Activities Report

of the

Department of Physics

1991–92

The University of Texas at Austin

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Cover: Cover design was prepared from notes for a published lecture by Professor Alfred Schild (1921-1977). These materials are a part of the Alfred Schild Collection maintained by the Harry Ransom Center. Dr. Schild was the founder of the Center for Relativity at The University of Texas at Austin.
Introduction

The Department of Physics experienced a successful and eventful 1991-92 academic year. During this year, the final year of the Chairmanship of Dr. Austin Gleeson, many improvements in the teaching program were implemented and several faculty received prestigious international as well as national honors. The first section of this report is an overview of major departmental changes and new research and teaching activities initiated during the academic year. It describes special awards and introduces new faculty, new students, and new programs.

The second section is a listing of all colloquia and seminars given by Physics faculty, students and staff during the 1991-92 academic year. There were about 300 seminars, which have been categorized by interest group in this report. The speakers, from institutions all over the world, are at the leading edge of research in all areas of physics. They come to Texas both to speak and to listen. Their presence on our campus is an excellent index of the high regard in which our faculty is held.

The third section is a listing of faculty publications in refereed journals, the most widely used measure of valid scientific ability. Refereed journals require careful prepublication review by independent referees to determine correctness and importance. The publication list is strong evidence of an active faculty.

The final section lists our graduates for 1991-92, giving the titles of doctoral dissertations and master's theses. These dissertations and theses, most of which are published in refereed journals in collaboration with students' advisors, clearly demonstrate that our students are engaged in the most current fields of physics research.

The Department of Physics at The University of Texas at Austin is among the best in the world. Its size allows for a range of interests that encompasses almost all of modern physics research. The teaching, at both the graduate and undergraduate levels, reflects the influence of quality faculty involved in an active research program.

Peter J. Riley
Chairman
Overview of 1991-92 Activities

Special Accomplishments in Teaching

The Department of Physics at The University of Texas at Austin serves in three special teaching roles: service teaching for non-majors, teaching of majors, and teaching of graduate students. In addition, we sponsor workshops for area high school physics teachers and their students, and sponsor summer research/teaching programs for high school students. In all areas of teaching we attempt to provide the most modern comprehensive education possible. In all areas we made significant gains during the past year.

Procedures for improvement in teaching Engineering Physics (Physics 303K and L) have been taking place during the last nine months. This course, our largest service course, handles approximately 3,000 students per year, and is designed to provide freshman engineers with the necessary background in classical physics. It is required for all engineering degrees and has the reputation for being a grueling and impersonal introduction to basic physics. Previously, the computerized homework generation and grading was conducted single-handedly by Dr. Charles Scherr. Dr. Austin Gleeson gave the responsibility for the course to a team of professors and students led by Professors Fred Moore and Charles Chiu. One of the primary goals was to modernize the computer programs which generate individualized problems on all homework sets and exams, and then grade the results. Although it may seem paradoxical, computerized grading probably has the effect of making the courses more personal than they would otherwise be; by freeing graduate assistants from the task of grading hundreds of problems each week, it allows them to conduct large numbers of additional office hours and problem sessions at which they can answer student questions. In addition, the objectivity of computer grading means that almost no time is wasted arguing about errors or partial credit. The goals in modernizing the computer system were to increase flexibility in the types of problems that could be assigned, to generate a large new base of problems with carefully worked solutions, and to improve the legibility and appearance of the printouts associated with the course. Multiple-part problems and problems with variable numbers of multiple-choice answers were some of the added features. New programs to create the problem sets were written by David Chao and Herio Ward, new programs to grade the results were written by Dr. Michael Marder, and Dr. de Lozanne developed a computer program to fill out bubble sheets for Phy 303K and L exams and make seating assignments. Many graduate assistants were involved in the implementation of the new system, writing the problems and developing new procedures. The classes have received these new formats well.

A new course, Physics 364E, was developed by Prof. Duane Dicus. This is a course in Quantum Mechanics for engineers. It emphasizes topics of interest related to condensed matter physics. So, for example, much attention is devoted to quantum statistics, Block’s Theorem, the Koenig-Penney model, and the Brillouin Zones while less emphasis is placed on radial solutions to the hydrogen atom. This course was taught for the second time in the Fall of 1991 and will continue to be taught each fall semester. The enrollment is approximately one-half engineering graduate students and one-half undergraduates from engineering and Natural Sciences.

For our physics majors we are continuing our efforts to improve the lower-division laboratory courses. The emphasis will be to use small computer work stations to log, reduce, and analyze data. This past year the Department of Physics received approximately $19,000 from AT&T’s Undergraduate Laboratory Equipment Award which funded the development and outfitting of the Undergraduate Teaching Laboratory with ten Macintosh IICl computers. The students in the Physics 101 Lab, taught by Dr. Amir Zaidi, are learning to use the most modern computers and software to analyze the data in ways accessible only to research groups in the past.

At the graduate level Dr. Toshiki Tajima developed a new graduate course, Topics in Accelerator Physics, with Alex Chao of SSC Laboratory. This class, Physics 391T, was taught during the Spring 1992 semester.
The Department along with the SSC were hosts to the U.S. Particle Accelerator School. There is shortage of physicists trained in accelerator technology. The Department of Energy provides support for schools at which students from all over the world can earn graduate credit for courses in accelerator physics. Previous schools have been held at the University of Chicago, Harvard University, and Stanford University. More than two hundred students attended the two-week school, held for the first time in the winter intersession at U.T.

The Department of Physics continued its efforts to recruit the best possible students for its programs. Plans are underway to raise requirements for admission to the program. The continuation of the Department of Education Fellowship Grants as well as higher salaries for Teaching Assistants enabled us to recruit one of the best beginning graduate classes ever into the Department.

During the summer of 1992, 80 high-ability high school students participated in a 9-week research program at UT entitled Young Scholars Program in Life Sciences and Biochemistry, Chemistry, and Physics sponsored by the National Science Foundation. The program was directed by Irwin Spear (Botany) and Jack Turner (Physics) with additional faculty/staff participation by Joe Lagowski (Chemistry) and Karl Trappe (Physics). During the first four weeks the students combined normal coursework with half-time research in the laboratories of faculty in participating departments. During this time, each student assembled a computer which was used throughout the summer and taken home at the end of the program. For the remaining five weeks, the students were engaged in full-time research, ending the summer with a two-day scientific conference at which posters and oral presentations by each student reported the results of research. About two-thirds of the students were from Texas, with the rest coming from all over the U.S. Of the 80 participants, 21 were in the physics part of the program. Funding for the program is scheduled to continue for summer 1993 as well. Due to a number of novel features of the program, NSF identified it as one of only a few to be treated as pilot projects, and funded it at a level exceeded only by two of the more than 120 Young Scholars Programs now active.

The Department of Physics has continued to sponsor workshops for area high school physics teachers and their students. Members of the faculty gave lectures on chaos, relativity, neutrinos, sound, computers and physics instruction, and pseudoscience. Following a lunch provided by the Department, the teachers participated in a workshop on lecture demonstration equipment conducted by Dr. Karl Trappe. During these sessions, teachers were provided with materials and the necessary help to complete the construction of a lecture demonstration apparatus for use in their classes. The enthusiasm of the teachers for these workshops resulted in a summer course for teachers on Physics Demonstrations, taught by Dr. Karl Trappe. Partial financial support for the course was provided by the Eisenhower Mathematics and Science Education Act.

Research Accomplishments

During the past year faculty, staff, and students of the Department of Physics made significant research advances. Perhaps the most significant of these is the upgrade of the Texas Experimental Tokamak. The Tokamak TEXT is in its final stages of completion of its $6 million upgrade. To continue our search for the explanation of plasma transport in magnetic fields we are changing the magnetic configuration, adding more heating power, and developing new diagnostics to measure the turbulent fluctuations in the plasma core.

The new vacuum vessel is operational, as are a large number of the new diagnostics. These include a system to measure plasma temperature fluctuations, based on studying the electron cyclotron emission from the plasma. A new heavy ion beam probe, producing Cs+ of T+ ions with an energy of up to 2MeV, now allows us to penetrate to the plasma center and measure density and potential fluctuation levels there. A new Thomson scattering system now provides multi-point profiles of equilibrium plasma temperature. In August 1992 the Tokamak was closed for a period expected to last about 7 months, to allow installation of new windings which will generate the new magnetic configuration. New power supplies (associated with the new windings) can be seen in the basement of the ENS building.
Physics successes in the last 12 months include improving the edge plasma confinement by inducing a plasma mass flow. We believe that this works by de-correlating the natural electrostatic turbulent structures, decreasing the associated diffusion, and thus increasing confinement. We are also pursuing the possibility of feedback stabilizing the edge electrostatic fluctuations. Preliminary experiments show we can either reduce or increase edge turbulence, depending on the phase between sensor and driver.

We have generated high energy (~1 MeV) “runaway” electrons, and measured their transport. These electrons are sensitive to the turbulent magnetic fluctuations rather than the turbulent electrostatic ones. In the plasma edge we have compared the measured magnetic fluctuations with those inferred from the runaway electron transport; the agreement validates the quasi linear theory of test particle transport in a fluctuating magnetic field. We hope to be able to make use of these runaway electrons to measure the magnetic fluctuations in the plasma interior, and answer the question “Is plasma transport caused by electrostatic or magnetic turbulence?”

Prof. Toshiki Tajima helped create the national Numerical Tokamak Project consortium to advance the UT Numerical Tokamak as one of six U.S. DOE Grand Challenge projects. Dr. Tajima initiated the laser wakefield project with Dr. Downer. This is the first such DOE project selected in the country and its international collaboration with KEK-Japan. He also initiated the undergraduate summer internship in computational physics in the Physics Department (Summer of 1992). Also, Prof. T. Tajima co-authored a theoretical idea with J. Dawson, laser beatwave acceleration, 1979, which has been experimentally verified (Osaka and UCLA). Prof. Tajima, who has been working in various phases of research in connection with the SSC, has also determined the properties of beam-beam interaction in the SSC.

Dr. James Koga, who received his doctorate from U.T. in August under the supervision of Dr. Tajima, was elected as a 1992-93 SSC Lab Fellow for his Ph.D. dissertation. Dr. Koga is developing computer software to track and analyze the disorganization of the proton beams. According to Dr. Tajima, “His method of tracking, developed here in Austin, is the most advanced. Cumulative collisions eventually become unstable and the beams may go out of control. We need to be able to do lots of sophisticated tracking of this information without bankrupting the computer. James is working on modeling the effects in two dimensions.”

Our High Energy group has received support from the Texas National Research Laboratory Commission to conduct detector R&D for SSC experiments. They are also actively participating in the new GEM proposal for a major high $p_T$ detector at the SSC. Under the direction of Dr. Jack Ritchie, our new program in High Energy Physics continues in an important series of rare kaon decay experiments at Brookhaven National Laboratory.

In the area of condensed matter physics, Dr. Alex de Lozanne has done the first four-point measurements of STM-fabricated nanostructures and the first observation of Cu-O chains in Y Ba$_2$ Cu$_3$ O$_7$.

Dr. Ken Shih’s group has achieved, through scanning-tunneling microscopy (STM) studies of graphite, selective images of the two inequivalent sites of graphite atoms. This new observation revises the widely accepted but incorrect interpretations of STM images of graphite. They have also, for the first time, successfully mapped out the detailed electronic structure on the nanometer scale across AlGaAs/GaAs semiconductor heterostructures using scanning tunneling spectroscopy (STS).

Research by Dr. Michael Downer and students using femtosecond laser pulses to create and probe the liquid phase of carbon was highlighted in the article “First Light on Fluid Carbon” published in NATURE 356, 110 (12 March 1992) written by 1981 Nobel laureate Nicolaas Bloembergen.
Over the last two years Dr. Manfred Fink (Atomic and Molecular Physics) has designed a new Raman spectrometer which will extend the present technology by several orders of magnitude in sensitivity, range, and resolution. The apparatus is currently under consideration for a patent and for the use in the detection of impurities in the emissions of smokestacks. It is built on the ability of laser diodes which can produce very monochromatic, intense light beams which are further enhanced by multi-passing. The scattered light signal from a gas mixture is collected and preselected by a narrow absorber which totally removes the very strong elastic contribution. The remaining spectrum passes the filter absolutely unperturbed and is analyzed by the fast Fourier transform spectrometer. Dr. Fink can measure very soft modes of solids and biological molecules as well as impurities of less than 1 part per million. The data reflects the absolute concentrations and mixtures of gases with over one hundred constituents can be recorded free of interference and with large dynamic range. The absorption of light in gases is often an undesired effect for large signal transfers. This effect is blocked by an electromagnetically induced transparency which is based on the modification of atomic states by a second pump laser beam. The theory predicts the modification of the index of refraction. This hypothesis is currently tested in a rubidium cell.

At UT-Austin we have one of the premier programs in nonlinear dynamics, directed by Dr. Harry Swinney. An article by Q. Ouyang and H. Swinney appeared in the July 1992 issue of Discover Magazine which reviews Swinney's work on Turing patterns. Dr. Swinney and Dr. Ouyang are continuing their research of remarkable patterns which were first predicted by Alan Turing and have just now been observed. Swinney and his colleague have simulated Turing's scheme in a disk-shaped polymer gel, an inch in diameter and a tenth of an inch thick. The gel is sandwiched between hair-thin disks of porous glass that separate it from reservoirs of chemicals. They found that when they cooled the gel below the critical temperature (64 degrees) the patterns appeared.

In the same area of nonlinear dynamics, which includes the study of chaos, Dr. Michael Marder has received a Texas Advanced Research Program grant for $128,000 for a period of two years to study fracture. His research achievements include new experimental measurements of thermal and acoustic emissions from fracture, and measurement of fracture energy in a new way. The main theoretical success has been the discovery of analytical solutions for cracks in discrete lattices. He has also published equations for self-forming channels and for an unexpected long-time exponent in phase transitions.

Dr. Richard Matzner, Director of the Center for Relativity, along with his research group at Texas and collaborators at Cornell have solved the initial data problem for two black holes. Dr. Matzner has received a Texas ARP grant to study the interaction of black holes via computational techniques.

Dr. Bryce DeWitt, of the Relativity group, has completed the first stage (after 4-1/2 years of effort) of a major supercomputer project. He along with his research group, together with Prof. Joe Polchinski, were able to show that the quantized $O(1,2)/O(2) \times Z_2$ sigma model (a toy model for quantum gravity) has no continuum limit in four dimensions. This result is substantially different from lattice calculations using other field theories.

Dr. Cécile DeWitt-Morette has developed an axiomatic basis for functional integration (in collaboration with Pierre Cartier). She is currently writing a book with Pierre Cartier on functional integration.

**Faculty and Student Honors**

Prof. Austin Gleeson was chosen as one of Drexel University's 100 most distinguished graduates. He was presented with the Drexel Centennial Medal at a ceremony on June 12, 1992. The selection process involved the review and screening of nominations from over 60,000 alumni living worldwide. Outstanding professional and personal achievement, with a demonstrated contribution to society, were the criteria used in selecting the "Drexel 100." Prof. Gleeson is the current holder of the Marian Harris Thornberry Centennial Professorship in Physics and served as the Chairman of the Department of Physics during the past four years.
Prof. Cécile DeWitt-Morette was awarded the Prix des Sciences Physiques et Mathématiques by the Comité du Rayonnement Français. This is a very prestigious award which is given annually to a French scientist who has made significant contributions to science with an impact outside of France. Prof. DeWitt-Morette was required to travel to France to receive the award which included a $10,700 cash prize.

Prof. Manfred Fink was a recipient of the Humboldt Award (Senior U.S. Scientist Award) presented to him by the German government. This award offered Dr. Fink the opportunity for an extended stay in Germany for research at the Max Planck Institute for Quantum Optics. In addition, Dr. Fink has received a new NSF grant for study of the neutrino restmass determination.

This year Professors Qian Niu and Alex de Lozanne were awarded one of the two National Institute of Standards and Technology Precision Measurement Grants given nationwide. These are very competitive grants: six semifinalists were chosen from the pre-proposals of many researchers from across the country. The semifinalists wrote final proposals from which two were chosen. The other recipient of the grant was Dr. Dan Heinzen also of our Department. Ours is quite possibly the only university in the country to receive two such grants in the same year. Drs. Niu and de Lozanne will be developing a “quantum charge pump,” a device that counts single electrons as it pushes them from one electrode of the pump to the exit electrode. This device was invented by Prof. Niu, who now holds a patent on it. Since the smaller the device can be made the better its performance will be, Prof. de Lozanne’s technique for making metallic wires as narrow as 35 mm, with the Scanning Tunneling Microscope, will be used to build the device. NIST is very interested in this device, because it could be the official standard of current.

Dr. Dan Heinzen received the NSF Young Investigator Award. Dr. Heinzen, an Assistant Professor of Physics, is involved in a recent development in physics research known as “atom trapping.” This is a process in which laser beams are shot into a vacuum tube holding a minute amount of gas, with the lasers positioned in such a way that the gas molecules are forced into a central region where their energy drops precipitously. Trapped atoms display several interesting characteristics including the lowest temperature ever recorded in a controlled laboratory experiment. The research is basic at present and has no current applications, although the process could someday have applications to the manufacture of microscopic electronic components and very precise atomic clocks.

Dr. Wendell Horton received a commendation from the Office of Fusion Energy Research in the Department of Energy for ten years of leading the US-Japan Fusion Theory Exchange Program called JIFT (the Joint Institute for Fusion Theory).

Dr. Mel Oakes received three teaching awards in the past year. He received the Jean Holloway Teaching Award, a plaque from the Friars Society for Contributions to Undergraduate Teaching, and a teaching award plaque at the Natural Sciences Honors Program.

Prof. Ilya Prigogine was elected President of the National Academy of Sciences of the Republic of San Marino, Italy in 1992. In December of 1991, he was one of six Nobel laureates who participated in the “Great Nobel Debate,” in Stockholm, Sweden. Nobel laureates were present for the PBS televised debate, hosted by David Frost and aired in the U.S. Dr. Ilya Prigogine received an honorary degree, D. Honoris Causa, from Tucuman, Argentina in 1991.

Dr. Mark Raizen joined the Department of Physics as an Assistant Professor in September 1, 1991. Dr. Raizen received his Ph.D. in 1989 under the supervision of Dr. Steven Weinberg and Dr. Jeff Kimble. After leaving Texas he served as a postdoctoral fellow at the National Institute of Standards and Technology with Dr. David Wineland. Dr. Raizen was recruited as a replacement for Dr. Jeff Kimble who left to go to Caltech. Since that time he has made rapid progress in establishing his lab for research in laser physics and quantum optics. He has received the ONR Young Investigator Award from the Navy and will receive $75,000 for each of three years. Dr. Raizen was "one of 16 investigators selected from an outstanding group of 234 applicants. This program is designed to attract young scientists and engineers who show exceptional promise for doing creative research and teaching." He also was selected as an Alfred P. Sloan Foundation Fellow. This is an
extraordinarily competitive award involving nominations for most of the very best young scientists from around the country. This award includes a grant of $30,000. Additionally, Dr. Raizen received a URI grant for the study of “Quantum Optics with Trapped Ions.”

Prof. E.C.G. Sudarshan has received the Sir Devaprasad Sarbadhikari Medal. This medal is awarded annually by the University of Calcutta for especially meritorious achievement. Dr. Sudarshan is being recognized for his many contributions to science. Additionally, Prof. Sudarshan has received an honorary degree of Doctor of Science from the Cochin University of Science and Technology in Kochi, India.

Dr. Harry Swinney was named a member of the National Academy of Sciences on April 28, 1992. The National Academy of Sciences is a 130-year-old private organization that advises the Federal Government on science and technology. Election to the academy is considered one of the very highest honors that can be accorded an American scientist or engineer.

Prof. Steven Weinberg received the National Medal of Science award, which was presented to him by President Bush at a ceremony at the White House on September 16, 1991. Weinberg was awarded the medal for “his contributions to the discovery of the structure of the fundamental forces of nature; the development of the standard model; and the unification of the weak and electromagnetic forces.”

Ed Ehrichs (Ph. D., June, 1992) received the Granger Fellowship for postdoctoral work at the University of Chicago. His Ph. D. dissertation was selected by the University of Texas Graduate School as one of the University’s outstanding dissertations of 1992. The award carries a $500 prize and was announced at the Graduate Convocation. The work was supervised by Professor Alex de Lozanne, who was recognized at the same ceremony. Ehrichs’ dissertation was entitled “Nanofabrication with the Scanning Tunneling Microscope.”

Alan McAllister, one of Dr. Tajima’s graduate students, was elected as a Fellow by the Japan Society for the Promotion of Science. Dr. M. J. LeBrun, former graduate student of Dr. Tajima, won the STA-NSF Fellowship.

Dr. T. Kurki-Suonio, UC Berkeley, a former graduate of Dr. Tajima (Ph.D. 1989) accepted a permanent position at Helsinki University of Technology.

Pete Abbamonte received a graduate fellowship from the University of Illinois. He also worked in the Summer Research Program at Argonne National Laboratory.

Stacy Thompson, a Senior, worked at the Los Alamos Meson Physics Facility at Los Alamos, New Mexico under the direction of Dr. Gerry Hoffmann in the Summer of 1992.

Christine Pulliam participated in the Physics Summer Research Program at the University of Virginia.

Chris Richardson won the Presidential Endowed Scholarship.

Mohammed Hasan was awarded the McMinn Endowed Scholarship in Physics.

Cary Lapoint was selected as Distinguished Physics Graduate; Eric Howard was selected as Outstanding Physics Graduate.

Peter Matl was honored for a 4.0 average at the Natural Sciences Honors Program.
Colloquia

Sep 4, 1991
Prof. Philip J. Morrison
Department of Physics, U.T. Austin
Quasigeostrophic Flow and Hamiltonian Transport

Sep 18, 1991
Chancellor Hans M. Mark
U.T. Austin
The Human Exploration of the Solar System

Sep 25, 1991
Dr. S.K. Srinivasan
Indian Institute of Technology, Madras, India
Squeezed Light and Population Theory

Oct 16, 1991
Dr. Stan Brodsky
Stanford University, Stanford, CA
Novel Effects in Quantum Chromodynamics

Oct 31, 1991
Prof. Kip Thorne
California Institute of Technology, Pasadena, CA
LIGO: The Laser Interferometer Gravitational Wave Observatory

Nov 6, 1991
Ms. Sheila Tobias
Research Corporation, Tucson, AZ
Why is it so Hard?

Nov 13, 1991
Dr. Behran N. Kursunoglu
University of Miami, Coral Gables, FL
Short Range Gravitational Force

Jan 21, 1992
Dr. Samuel A. Werner
University of Missouri, Columbia, MO
Neutron Interferometry: Quantum Interference on a Macroscopic Scale

Jan 29, 1992
Prof. Bryce S. DeWitt
Department of Physics, U.T. Austin
How Does the Classical World Emerge from the Wave Function?

Feb 5, 1992
Prof. Donald E. Winget
Department of Astronomy, U.T. Austin
Asteroseismology with the Whole Earth Telescope

Feb 12, 1992
Prof. Manfred Fink
Department of Physics, U.T. Austin
Experiments with Oriented Molecules

Feb 19, 1992
Prof. Gene Commins
University of California, Berkeley, CA
Search for the Electric Dipole Moment of the Electron

Feb 26, 1992
Dr. Steven Cowley
Princeton Plasma Physics Laboratory, Princeton, NJ
On the Possibility of a 10Å Laser

Mar 4, 1992
Prof. Ronald K. Thornton
Tufts University, Medford, MA
Teaching Fundamental Physics Concepts Using New Technologies and New Approaches to Learning

Mar 11, 1992
Dr. Ralph Smith
University of California, San Diego, CA
Recent Applications of Statistical Mechanics to Guiding-Center Plasmas in Two-Dimensional Turbulence

Mar 25, 1992
Prof. Howard J. Carmichael
University of Oregon, Eugene, OR
Quantum Trajectories with Applications in Cavity QED

Apr 1, 1992
Prof. William H. Press
Harvard-Smithsonian Center for Astrophysics, Cambridge, MA
Quasars and Gravitational Lenses: How to Make Sense of Fractal Data

Apr 7, 1992
Dr. Pablo Laguna
Los Alamos National Laboratory, Los Alamos, NM
Stellar Disruptions by Supermassive Black Holes

Apr 8, 1992
Dr. Steve Chu
Stanford University, Stanford, CA
Laser Manipulation of Neutral Particles
Apr 15, 1992
Prof. Shoji Nagarniya
Columbia University, New York, NY
Towards New Forms of Nuclear Matter with Relativistic Heavy-Ion Beams

Apr 22, 1992
Dr. Martin Gutzwiller
IBM Research Center, Yorktown Heights, NY
Chaos and the Ground State of the Helium Atom

Apr 29, 1992
Prof. A.J. Stewart Smith
Princeton University, Princeton, NJ
Kaon Physics - Forty Years of Surprises

Atomic and Molecular Seminars

Sep 13, 1991
Prof. Lothar W. Frommholz
Department of Physics, U.T. Austin
Virial Expansions and Spectroscopy

Sep 27, 1991
Prof. Mark Raizen
Department of Physics, U.T. Austin
Generation and Application of Squeezed States of Light

Oct 11, 1991
Prof. T. Erber
Illinois Institute of Technology, Chicago, IL
Quantum Mechanics of Single Atoms

Nov 15, 1991
Prof. Mark Raizen
Department of Physics, U.T. Austin
Hot Topics from the Optical Society of America Meeting

Nov 22, 1991
Dr. Warren Nagourney
University of Washington, Seattle, WA
High Resolution Spectroscopy of a Single Barium Ion

Dec 6, 1991
Dr. Carter Kittrel
Rice University, Houston, TX
Probing Molecular Dynamics with Dissociative Resonance Raman Spectroscopy

Jan 31, 1992
Prof. Mark F. Hamilton
Department of Mechanical Engineering, U.T. Austin
Nonlinear Acoustics: Analogs of Phenomena in Nonlinear Optics

Feb 7, 1992
Dr. Robert S. Mackay
Department of Chemistry, U.T. Austin
Dynamics of Oriented Molecule-Surface Interactions

Feb 14, 1992
Prof. W. Sandner
University of Tennessee, Knoxville, TN
Laser Excited Three-Body Coulomb Systems

Feb 21, 1992
Prof. Michael Downer
Department of Physics, U.T. Austin
Photon Accelerator

Feb 28, 1992
Prof. John E. Thomas
Duke University, Durham, NC
High Resolution Atomic Position Measurement Using Optical Fields

Mar 6, 1992
Prof. Daniel J. Heinzen
Department of Physics, U.T. Austin
Searching for an Electron Electric Dipole Moment with Laser-Cooled Atoms

Mar 20, 1992
Dr. John D. Ewart
University of Arkansas, Fayetteville, AR
The Diffraction of Electrons by Gases: Some New Horizons

Mar 27, 1992
Prof. H. Schüssler
Texas A&M University, College Station, TX
Cavity Enhanced Photothermal Spectroscopy
Apr 3, 1992
Prof. Adrian Melissinos
University of Rochester, Rochester, NY
Search for Weakly Coupled Particles by Optical Techniques

Apr 24, 1992
Dr. Robert Drullinger
N.I.S.T., Time and Frequency Division, Boulder, CO
Cesium Atomic Clocks: A Study in Applied Atomic Physics and Error Analysis

May 1, 1992
Dr. Norman Bardsley
Lawrence Livermore National Laboratory, Livermore, CA
Dynamics in Femtosecond Plasmas

May 22, 1992
Prof. Ling-An Wu
Chinese Academy of Sciences, Beijing, China
Degenerate Three and Four Wave Mixing with Squeezed Light As the Input

August 11, 1992
Dr. David H. Reitze
Bellcore, Red Bank, NJ
Teaching Old Femtosecond Pulses New Tricks:
Pulse-Shaping for Control of Molecular Motion

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Condensed Matter Seminars

Sep 10, 1991
Prof. James C. Thompson
Department of Physics, U.T. Austin
Metal-Ammonia Solutions 1991

Sep 17, 1991
Prof. Leonard Kleinman
Department of Physics, U.T. Austin
A Quantum Mechanical MD Study of Liquid NA

Sep 24, 1991
Dr. James C. Thompson
Department of Physics, U.T. Austin
Metal-Ammonia Solids-1991

Oct 1, 1991
Prof. J. David Gavenda
Department of Physics, U.T. Austin
Ultrasonic Measurements of Electron Trajectories: A New Technique and Some New Results

Oct 8, 1991
Dr. D.S. Dessau
Stanford University, Stanford, CA
Angle-Resolved Photoemission from the Normal and Superconducting States of the Cuprate Superconductors

Oct 22, 1991
Prof. Dan Cox
Ohio State University, Columbus, OH
The Two-Channel Kondo Effect: A Unifying Principle for Exotic Superconductors

Oct 23, 1991
Dr. O. Enea
Faculte des Sciences de Universite de Poitiers, France
Electrochemical Behavior of Some Metallic Deposits Characterized by STM and X-ray Methods

Oct 29, 1991
Prof. F.W. de Wette
Department of Physics, U.T. Austin
Calculations of Phonons and Related Properties of High-Tc Superconductors

Nov 5, 1991
Prof. Laurens Jansen
University of Amsterdam, The Netherlands and ETH, Zurich, Switzerland
Superconductivity in K-, or Rb-, Doped C_60 and in K(BEDT-TTF)_2Cu(NCS)_2

Nov 12, 1991
Dr. G.A. Mulholland
Department of Physics, U.T. Austin
Pan-dimensional Magnetism Studies in Photoemission Paradise
Nov 26, 1991
Prof. Quian Niu
Department of Physics, U.T. Austin
Adiabatic Trapping of Electrons and Non-Adiabatic Corrections

Dec 3, 1991
Dr. Stephen Joyce
Battelle Memorial Institute, Pacific NW Laboratory, Richland, WA
Interfacial Force Microscopy of Self-Assembled Monolayers

Dec 6, 1991
Prof. Erwin Batalla
Royal Military College of Canada, Kingston, Ontario, Canada
Magneto-Optic Determination of Critical Current Density in Superconducting Thin Films

Jan 28, 1992
Prof. J.W. Allen
University of Michigan, Ann Arbor, MI
Electron Spectroscopy of Strongly Correlated Materials

Feb 4, 1992
Prof. Manfred Fink
Department of Physics, U.T. Austin
Scattering of Molecules from Surfaces; New Data, New Confusion, and a Possible Solution

Feb 11, 1992
Dr. John L. Fry
U.T. Arlington, Arlington, TX
Antiferromagnetic Coupling in Magnetic Superlattices

Feb 18, 1992
Dr. Jay Fineberg
Department of Physics, U.T. Austin
Instability in Crack Propagation

Feb 25, 1992
Dr. Marshall Onellion
University of Wisconsin, Madison, WI
Superconducting Properties Studied Using Photoemission

Mar 24, 1992
Prof. Wiley P. Kirk
Texas A&M University, College Station, TX
Quantum Transport Effects in Mesoscopic Systems

Mar 31, 1992
Prof. James C. Thompson
Department of Physics, U.T. Austin
Photoemission from AG: Dispersion Relation, etc.

Apr 6, 1992
Prof. John Markert
Department of Physics, U.T. Austin
Direct Moment Measurements on Ultrathin Ferromagnetic Films

Apr 9, 1992
Prof. N.G. van Kampen
Rijks Universiteit, Utrecht, The Netherlands
The Quantum Langevin Equation

Apr 23, 1992
Dr. R. Ralston
Massachusetts Institute of Technology, Cambridge, MA
High Tc Thin Film Microwave Devices

Apr 28, 1992
Prof. C.K. "Ken" Shih
Department of Physics, U.T. Austin
Scanning Tunneling Microscopy of Semiconductor Surfaces and Interfaces

May 15, 1992
Prof. Adolfo G. Equiluz
Montana State University, Bozeman, MT
Towards a First-Principles Implementation of Density Functional Theory at a Metal Surface

Jul 23, 1992
Dr. Neal D. Shinn
Sandia National Laboratories, Albuquerque, New Mexico
Surface Reactivity and Substrate Electronic Structure
High Energy/Particle Physics Seminars

Sep 19, 1991
Profs. Jack Ritchie and Karol Lang
Department of Physics, U.T. Austin
High Energy Physics at UT

Sep 23, 1991
Dr. Martin Marcin
University of Michigan, Ann Arbor, MI
Development of the D8 Intercryostat Detector

Sep 30, 1991
Dr. Bruce Straub
University of Washington, Seattle, WA
A-Dependence of Production of High $P_T$ Hadrons and High Mass Hadron Pairs

Oct 3, 1991
Dr. Chau T. Nguyen
Rice University, Houston, TX
Spin Effects in Inclusive $\pi^+\pi^-$ and $\Lambda$ Production at 200 GeV

Oct 7, 1991
Dr. Jim Cline
McGill University, Montreal, Canada
The 17 keV Neutrino, The Solar Neutrino Puzzle, and Supernova 1987A

Oct 14, 1991
Prof. I. Bigi
University of Notre Dame, Notre Dame, IN
CP Violation in B Decays (& Elsewhere) — The Low Road to New Physics

Oct 28, 1991
Prof. S.V. Akulinichev
INR, Moscow, USSR
Nuclear Structure Effects in Lepton-Nucleus Deep Inelastic Scattering

Nov 7, 1991
Prof. Probir Roy
Tata Institute, Bombay, India
Oblique Electroweak Parameters and New Physics

Nov 11, 1991
Prof. Howie Baer
Florida State University, Tallahassee, FL
$W$ and $Z$ Production at Hadron Colliders: Parton Showers Merged with $O(\alpha_S)$ Monte Carlo Approach

Nov 14, 1991
Dr. Doris Ann Averill
Indiana University, Bloomington, IN
The $Z^\pm\rightarrow$($\text{Heavy Quarks}$) Fraction at the SLC

Nov 18, 1991
Dr. Michael Barnett
Lawrence Berkeley Laboratory, Berkeley, CA
New Particle Searches at the SSC

Dec 2, 1991
Dr. Charles Allen
Department of Physics, U.T. Austin
A Quark-Gluon Plasma Search at the Tevatron

Dec 9, 1991
Dr. Carsten Petersen
University of Lund, Lund, Sweden
Neural Network in High Energy Physics

Feb 10, 1992
Dr. Larry Nodulman
Argonne National Laboratory, Argonne, IL
Electroweak Physics at the Tevatron Collider

Mar 2, 1992
Prof. Hironori Miyazawa
Kanagawa University, Kanagawa, Japan
Multivalued Wave Functions and the Bohm-Aharanov Effect

Mar 9, 1992
Prof. David V. Bugg
Queen Mary College, London, United Kingdom
Synchronization of Resonance Masses by Phase Locking

Mar 16, 1992
Dr. Pankaj Agrawal
TRIUMF, Vancouver, British Columbia
Leading Order Electroweak Corrections to $b\bar{b}$ Mixing Amplitudes

Mar 23, 1992
Prof. Harris Kagan
Ohio State University, Columbus, OH
Present Status and Future Prospects for Measurements of the Tau Lifetime
Mar 27, 1992
Dr. Aida El-Khadra
Fermi National Accelerator Laboratory, Batavia, IL
Phenomenology on the Lattice

Mar 30, 1992
Dr. Chung Kao
Florida State University, Tallahassee, FL
Searching for the Pseudoscalar Higgs in the Minimal Supersymmetric Model at Hadron Supercolliders

Apr 13, 1992
Dr. Lanny Ray
Department of Physics, U.T. Austin
Using the Dirac Equation to Describe Nuclear Scattering

Math/Physics Seminars

Mar 4, 1992
Prof. Tadeusz Balaban
Boston University, Boston, MA and Rutgers University, New Brunswick, NJ
Lattice Field Theories with Continuous Symmetry Group, Goldstone Bosons, and All That

Apr 24, 1992
Prof. Serge Aubry
Laboratoire Leon Brillouin, Saclay, France
The Concept of Anti-Integrability for Electron Phonon Systems

Nonlinear Dynamics Seminars

Sep 9, 1991
Prof. Alain Karma
Northeastern University, Boston, MA
Scaling and Selection of Spiral Patterns in Excitable and Oscillatory Media

Sep 16, 1991
Dr. Roman Mints
University of Tel-Aviv, Tel-Aviv, Israel
Plastic Flow Instability in Metals at Low Temperatures

Sep 23, 1991
Dr. Vladimir Gontar
Hebrew University of Jerusalem, Jerusalem, Israel
Chaos, Self-Organization, Space and Time in Physico-Chemical Systems

Sep 30, 1991
Dr. John Pearson
Los Alamos National Laboratory, Los Alamos, NM
Numerical Results on Chemical Symmetry Breaking in Three Dimensions

Oct 7, 1991
Dr. Desiderio Vasquez
West Virginia University, Morgantown, W.VA
Onset of Convection for Autocatalytic Fronts

Oct 14, 1991
Prof. John Pojman
University of Southern Mississippi, Hattiesburg, MS
Multicomponent Convection Induced by Traveling Fronts

Oct 21, 1991
Dr. Pascal Chossat
Universite de Nice/CNRS, Nice, France
Imperfections in the Couette-Taylor Problem

Oct 28, 1991
Prof. MaryLou Zeeman
Department of Mathematics, U.T. Austin
Three-Dimensional Competitive Lotka-Volterra Systems
Nov 4, 1991
Dr. Qi Ouyang
Department of Physics, U.T. Austin
Chemical Turbulence

Nov 11, 1991
Dr. Michael F. Schatz
Department of Physics, U.T. Austin
Transition in Plane Channel Flow with Spatially-Periodic Perturbations

Nov 18, 1991
Dr. Marc Brachet
Ecole Normale Superieure de Paris, Paris, France
New Experimental Approach in Turbulence: The Intermittency of Vortex Filaments

Nov 20, 1991
Prof. Shunichi Tsugé
University of Tsukuba, Tsukuba, Japan
Solitary Wave Solutions of Turbulent Premixed Flames and Bénard Convection

Dec 2, 1991
Prof. Melvin Hinich
Department of Government, U.T. Austin
The Role of Cumulant Spectra in the Study of Nonlinear Dynamics

Jan 27, 1992
Dr. Alexei Pretechevensky
Department of Physics, U.T. Austin and Institute for Automation and Electrometry, Novosibirsk, USSR
Siberian Studies of Couette-Taylor Flow Instabilities

Feb 3, 1992
Dr. Frederick H. Willeboordse
University of Tsukuba, Tsukuba, Japan
Windows, Attractors, and Self-Similar Patterns in a Coupled Map Lattice

Feb 6, 1992
Dr. Victor Steinberg
Weizmann Institute, Rehovot, Israel
Transition from Confined to Extended Traveling Waves

Feb 10, 1992
Prof. Sheldon Newhouse
University of North Carolina, Chapel Hill, NC
Entropy and Volume

Feb 14, 1992
Prof. Robert Buchler
University of Florida, Gainesville, FL
Arrhythmia in Stellar Pulsations

Feb 17, 1992
Prof. W.G. Pritchard
Pennsylvania State University, University Park, PA
Instability and Chaotic Behavior in Viscous Free-Surface Flows

Feb 24, 1992
Mr. George Broze
University of Houston, Houston, TX
Low Dimensional Dynamics in an Open Flow: A Periodically Forced Jet

Mar 2, 1992
Dr. Hiroshi Hasegawa
Department of Physics, U.T. Austin
Nonequilibrium Statistical Mechanics of Maps

Mar 9, 1992
Prof. Irving Epstein
Brandeis University, Waltham, MA
How the Leopard Got its Spots: Turing Structures and Chemical Pattern Formation

Mar 23, 1992
Dr. Boris Malomed
Tel Aviv University, Tel Aviv, Israel
Grain Boundaries in Two-Dimensional Nonlinear Dissipative Patterns

Mar 30, 1992
Prof. G. Gunaratne
University of Houston, Houston, TX
Topological Universality Beyond the Onset of Chaos

Apr 6, 1992
Prof. Bassett Maguire, Jr.
Department of Zoology, U.T. Austin
A Biologist Looks at Logistic Bifurcations

Apr 13, 1992
Dr. John Rinzel
National Institutes of Health, Bethesda, MD
Novel Rhythmogenesis in Coupled Neuron Models
Apr 15, 1992
Dr. Brosl Hasslacher
Complex Systems Group, Theory Division and
Los Alamos National Laboratory, Los Alamos, NM
Recent Developments in Lattice Gas Automata:
A Gateway to the Biochemical Pathways of the Cell

Apr 20, 1992
Prof. Martin Golubitsky
University of Houston, Houston, TX
Detecting Symmetries of Attractors

Apr 27, 1992
Dr. Oscar Manley
Never Linearize the Navier-Stokes Equation

May 4, 1992
Prof. Mark Raizen
Department of Physics, U.T. Austin
Nonlinear Optics with Small Atomic Samples

Nuclear Physics Seminars

Sep 27, 1991
Dr. Y. Suzuki
Niigata University, Niigata, Japan
Reactions of $^7$Li at Intermediate and High Energies

Jan 27, 1992
Dr. Peter D. Morley
Department of Physics, U.T. Austin
Electroweak Effects in Neutron Stars

Mar 9, 1992
Prof. David V. Bugg
Queen Mary College, London, U.K.
Dynamics of Pion Production

Plasma Physics Seminars

Sep 9, 1991
Dr. Giuseppe Cima
Department of Physics, UT-Austin
Thermal, Nonthermal, and Stimulated Electron Cyclotron Emission (ECE) Fluctuations in a Tokamak Plasma

Sep 30, 1991
Dr. Frank Waelbroeck
University of Maryland, College Park, Maryland
Stabilization of Drift Modes by Toroidal Rotation

Oct 14, 1991
Mr. Daniel D. Hua
University of California, Berkeley, CA
Some Recent Results on Drift Instabilities in Noncircular Tokamaks

Oct 21, 1991
Dr. King Lap Wong
Princeton Plasma Physics Laboratory, Princeton, NJ
Simulation of Alpha Particle Physics in TFTR

Oct 22, 1991
Dr. Paul Dubois
Lawrence Livermore National Laboratory
Livermore, CA
Computational Physics in Large Plasma Simulation

Nov 11, 1991
Dr. Niek Lopes Cardozo
FOM-Instituut Voor Plasmaphysica
Rijnhuizen, The Netherlands
Perturbative Transport Experiments in Tokamaks
Nov 18, 1991
Dr. Yuyi Nakamura
Kyoto University, Kyoto, Japan
MHD Stability and Transport of Heliotron-Torsatron Plasmas

Nov 25, 1991
Dr. Yil Bong Kimi
University of California, San Diego, CA
Neoclassical Rotation and Dynamics of L-H Transition

Nov 26, 1991
Dr. Christoph Ritz
Department of Physics, UT-Austin
Digital Spectral Analysis of Plasma Fluctuations - Part I: Basic Properties of Fluctuation Data

Dec 2, 1991
Dr. Chang-Bae Kim
Department of Physics, UT-Austin
New Fluid Model for the Ion-Temperature-Gradient Turbulence and Maximum Heat Flux

Dec 3, 1991
Dr. Christoph Ritz
Department of Physics, UT-Austin
Digital Spectral Analysis of Plasma Fluctuations, Part II: Linear Fluctuation Analysis

Dec 5, 1991
Dr. H.Y.W. Tsui
Department of Physics, UT-Austin
Formation of Velocity Shear Layer in Confined Plasmas

Dec 9, 1991
Dr. Gary L. Jackson
General Atomic, San Diego, CA
A New Regime of Very High Confinement (VH Mode) in DIII-D

Dec 10, 1991
Dr. Christoph Ritz
Department of Physics, UT-Austin
Digital Spectral Analysis of Plasma Fluctuations, Part III: Advanced Analysis

Dec 16, 1991
Dr. Robert L. Dewar
Australian National University, Canberra, Australia
Twisted Radial Fourier Transform as the Basis for Finite-n Ballooning Theory

Feb 6, 1992
Prof. John R. Cary
University of Colorado, Boulder, CO
Breakdown of Quasilinear Theory: Implications for Turbulence Analyses

Feb 10, 1992
Dr. Steven D. Scott
Princeton Plasma Physics Laboratory, Princeton, NJ
A Survey of TFTR Perturbation Experiments

Feb 17, 1992
Dr. Boris Breizman
Institute for Nuclear Physics, Novosibirsk, Russia
Theory of Plasma Turbulence in a Beam Heated Plasma

Feb 20, 1992
Dr. Huan Chun Ye
Department of Physics, U.T.-Austin
Analytic Theory for Ion Gyroresonance

Feb 24, 1992
Dr. James Drake
University of Maryland, College Park, MD
Development of Plasma Rotation, Parallel Flows and Turbulence in Tokamak Edge Plasmas

Feb 27, 1992
Dr. Tosiya Taniuti
Chubu University, Japan
Solitary and Shock Structures Induced by Poloidal Flow in Tokamaks

Mar 2, 1992
Dr. Michael Kiessling
Dartmouth College, Hanover, NH
Statistical Mechanics of Logarithmic Interactions in Plasmas

Mar 5, 1992
Dr. Andris Dimit
Lawrence Livermore National Laboratory, Livermore, CA
Simulations of Tokamak Turbulence Using Field-Line-Following Coordinates

Mar 25, 1992
Dr. Richard E. Denton
Dartmouth College, Hanover, NH
Polarization Properties of Ion Cyclotron Waves in the Magnetosphere
Mar 30, 1992
Dr. Ker-Chung Shaing
Oak Ridge National Laboratory, Oak Ridge, TN
Ion Orbit Loss, Poloidal Rotation, and H-Mode in Tokamaks

Mar 31, 1992
Dr. Maurice LeBrun
Department of Physics, UT-Austin
Kinetic Simulation of Anomalous Heat Conduction in Tokamaks

Apr 2, 1992
Dr. Xueqiao Xu
University of California, Berkeley, CA
Turbulent Transport Across Separatrix Due to ETG Driven Instability in Tokamak SOL

Apr 9, 1992
Dr. Leonid E. Zakharov
Kurchatov Institute of Atomic Energy, Moscow
Two-Fluid Model of m=1 Reconnection

Apr 20, 1992
Dr. E.K. Maschke
Eurom-C.E.A. Association, Cadarache, France
Lecture Series on Bifurcation Theory in Plasma Physics: Methods and Examples (Lecture 1 of 2)

Apr 23, 1992
Mr. Andrew Ware
University of California, San Diego, CA
Theory of Ionization Driven Drift Wave Turbulence

Apr 24, 1992
Dr. E.K. Maschke
Eurom-C.E.A. Association, Cadarache, France
Lecture Series on Bifurcation Theory in Plasma Physics: Methods and Examples (Lecture 2 of 2)

Apr 27, 1992
Dr. Z. Sediacek
Czechoslovakia Academy of Sciences, Czechoslovakia
Vlasov Plasma Oscillations and the Theory of Open Systems

May 4, 1992
Dr. Bob Taylor
University of California, Los Angeles, CA
Configurational and Kinetics Asymmetries in CCT

May 11, 1992
Dr. J.D. Crawford
University of Pittsburgh, Pittsburgh, PA
Hidden Symmetries in Linear and Nonlinear Problems

Relativity Seminars

Sep 3, 1991
Dr. Omella Pantano
University of Padua, Padua, Italy
Hydrodynamical Computations of the Cosmological Quark-Hadron Transition

Sep 12, 1991
Dr. Eric Myers
Department of Physics, U.T. Austin
Evidence for a Strong Coupling Limit in the SO(1,2) Nonlinear Sigma Model

Sep 24, 1991
Dr. Henry Waelbroeck
Institute of Nuclear Sciences, UNAM, New Mexico
A Lattice Theory with Curvature and Exact Translation Symmetry

Sep 26, 1991
Dr. Henry Waelbroeck
Institute of Nuclear Sciences, UNAM, New Mexico
Closed Timelike Curves with Four Parallel Cosmic Strings

Oct 8, 1991
Dr. Nelson Zamorano
University of Chile, Santiago, Chile
Generalized Kerr-Schild Metrics and Cosmic Strings

Oct 12, 1991
Dr. Matthew Choptuik
Department of Physics, U.T. Austin
"Critical" Behavior in Massless Scalar Field Collapse

Oct 24, 1991
Ms. Wendy White
Department of Physics, U.T. Austin
Parallelization of Computer Code for The Connection Machine
Oct 29, 1991
Mr. Don Maroff
Department of Physics, U.T. Austin
A General Context for Theories with Invariances

Nov 5, 1991
Dr. Elaine Kant
Schlumberger Laboratory for Computer Science, Austin, TX
Automatic Generation of Finite Difference Codes

Nov 12, 1991
Mr. Joan Masso
University of Illes Balears, Balearic Islands, Spain
A Harmonic Evolution Code for 3-D Numerical Relativity

Nov 21, 1991
Dr. Timothy E. Gallivan
Department of Physics, U.T. Austin
Finite Lattice Systems with True Critical Behavior

Dec 4, 1991
Mr. David Brydon
Department of Physics, U.T. Austin
A Simple Unified Theory via Geometric Algebra

Jan 23, 1992
Dr. Greg Comer
The Hebrew University, Jerusalem, Israel
"Curved Space" Effects in Superfluid Helium 4

Jan 30, 1992
Dr. Hugo Martel
Department of Physics, U.T. Austin
Large Scale Structure: the Search for the Cosmological Constant

Feb 5, 1992
Prof. Demetri Christodoulou
Courant Institute, New York, NY
Gravitational Collapse and Singularities, Part I

Feb 7, 1992
Prof. Demetri Christodoulou
Courant Institute, New York, NY
Gravitational Collapse and Singularities, Part II

Feb 13, 1992
Dr. Mark Dubal
Department of Physics, U.T. Austin
The Two-Black-Hole Collision Problem: A Numerical Relativity Approach

Feb 27, 1992
Mr. Scott Klisky
Department of Physics, U.T. Austin
A LINE-SOR Solution for the 2-Black-Hole Initial Value Problem

Mar 5, 1992
Dr. Timothy E. Gallivan
Department of Physics, U.T. Austin
Nonperturbative Renormalization of the Four-Dimensional O(2,1) Nonlinear Sigma Model: The Final Chapter

Mar 12, 1992
Dr. Eric Myers
Department of Physics, U.T. Austin
Review of Lattice Gauge Field Theory

Mar 24, 1992
Prof. Herbert W. Hamber
University of California, Irvine, CA
Simplicial Quantum Gravity

Apr 2, 1992
Dr. John L. Fry
U.T. Arlington, Arlington, TX
Feynman-Kac Path Integral Calculation of the Ground State Energy of H, He, Li, Be and B

Apr 9, 1992
Mr. Ali Mostafazadeh
Department of Physics, U.T. Austin
Berry’s Phase and Theory of Vector Bundles (An Interaction between QM and Algebraic Topology)

Apr 16, 1992
Prof. Pierre Cartier
Ecole Normale Superieure DMI, Paris, France and Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France
A Non-Commutative Differential Calculus

Apr 23, 1992
Dr. Martin Gutzwiller
IBM Research Center, Yorktown Heights, NY
The Poincaré Surface of Selection in Quantum Mechanics

Apr 30, 1992
Prof. Hui Kuo
Louisiana State University, Baton Rouge, LA
White Noise Calculus Approach to the Feynman Integral
May 7, 1992  
Dr. Nikolai V. Mitskevich  
Universidad de Guadalajara, Jalisco, Mexico  
On Some Self-Consistent Solutions of the Einstein-Maxwell Equations with Charged Fluid

May 14, 1992  
Mrs. Carmen Molina-Paris  
Department of Physics, U.T. Austin  
Causality in Spacetime

Statistical Mechanics Seminars

Oct 7, 1991  
Mr. Ke-Hong Wen  
Department of Physics, U.T. Austin  
Free Way Model of Bounded Expectation-A Non-Linear Dynamic Economic Model

Oct 9, 1991  
Prof. Thomas Erber  
Illinois Institute of Technology, Chicago, IL  
The Quantum Mechanics of Single Atoms

Oct 25, 1991  
Dr. Peter Jung  
University of Augsburg, Augsburg, Germany  
Rate Processes in Periodically Driven Systems

Nov 15, 1991  
Dr. Hiroshi Hasegawa  
Department of Physics, U.T. Austin  
Non-Equilibrium Statistical Mechanics of Simple Chaotic Maps: Ruelle Resonances and Subdynamics

Jan 14, 1992  
Dr. Christian van den Broeck  
Free University of Brussels, Belgium and University of California, San Diego, CA  
Generalization of Neural and Boolean Networks

Jan 23, 1992  
Dr. Mark G. Gray  
Department of Physics, U.T. Austin  
Solution of the Complex Ginzburg-Landau Equation on the Connection Machine

Feb 12, 1992  
Dr. Mark Dykman  
Institute of Semiconductors, Ukraine and San Francisco State University, San Francisco, CA  
Quantum Theory of Escape from Metastable State of Forced Vibrations

Feb 20, 1992  
Prof. E.C.G. (George) Sudarshan  
Department of Physics, U.T. Austin  
Quantum Semi Groups

Feb 27, 1992  
Dr. Paolo Grigolini  
University of North Texas, Denton, TX  
Deterministic Brownian Motion

Mar 5, 1992  
Mr. William Saphir  
Department of Physics, U.T. Austin  
Zeta Functions for Physicists

Mar 12, 1992  
Dr. Dilip Kondepudi  
Wake Forest University, Winston-Salem, NC  
Chiral Symmetry Breaking in Crystallization

Mar 24, 1992  
Dr. Peter Geissler  
University of California, Irvine, CA  
A Global, Thermodynamic-Potential Approach to Complex Systems and Deterministic Chaos

Mar 25, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - I

Mar 27, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - II

Apr 1, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - III
Apr 3, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - IV

Apr 7, 1992  
Mr. Mark Million  
Department of Physics, U.T. Austin  
Connectionist Theory of Swarm Intelligence and Morphogenesis

Apr 8, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - V

Apr 10, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - VI

Apr 13, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - VII

Apr 20, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - VIII

Apr 22, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - IX

Apr 24, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - X

Apr 27, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - XI

Apr 30, 1992  
Dr. Peter Mildon  
Los Alamos National Laboratory, Los Alamos, NM  
Macroscopic Van der Waals Forces

May 1, 1992  
Prof. Ilya Prigogine  
Department of Physics, U.T. Austin  
Time, Chaos and Quantum Theory - XII

Jun 4, 1992  
Prof. Jixing Liu  
Chinese Academy of Sciences, Beijing, China  
Why the Membrane Bubble is Dispersed and Spirals Up? - Theory of Helical Structures of Lipid Bilayers

Jul 21, 1992  
Dr. Peter Coveney  
Schlumberger, Cambridge Research Ltd., England  
Some Rigorous Results in Statistical Mechanics

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**Theoretical Physics Seminars**

Sep 3, 1991  
Prof. Joseph G. Polchinski  
Department of Physics, U.T. Austin  
QCD Strings and Fundamental Strings

Sep 24, 1991  
Dr. Rolf Schimmig  
University of California, Santa Barbara, CA  
Mirror Symmetry

Oct 1, 1991  
Dr. M. Mineev  
Northwestern University, Evanston, IL  
Exact Solutions of Two-Dimensional Dynamics

Oct 8, 1991  
Prof. Michael Duff  
Texas A&M University, College Station, TX  
Evidence for String/Fivebrane Duality
Oct 15, 1991
Dr. Gerald Gilbert
University of Maryland, College Park, MD
On the Perturbations of String-Theoretic Black Holes

Oct 25, 1991
Prof. Stephen Shenker
Rutgers University, New Brunswick, NJ
The Strength of Nonperturbative Effects in String Theory

Oct 29, 1991
Dr. Mitchell Golden
Boston University, Boston, MA
Hiding the Electroweak Symmetry Breaking Sector

Nov 5, 1991
Dr. Jim Hughes
Lawrence Livermore National Laboratory, Livermore, CA
Skyrmion Recoil in Pion-Nucleon Scattering

Nov 12, 1991
Prof. John Preskill
California Institute of Technology, Pasadena, CA
Growing Hair on Black Holes

Nov 26, 1991
Dr. H. Nishino
University of Maryland, College Park, MD
N ≥ 2 Supersymmetric Chern-Simons Theories in Three-Dimensions

Jan 14, 1992
Dr. F. Quevedo
Universite de Neuchatel, Switzerland
Strings on Curved Space-Times: Black Holes, Torsion and Duality

Jan 21, 1992
Prof. Frank Wilczek
Institute for Advanced Study, Princeton, NJ
Black Holes as Elementary Particles

Jan 23, 1992
Prof. Leonard Susskind
Stanford University, Stanford, CA
Two Dimensional Black Holes

Jan 28, 1992
Prof. Stuart Raby
Ohio State University, Columbus, OH
A Predictive Framework for Fermion Masses in Supersymmetric Theories

Jan 30, 1992
Dr. Kingsley Jones
The University of Melbourne School of Physics
Melbourne, Australia
Classical Mechanics as an Example of Generalized Quantum Mechanics

Feb 4, 1992
Dr. J. Dixon
Texas A&M University, College Station, TX
Heterotic Fivebranes?

Feb 6, 1992
Prof. Augusto Garcia
Institute for Advanced Studies, Mexico City, Mexico
Weakly Mixed Hadrons and Weak Radiative Decays

Feb 18, 1992
Dr. Christoph Avenarius
Nuclear Physics Laboratory, Oxford, United Kingdom
SU(3) Symmetry Breaking in the Baryonic Magnetic Moments and in the Semileptonic Hyperon Decays

Mar 9, 1992
Prof. Marc Wise
California Institute of Technology, Pasadena, CA
Combining Heavy Quark Symmetry and Chiral Symmetry

Mar 10, 1992
Dr. V. Miransky
Ohio State University, Columbus, OH
Why is the Top Quark Much Heavier than the Bottom Quark?

Mar 24, 1992
Prof. Lawrence Hall
University of California, Berkeley, CA
Predicting Fermion Masses and Mixings

Mar 31, 1992
Prof. Lance Dixon
SLAC, Stanford, CA
Gauge Amplitudes from String Theory

Apr 2, 1992
Dr. Denise Freed
Massachusetts Institute of Technology, Boston, MA
The Phase Structure of a Model Dissipative System
Apr 7, 1992
Prof. Benjamin Grinstein
Superconducting Super Collider Laboratory, Waxahachie, TX
QCD Basis for Factorization in Decays of Heavy Mesons

Apr 14, 1992
Prof. Toshiki Tajima
Department of Physics, U.T. Austin
Cosmological Plasma and Structure Formation

Apr 21, 1992
Prof. L. McLerran
University of Minnesota, Minneapolis, MN
Current Status of Electroweak Baryogenesis

Apr 28, 1992
Prof. P. Frampton
University of North Carolina, Chapel Hill, NC
Aspon Model of CP-Violation and its Detectability at the SSC

Aug 13, 1992
Dr. Robert Leigh
University of California, Santa Cruz, CA
Weak Interactions Phase Transition

**Special Events**

Sep 15-17, 1991
*Workshop in Honor of E.C.G. Sudarshan's Contributions to Theoretical Physics* (on the occasion of Professor E.C.G. Sudarshans 60th Birthday) Dr. A. Bohm, UT-Austin; Dr. C. Chiu, UT-Austin; Dr. F. Gilman, SSC Laboratory, Dallas; Dr. S. Glashow, Harvard University; Dr. J. Kimble, California Institute of Technology; Dr. J. R. Klauder, University of Florida; Dr. W.E. Lamb, University of Arizona; Dr. R.E. Marshak, Virginia Polytechnic Institute; Dr. S. Meshkov, SSC Laboratory, Dallas; Dr. Y. Nambu, Enrico Fermi Institute, University of Chicago; Dr. Y. Ne'eman, UT-Austin and Tel Aviv University; Dr. J. Nilsson, Goteborgs Universitat; Dr. L. O'Rafaelaigh, Dublin Institute for Advanced Studies; Dr. S. Pakvasa, University of Hawaii; Dr. I. Prigogine, UT-Austin; Dr. P. Ramond, University of Florida; Dr. P. Rosen, UT-Arlington; Dr. M. Scully, University of New Mexico; Dr. C. Teltelboim, Centro de Estudios Cientificos de Santiago; Dr. K.C. Wall, Syracuse University; Dr. E. Wolf, University of Rochester

Jan 6-17, 1992
*U.S. Particle Accelerator School* (sponsored by UT-Austin, the Department of Energy, and SSC Laboratory in Dallas) Dr. G. Bourianoff, SSC Laboratory; Dr. I. G. Brown, Lawrence Berkeley Laboratory; Dr. R.K. Cooper, Los Alamos National Laboratory; Dr. R. Davidson, Princeton University; Dr. A. Devred, SSC Laboratory; Dr. M. Howells, Lawrence Berkeley Laboratory; Dr. D. Larbalestier, University of Wisconsin-Madison, Dr. J.R. Seeman, SLAC; Dr. R.M. Talmam, Cornell University; Dr. T.P. Wangler, Los Alamos National Laboratory; Dr. W.H. Warness, Oregon State University; Dr. P. B. Wilson, SLAC

Mar 4, 1992
*The Something Old, Something New*
*CIRCUS OF PHYSICS*
Ringmasters: Dr. K. Trappe and Prof. W.R. Coker
Department of Physics, U.T. Austin

Apr 10, 1992
*F.A. Matsen Lectureship on the Theories of Matter*
Prof. Murray Gell-Mann
California Institute of Technology, Pasadena, CA
*Quantum Mechanics and the World of Familiar Experiences*
Apr 21, 1992
Dr. Henry Teoh
State University of New York,
College at Old Westbury, NY
Recruitment and Retention of Minority Students in Science and Technology

Apr 21, 1992
E.L. Hudspeth Centennial Lectureship in Physics
Prof. R.E. Smalley
Rice University, Houston, TX
C60 and the Emerging Carbon-Based Nanotechnology
Mutual Grilling Sessions

Sep 11, 1991
Mr. David Brydon
Department of Physics, U.T. Austin
A Better Covariance Group for Physics

Sep 16, 1991
Mr. Craig Siders
Department of Physics, U.T. Austin
Ionization-Induced Spectral Blue-Shifting of High-Intensity Femtosecond Pulses: New Directions

Sep 18, 1991
Mr. Steve Madere
Department of Physics, U.T. Austin
Lattice Gas Simulations for Fluid Dynamics

Sep 19, 1991
Mr. John LaChappelle
Department of Physics, U.T. Austin
Fibre Bundles and the Electroweak Theory

Sep 25, 1991
Mr. Bob Steimle
Department of Physics, U.T. Austin
Formation of Non-Maxwellian Electron in TEXT via ECRH

Oct 2, 1991
Mr. Paul Williams
Department of Physics, U.T. Austin
Theory of the Acoustic Properties near the N*-A* Phase Transition in Liquid Crystals: A Work in Progress

Oct 9, 1991
Ms. Linda Stuk
Department of Physics, U.T. Austin
Why There are No Plastic Beer Bottles

Oct 16, 1991
Mr. Andy Whitehead
Department of Physics, U.T. Austin
Collisional Deactivation of Two-Photon Excited Krypton and Xenon

Oct 23, 1991
Ms. Premana Premadi
Department of Physics, U.T. Austin
Gravitational Lensing

Oct 30, 1991
Mr. Jing-Lee Lee
Department of Physics, U.T. Austin
Poincaré Theorem and Subdynamics for Time Dependent Systems

Nov 1, 1991
Mr. Greg Lewis
Department of Physics, U.T. Austin
Velocity Measurements in Turbulent Couette-Taylor Flow

Nov 13, 1991
Mr. Bill Craven
Department of Physics, U.T. Austin
A Search for Magnetic Islands; Celebrating the Cinquecento Anniversary of 'Columbus' Discovery of the New World

Nov 20, 1991
Mr. Horacio Gasquet
Department of Physics, U.T. Austin
Using Electron Cyclotron Radiation to Measure Plasma Temperature

Dec 4, 1991
Ms. Rebecca McGowan
Department of Physics, U.T. Austin
Spectra of Rydberg Atoms in a Micromaser

Jan 29, 1992
Prof. Manfred Fink
Department of Physics, U.T. Austin
Molecular Point of View of Surface Scattering

Feb 5, 1992
Mr. Walter Buell
Department of Physics, U.T. Austin
The Single Atom Maser: An Introduction

Feb 12, 1992
Mr. Grey Tarkenton
Department of Physics, U.T. Austin
New Physics from Old Fluids

Feb 26, 1992
Prof. Daniel J. Heinzen
Department of Physics, U.T. Austin
Squeezing Atoms Instead of Fields
Mar 11, 1992
Mr. Suhail Farooqi
Department of Physics, U.T. Austin
Halos Around the Spiral Galaxies

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Mr. Nathan Hardee
Department of Physics, U.T. Austin
Tippee Tops and Celts

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Mr. Mike Gojer
Department of Physics, U.T. Austin
Pumping Forbidden Transitions with Stimulated Raman Scattering

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Mr. Chiu Liu
Department of Physics, U.T. Austin
The Quantum Charge Pump

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Ms. Elizabeth Miller
Department of Physics, U.T. Austin
Propagation of Longitudinal and Shear Waves through Ice

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Department of Physics, U.T. Austin
Exploration of the Giant Resonance of Xe via (e, 2e) Electron Spectroscopy

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Puzzles in Thermal Transport Near a Liquid Crystal Phase Transition

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Dense Atomic Point Samples for Quantum Optics Experiments

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Baseball Physics

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Asymmetric (e,2e) Measurements on Excited State Helium

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Phaseonium: New Properties via Quantum Coherence

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Video Display Technology
Qualifiers for Ph.D. Candidacy

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Persistence of Periodic and Quasi-Periodic Orbits in Dynamical Systems

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Department of Physics, U.T. Austin
Burning Plasmas and Radial Sheath

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Mr. Ali Mostafazadeh
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Atiyah-Singer Index Theorem and Supersymmetric Quantum Mechanics

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Nonlinear Acoustic Wave Propagation in a Pekeris Waveguide

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Ionization-Induced Spectral Blue-Shifting of High-Intensity Femtosecond Pulses: New Directions

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Search for Oxygen Ion Conductors in Barium Indates

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Fiber Bundles and the Standard Electro-Weak Theory

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An Effective Superpotential for the Dilaton

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Scale Invariance in a Simple Quantum System

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Mr. John Johnson
Department of Physics, U.T. Austin
E1140: Search for the \( \eta^0 \) Component of DCX

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Formation of Non-Maxwellian Electron Population by Electron Cyclotron Resonant Heating

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Measuring Magnetoacoustic Effects with a Network Analyzer

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Lattice Gas Methods for Fluid Dynamics Simulations

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An ELM Monitor for TEXT-U

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Velocity Measurements in Turbulent Couette-Taylor Flow

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Low Energy Non-Critical String Theory for QCD String

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Department of Physics, U.T. Austin
Lepton, Baryon Number Violating Operators in the Standard Model and Supersymmetric SM

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Contact Resistance and Proximity Effect at HTSC Surface
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Iterated Function Systems as Morphological Models of Gravitational N-Body Systems

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Ultrafast Spectroscopy of Semiconductors

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Gravitational Lensing

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Spinor Techniques for Massive Fermions

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Pion Elastic Scattering on $^{12}C$, $^{90}Zr$ and $^{208}Pb$

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Energy Levels of Superheavy Bubble Nuclei

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Quadrupole Lenses for Vector Optics

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Electron Temperature Measurement with ECE and Comparison with Thomson Scattering

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The Micromaser Spectrum

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Mr. Steven D. Worm
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Analysis of the E871 Beam Plug at Brookhaven

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Mr. Arthur R. Smith
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Scanning Tunneling Microscopy/Spectroscopy of Semiconductor Heterojunctions

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A Probabilistic Approach to the Magnetostatic Inverse Problem

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Searching for Low-Dimensional Chaos in a Geophysical Signal Using Principal Component Analysis

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Electromagnetism as Dynamic Curvature in Einstein's Equations

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Hopfield-Like Neural Networks

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Mr. Jamshid Sabbaghzadeh
Department of Physics, U.T. Austin
Pure Rotational Raman Spectroscopy of Methane

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Mr. Caiwen Yuan
Department of Physics, U.T. Austin
High $T_c$ YBCO Thin Film and SQUID

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Atomic Force Microscopy of Ammonium Perchlorates

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Black Hole Plasma Physics

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Scanning Tunneling Microscopy and Spectroscopy of $YBa_2Cu_3O_{7-x}$

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Ms. Azita Valinia
Department of Physics, U.T. Austin
Ion Temperature Measurements in TEXT-U
Final Defense Presentations

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Mr. David Ambrose
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Cylindrical Drift Chamber Detection of Single Pion Production

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Poincaré's Theorem and the Subdynamics of Time-Dependent Systems

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Deactivation of Two-Photon Excited Xe (6p, 7p, 6p') and Kr (5p)

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The Turbulence and Transport Studies in the Edge Plasma of TEXT

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Breakup Fusion Theory for Cluster Transfer Reactions

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The Source of Complex Behavior in the Belousov-Zhabotinsky Reaction

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Lattice Dynamics of Semiconductor Surfaces: A Bond Charge Model

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Temperature Dependent Conduction Band Exchange Splitting in Ferromagnetic HEP Gd

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Turbulent Flow between Rotating Concentric Cylinders at Large Reynolds Numbers

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Application of Krylov Integration to the Scanning Electrochemical Microscope and Comparison to Standard Stiff Equation Solvers

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Dual Mass and Torsion

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Development of a Supersonic Beam Machine in Spectroscopic Investigations on Small Rare Gas Clusters

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The Nonequilibrium Statistical Mechanics of Simple Chaotic Maps

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A Survey of the Green's Bracket

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Invariants for Gauge Theories of Gravity with Affine Symmetry Groups and Classification of their irreps

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Low Frequency Fluctuations in Plasma Magnetic Fields

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Nanofabrication with the Scanning Tunneling Microscope
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Resistive Magnetohydrodynamic Studies of Tearing
Mode Instability with Equilibrium Shear Flow and Magnetic Reconnection

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The Two-Body Problem in Numerical Relativity

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Ms. Linda J. Parkes
Department of Physics, U.T. Austin
The Geometry of the Mirror of the Z Manifold

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Mr. Pranab Das
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The Dynamics of Small Asymmetric Self-Connected Hopfield Neural Networks

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Mr. Michiro Naito
Department of Physics, U.T. Austin
(p,n) and (e,e') Reactions in Quasi-Elastic and Delta-Resonance Regions

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The Effects of externally Imposed Magnetic Perturbations on Plasmas in TEXT

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Beam-Beam Interaction Effects on Particle Dynamics

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Mr. Paul Williams
Department of Physics, U.T. Austin
Theory of Critical Dynamics Near Liquid Crystal Phase Transitions

Jul 29, 1992
Mr. Brian Kendrick
Department of Physics, U.T. Austin
Berry's Phase and Some of its Consequences

Aug 19, 1992
Mr. Winston Layne
Department of Physics, U.T. Austin
A Time and Wavelength Resolved Study of Xenon Reactive Quenching by Chlorine
Refereed Publications

Roger D. Bengtson


Herbert L. Berk


Arno Bohm


Philip Candelas

Charles B. Chiu


W. Rory Coker

Alejandro L. de Lozanne
Duane A. Dicus


Michael Downer


James L. Erskine


(with Chen and Drakaki) “Chemisorption Induced Change in Thin-Film Spin Anisotropy: Oxygen Adsorption on the p(1x1)Fe/Au(100) System,” Physical Review B45 (1992) 3636.


Willy Fischler


Lothar W. Frommhold


J. David Gavenda

Richard D. Hazeltine


Daniel J. Heinzen


Gerald W. Hoffmann

C. Wendell Horton, Jr.


John W. Keto


Leonard Kleinman


Karol Lang

Michael P. Marder


John T. Markert

(with B. Jiang) "Magnetization of Sm1.5Y0.5CuO4: Observation of Ferromagnetic Remanence in a Superconducting Cuprate Parent Compound," Applied Physics Communications 11, 285 (1992).


Richard A. Matzner


C. Fred Moore


Philip J. Morrison


**Yuval Ne’eman**


"Five Reasons Against Brinkmanship," (Hebrew), 'Política', #44 (March 1992) 30-32.


**Qian Niu**


**Melvin E.L. Oakes**


**Perry E. Phillips**


**Joseph G. Polchinski**


**Ilya Prigogine**


**Mark Raizen**


Linda E. Reichl


Peter J. Riley


William L. Rowan


William C. Schieve


Chih-Kang (Ken) Shih


(Eliezer and Kulcsrud) "Direct Conversion of Muon Catalyzed Fusion Energy," Muon Catalyzed Fusion 7 (1992) 47.
James C. Thompson


(with H.-T. Chou) "Reflectance and Photoemission from Ag in Liquid NH₃," *Journal de Physique IV, Colloque C5*, 1 (1991) 71-76.


Takeshi Udagawa


(with Chong-Yeal Kim) "Breakup-Fusion Analyses of the ^{40}Ca(6Li,d)^{44}Ti Reactions and d-Cluster Structure in ^{44}Ti," *Physical Review C46* (1992) 532-540.

James W. Van Dam


Steven Weinberg


Alan J. Wootton


Syed Amir Ali Zaidi
Ph.D. Graduates
Fall, 1991

Gary Wayne Burdick
Third Order Contributions to Spin-Forbidden Rare Earth Optical Transition Intensities
Professor Michael C. Downer

Chong Yeal Kim
Breakup Fusion Reaction Theory for Cluster Transfer Reactions
Professor Takeshi Udagawa

Jing-Yee Lee
Poincare's Theorem and Subdynamics for Time-Dependent Systems
Professor Ilya Prigogine

Hong Lin
Turbulence and Transport Studies in the Edge Plasma of the TEXT Tokamak
Professors Roger Bengtson, Christopher P. Ritz

Arthur George Mihili, Jr.
A Gas Phase Electron Diffraction Study of Several Metallophthalocyanines and Elastic Electron Scattering from Oriented Molecules
Professor Manfred Fink

Leick Douglas Robinson
Sonic Boom Propagation Through an Inhomogeneous, Windy Atmosphere
Professor Thomas A. Griffy

Michael Francis Schatz
Transition in Plane Channel Flow with Spatially Periodic Perturbations
Professor Harry L. Swinney

Linda Gall Fugate Stuk
Investigation of the Sources of Complex Behavior in the Belousov-Zhabotinskii Reaction
Professor William D. McCormick

Charles A. Whitehead
A Couple of Experiments Involving Two-Photon Excitation of Rare Gases
Professor John W. Keto

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Albert Ballard Andrews
Electronic and Magnetic Properties of Bulk Gadolinium and Iron Thin Films
Professor James L. Erskine

Steven Douglas Breed
Dual Mass and Torsion
Professor Lawrence C. Shepley
Samuel Benjamin Cable  
Low Frequency Fluctuations of Plasma Magnetic Fields  
Professor Toshiki Tajima

Bright Carley Dornblaser  
Application of Krylov Integration to the Scanning Electrochemical Microscope with Comparison to Standard Stiff Equation Solvers  
Professor Laurette Tuckerman

Edward Erling Ehrichs  
Nanofabrication with the Scanning Tunneling Microscope  
Professor Alex L. de Lozanne

Daniel Perry Lathrop  
Turbulent Drag and Transport in High Reynolds Number Couette-Taylor Flow  
Professor Harry L. Swinney

Donald Michael Marolf  
Green's Bracket Algebras and their Quantization  
Professor Bryce S. DeWitt

Leon Ofman  
Resistive Magnetohydrodynamic Studies of Tearing Mode Instability with Equilibrium Shear Flow and Magnetic Reconnection  
Professor Philip J. Morrison

Jose Pecina-Cruz  
Invariants for Gauge Theories of Gravity with Affine Symmetry Groups and Classification of their Irreducible Representations  
Professors Yuvan Ne'eman and E.C.G. Sudarshan

William Cooper Saphir  
The Nonequilibrium Statistical Mechanics of Simple Chaotic Maps  
Professor Ilya Prigogine

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Le Li Chen  
Development of a Supersonic Beam Machine and Spectroscopic Investigations on Small Rare Gas Clusters  
Professor John W. Keto

Pranab Kumar Das II  
The Dynamics of Small Asymmetric Self-Connected Hopfield Neural Networks  
Professor William C. Schieve

Mark Stephen Foster  
The Effects of Externally Imposed Magnetic Perturbations on Plasmas in TEXT  
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Fawzi Hadjarab  
Lattice Dynamics of Semiconductor Surfaces: A Bond Charge Model  
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*Berry's Phase and Some of its Consequences*  
Professor Arno Bohm

James Kevin Koga  
*Beam-Beam Interaction Effects on Particle Dynamics*  
Professor Toshiki Tajima

Michiro Naito  
*(p,n) and (e,e') Reactions in Quasi-elastic and Delta-Resonance Regions*  
Professor Takeshi Udagawa

Samuel Rocha Oliveira  
*The Two Black Hole Problems in 3+1 General Relativity: Analytical Approximations and Numerical Solutions of the Initial Data*  
Professor Richard A. Matzner

Linda Jean Parke  
*Superstring Compactification: The Geometry of Three Pairs of Mirror Manifolds*  
Professors Philip Candelas and Joseph G. Polchinski

Paul Edward Williams  
*Theory of Critical Dynamics Near Liquid Crystal Phase Transitions*  
Professor Jack Swift

**M.A. Graduates**  
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William Judson Holloway  
*Experimental Studies of Steady-State and Rossby Wave Flow in Planetary Jets*  
Professor Harry L. Swinney

Michael Wayne Hughes  
*Modeling and Measurement of Unabsorbed Microwave Power in the Texas Experimental Tokamak*  
Professor Roger D. Bengtson and David C. Sing

John Charles Robinson  
*A New Spectrometer for Vapor Phase Spontaneous Raman Scattering*  
Professors Manfred Fink and Lothar W. Frommhold
M.A. Graduates
Spring, 1992

David Calvin Greenlaw
High Resolution Electron Energy Loss Spectroscopy: Observations of Ni(110) Surface Phonons Using an Improved Data Acquisition System
Professor James L. Erskine

Kevin William Johnson
Elastic Asymmetry Measurements of Charged Pions Scattering from 13C at 162 MEV
Professor C. Fred Moore

John Douglas Miller
Elastic Electron Diffraction for Gas Phase SF6
Professor Manfred Fink

Mark Francis Muldoon
Design and Constuction of a Charge Exchange Q-Diagnostic for TEXT-U
Professor Roger D. Bengtson

Panayotis G. Panayotaros
Quantum Mechanics in Multiply Connected Spaces
Professor George Sudarshan

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Guo Wel
Femtosecond Ellipsometric Spectroscopy of Semiconductors
Professor Michael Downer
B.S. and B.A. Graduates
Fall, 1991

Kristin Elizabeth Daigle
Steven Anthony Bucci
William Patrick Coffey
Edwin James Herrell
Stuart George Johnson
Mark Maurice Kness
Cary Robert Lapoint

Boyd Wayne Meier, Jr.
Madeleine Laure Naudeau
Christian Shane Nelson
Robert James Regan
Gwo-Tsair Wang
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Robert Lee Hutton
Robert Lee Jones, III
Christopher Throckmorton
Travis Scott Wall

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Scott Wesley Rubin
Peter Michael Abbamonte

Christopher Lee Hackert
Mark McGrew Mims