe some of the exciting educational materials that they have developed that use high-energy space science as a means to inspire students, to train teachers nation-wide, and to enhance science literacy for the general public.

15 OCT 2012 THE UNIVERSE IN ABSORPTION

As the light from bright, distant objects traverse the Universe, intervening gas clouds---between, around, and in galaxies---absorb the light at wavelengths characteristic, albeit redshifted, of the elements in the clouds. By identifying and modeling the elements associated with absorption systems, Dr. Kathy Cooksey from the Massachusetts Institute of Technology will explain how we learn about how gas is processed through and dispersed from galaxies over cosmic time.

22 OCT 2012 SOME MAGNETIC MOMENTS

Dr. Pines will describe the origins and scientific foundation of nuclear magnetic resonance (NMR) and its intellectual daughter - magnetic resonance imaging (MRI). Beyond the fun of spin dynamics, the methods have wide applicability in disciplines ranging from physics and materials to chemistry and biomedicine. Recent

advances include the miniaturization of NMR and MRI on to a portable microfluidic platform.

29 OCT 2012 THE HIGGS BOSON UNLEASHED

Dr. Haber, co-author of "The Higgs Hunter's Guide", will give his perspective on the recent exciting results from the Large Hadron Collider.

5 NOV 2012 THE UNIVERSE IN AN ATOM: HOW PRECISION MEASUREMENTS OF ATOMS CAN PROBE THE UNIVERSE'S GREATEST MYSTERIES

Dr. Derek Kimball will discuss how modern cosmology poses deep, unanswered questions about the nature of the universe, we are searching for possible answers to these questions using precise measurements of atomic spins. Heretofore undiscovered, symmetry-violating interactions could explain dark energy, contribute to dark matter, and generate the matter/antimatter asymmetry of the universe. Such interactions also produce spin-mass and spin-spin interactions that can be searched for in laboratory experiments in a variety of ways.

19 NOV 2012 THE PERIODIC TABLE IN MOTION: WHERE WILL IT END

Dr. Heino Nitsche, the founding director of the Glenn T. Seaborg Center at Lawrence Berkeley National Lab, conducts research into the heaviest elements and their properties. Recently the team discovered six new isotopes, reaching in an unbroken alpha decay chain from element 114 down to 104, rutherfordium. This is a major step toward better understanding how to explore the region of enhanced stability thought to lie in the vicinity of element 114 - and possibly beyond. [Available on DVD in the SSU library.]

26 NOV 2012 DARK ENERGY FROM THE LARGEST GALAXY MAPS

The effects of dark energy imprint on large galaxy maps. Dr. David Schlegel will describe the results from the Sloan Digital Sky Survey, which has mapped over a million galaxies and quasars in 3-D, and the future prospects from the BigBOSS project. [Available on DVD in the SSU library.]

28 JAN 2013 DISTRIBUTED ENERGY RESOURCES

Prospects for distributed energy resources (DERs) are affected by a spectrum of interesting considerations and drivers such as: technology advancement and acceptance; technological transformation in the electric utility realm; mechanical and electrical engineering theory and modeling and the intriguing nexus between science/technical issues and business/economics issues. Jim Eyer of E & I Consulting discusses the above.

4 FEB 2013 SEARCHING FOR GRAVITATIONAL WAVES WITH LIGO

Dr. Beverly Berger, the Former Program Director for LIGO Project, National Science Foundation talks about when massive objects move in space, they cause space (and time) to ripple. Even if these ripples are produced by the falling together and merger of two black holes, the ripples (or gravitational waves) reaching the earth would cause a very tiny effect---equivalent to the change in the distance from the earth to the sun by the diameter of a single atom. Astonishingly, the Laser Interferometer Gravitational-wave Observatory (LIGO) is designed to detect these tiny ripples and to observe gravitational waves for the first time.

11 FEB 2013 NOT JUST FOR SCIENTISTS: NASA AND SSU BRING SCIENTIFIC ADVANCES TO THE CLASSROOM AND THE WORLD

Funded by NASA, the Eduction and Public Outreach Group at SSU develops programs that bring new science and research experiences into the classroom. This presentation by Dr. Kevin McLin will highlight two of these programs, one involving telescopic observations for undergraduates and high school students, and the other describing a new curriculum in modern cosmology for non-science major undergraduates.

25 FEB 2013 TEACHER RESEARCH EXPERIENCES: IMPACT OF THE STEM TEACHER AND RESEARCHER (STAR) PROGRAM

Dr. Rebar, joining us via Skype video, and Ms. Seimer, joining us in-person, will present a lively overview of the teacher-researcher experiences possible in the STAR program. STAR is a 9-week summer research internship for aspiring science and mathematics teachers.

4 MAR 2013 DOING POLICY AND TECHNOLOGY EXPERIMENT WITH NUCLEAR WEAPONS

No one (except North Korea) tests nuclear weapons anymore. However, Dr. Jay Davis and others in the physics and policy community conducted a social and technical experiment last week in Washington to see if obstacles to the next nuclear arms reduction treaty could be understood and resolved. The need for this, the experiment itself, and the results will be described.

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11 MAR 2013 TINY MOONS AROUND ASTEROIDS

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After decades of speculation, the existence of multiple asteroids---asteroids with one or several companions around them---has been observationally confirmed thanks to the advanced imaging capabilities of large telescopes; Dr. Franck Marchis a Senior Researcher at SETI Institute will present this discussion.

25 MAR 2013 A THIRSTY LAB

SSU Professor Dr. Qualls addresses the serious issue of water supply. An estimated 780 million people lack access to an improved water source and more than 3 million die every year due to water related diseases. This talk takes a hard look at new emerging air to water collection technologies, alternative large scale water sources, and development of new water collection devices at SSU.

8 APR 2013 NIRCAM FOR THE JAMES WEBB SPACE TELESCOPE

Frederick Arioli, an SSU Physics alumnus from 1975, will be presenting a glimpse of his work at Lockheed Martin as part of the team building the NIRCam instrument for the James Webb Space Telescope. This next generation space telescope is the heir to the Hubble Telescope and has a collecting area about five times larger.

15 APR 2013 MUSICAL ACOUSTICS OF BAROQUE BASSOONS

A connection between music and physics-- a bassoonist and a physicist, Dr. Bryant Hichwa, Sonoma State University (Emeritus), have worked together to model the standing wave physics in Baroque bassoons and accurately predict the pitch of the various notes of the bassoon.

22 APR 2013 NMR SPECTROSCOPY AS A TOOL FOR BRIDGING PHYSICS AND (BIO)CHEMISTRY

The principles of NMR spectroscopy are based on pure physics and can be described using classical or quantum mechanics. Dr. Monika Ivancic's (B.S. Physics SSU '93) talk will describe some of the basics of NMR and show how NMR is useful to several other disciplines.

9 SEP 2013 MAGNETIC FIELDS ON THE SUN: ALL THAT STUFF FROM E&M REALLY WORKS!

Dr. Brian Welsch from UC Berkeley will present this talk. Essentially all solar activity is modulated by the Sun's magnetic field, ranging from dramatic solar flares and coronal mass ejections (CMEs) to longer-term radiance variations that can affect terrestrial climate. As it happens, several concepts discussed in courses covering electricity and magnetism (E & M) have direct application in modeling solar magnetic fields. [Available on DVD in the SSU library.]

16 SEP 2013 A CITIZEN SCIENCE COLONIZATION MODEL FOR THE KOPRULU SECTOR IN STARCRAFT 2

Dr. Tom Targett (SSU) will present results from a citizen science outreach project to develop models of

interstellar colonisation based on the multi-player strategy game StarCraft 2. Data were gathered from the online gaming community to provide a test set of outcomes for encounters between several fictitious alien species, each following various economic and military strategies. [Available on DVD in the SSU library.]

23 SEP 2013 DARK MATTER: AND HOW WE WOULD NOT BE ALIVE WITHOUT IT

In this talk, Professor Tom Abel from Stanford University/KIPAC will explain how observations using telescopes convinced the scientists that Dark Matter must exist. [Available on DVD in the SSU library.]

30 SEP 2013 S4: SMALL SATELLITES FOR SECONDARY STUDENTS

Kevin John ('07) of Sonoma State's NASA Education and Public Outreach group will discuss an exciting project conceived and executed here at Sonoma State to teach STEM principles to middle and high school students by incorporating Arduino-based electronics and programming with the visceral thrill of launching high-powered rockets. [Available on DVD in the SSU library.]

7 OCT 2013 PHYSICS AND LAW: INTELLECTUAL PROPERTY AND 21ST CENTURY BUSINESS

Wayne Sobon, VP & General Counsel from Inventergy, Inc. will present this talk on intellectual property, which is fast becoming the critical modern business asset. It lies at the intersection of science, between business and language. Those with degrees in science, particularly physics, remain in high demand in all areas of intellectual property, particularly patent law.

14 OCT 2013 EXO AND THE QUEST FOR MAJORANA NEUTRINO MASSES

Dr. Giorgio Gratta from Stanford University will discuss recent evidence pointing towards a non-zero mass for neutrinos, and will describe how the EXO program might be able to measure neutrino masses.

21 OCT 2013 SOLAR FUELS PRODUCTION BY ARTIFICIAL PHOTOSYNTHESIS

Dr. Joel Ager from the Lawrence Berkeley National Laboratory will explain his research on practical methods to use sunlight to generate liquid transportation fuels, using a carbon-neutral energy source. Artificial

photosynthesis is the first step to such alternative fuels.

28 OCT 2013 DEVELOPING SCIENTIFIC WRITING: CURRICULUM AND CLASSROOMS TO SUPPORT SCIENCE LITERACY

Dr. Leslie Atkins of California State University, Chico, will describe what makes scientific writing "scientific" and how it might be excluding a wider participation in science. The relationship between the classroom and scientific literacy will be further explained through Dr. Atkins' research.

4 NOV 2013 WHAT (SOME) PHYSICISTS DO: ONE HILLBILLY'S PERSPECTIVE ON THE SUBJECT

Dr. Jerry Johnston from Optical Coating Laboratory Inc. in Santa Rosa will be talking about his career evolution from being an academic to a technical project manager position in the aerospace and defense industry.

18 NOV 2013 THE DARK UNIVERSE THROUGH EINSTEIN'S LENS

Dr. Deborah Bard from SLAC and KIPAC will be talking about how gravitational lensing was first observed and how it is used for studying exoplanets to Dark Matter and much more.

Current semester

History of the Series

Please send comments, additions, corrections, and questions to joe.tenn@sonoma.edu

<u>JST</u> 2013-12-06