

**The University of Texas
at Austin**

Newton

White head

$$d\tau^2 = -dx^2 - dy^2 - dz^2 + dt^2 = \gamma_{\mu\nu} dx^\mu dx^\nu$$

$$x \equiv (x, y, z, t) \equiv x^\mu$$

$$A \cdot B = -A^1 B^1 - A^2 B^2 - A^3 B^3 + A^4 B^4$$

Potentials:

$$V = -\frac{M}{r}$$

(Instantaneous)

$$g_{\mu\nu} = \gamma_{\mu\nu} - \frac{M}{(y-\lambda)^3} \gamma_\mu \gamma_\nu$$

(Retarded - Lorentz invariant)

Equations of Motion

$$\frac{d^2 x^i}{dt^2} + \frac{d}{dt} \left[\frac{dx^i}{dt} \right] = 0$$

$$\delta \int_{u_1}^{u_2} \left[\frac{dx^i}{du} \cdot \frac{dx^i}{du} du - M \int_{u_1}^{u_2} \frac{1}{(y-\lambda)^3} \left(\frac{dx^i}{du} \right)^2 du \right] = 0$$

$$A = \epsilon \frac{\lambda}{r^2}$$

Retarded Liouville
Lorentz invariant

$$\delta \int_{u_1}^{u_2} \left[\frac{dx^i}{du} \cdot \frac{dx^i}{du} du + 2\epsilon \int_{u_1}^{u_2} A \cdot \frac{dx^i}{du} du \right] = 0$$

The Department of Physics

Activities Report

1991-92

$$\delta \int_{u_1}^{u_2} \left[\frac{dx^i}{du} \cdot \frac{dx^i}{du} du + 2\epsilon \int_{u_1}^{u_2} A \cdot \frac{dx^i}{du} du \right] + \int_{U_1}^{U_2} \left[\frac{dX^i}{dU} \cdot \frac{dX^i}{dU} dU \right] = 0$$

Schwarzschild, Fokker, Wheeler + Feynman, Schild

Conservation of Linear Momentum (no secular accel of C.M.)
Angular Momentum

$$ds^2 = -(1+G)dr^2 - (1+H)r^2(d\theta^2 + \sin^2\theta d\phi^2) + (1+F)dt^2 + 2Jdrdt$$

$$= (1+H)' - dr^2 - r^2(d\theta^2 + \sin^2\theta d\phi^2) + dt^2 - (G-H)(-dr+dt)^2 + 2(G-H-F)(dr+dt)dt$$

F, G, H, J terms of $\frac{M}{r} = O(\frac{M}{r})$

1st approx: Newton

2nd approx: Perihelion motion

Light deflection

$$F = -\frac{M}{r} + O(\frac{M}{r})^2, F'(0) = -1$$

$$H'(0) + G'(0) - F''(0) = 1$$

White head

$$H = 0$$

$$F = -M$$

Conservative Theory

$$J = 0$$



Activities Report
of the
Department of Physics
1991-92

The University of Texas at Austin

Compiled by: Dottie Petersen
Peter J. Riley
Dorothy L. Walker

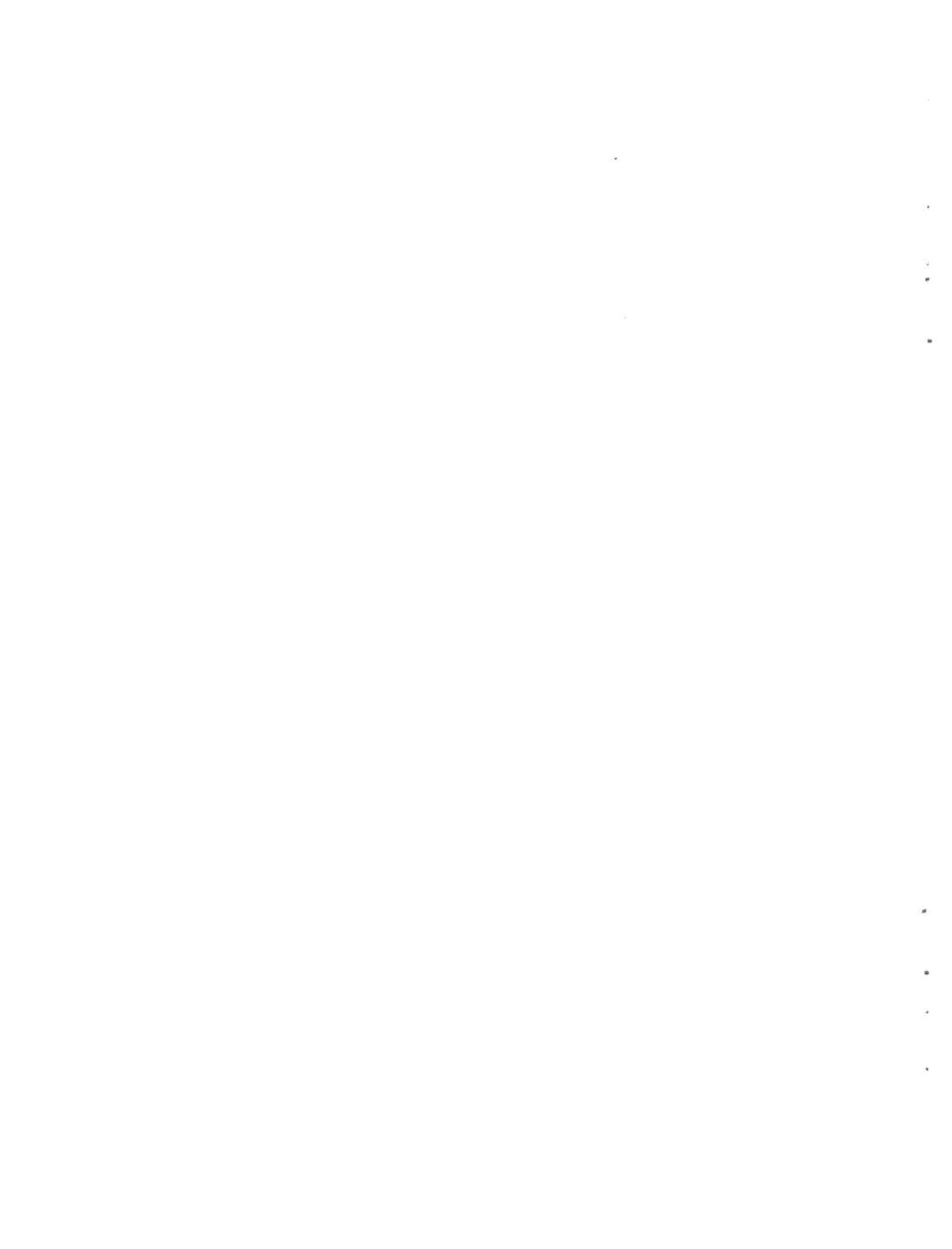


Table of Contents

<i>Introduction</i>	<i>iii</i>
<i>Overview of 1991-92 Activities</i>	<i>v</i>
<i>Colloquia and Seminars</i>	
<i>Colloquia</i>	<i>1</i>
<i>Atomic and Molecular Seminars</i>	<i>2</i>
<i>Condensed Matter Seminars</i>	<i>3</i>
<i>High Energy/Particle Physics Seminars</i>	<i>5</i>
<i>Math/Physics Seminars</i>	<i>6</i>
<i>Nonlinear Dynamics Seminars</i>	<i>6</i>
<i>Nuclear Physics Seminars</i>	<i>8</i>
<i>Plasma Physics Seminars</i>	<i>8</i>
<i>Relativity Seminars</i>	<i>10</i>
<i>Statistical Mechanics Seminars</i>	<i>12</i>
<i>Theoretical Physics Seminars</i>	<i>13</i>
<i>Special Events</i>	<i>15</i>
<i>Mutual Grilling Sessions</i>	<i>17</i>
<i>Qualifiers for Ph.D. Candidacy</i>	<i>19</i>
<i>Final Defense Presentations</i>	<i>21</i>
<i>Refereed Publications</i>	<i>23</i>
<i>Graduates</i>	
<i>Ph.D.</i>	<i>33</i>
<i>M.A.</i>	<i>35</i>
<i>B.S. and B.A.</i>	<i>36</i>

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 Herb 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, Bloch'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 IIci 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. Toshiaki 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⁺ or Tl⁺ 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 $YBa_2Cu_3O_7$.

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. Ouyuang and H. Swinney appeared in the July 1992 issue of *Discover Magazine* which reviews Swinney's work on Turing patterns. Dr. Swinney and Dr. Ouyuang 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 nm, 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 Tunnelling 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 10^A 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 Nagamiya
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. Frommhold
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. Ewbank
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

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- T_c Superconductors

Nov 5, 1991

Prof. Laurens Jansen
University of Amsterdam, The Netherlands and
ETH, Zurich, Switzerland
Superconductivity in K-, or Rb-, Doped C₆₀ and in K(BEDT-TTF)₂Cu(NCS)₂

Nov 12, 1991

Dr. G.A. Mulhollan
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 T_C 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. Eguluz
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 D0 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 π^+ , π^- and Λ 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 $Z^0 \rightarrow$ (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. Hironari Miyazawa
Kanagawa University, Kanagawa, Japan
*Multivalued Wave Functions and the Bohm-
Aharonov 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 bb
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 Supérieure 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 Predtechensky
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. Brosi 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
U.S. Department of Energy, Washington, D.C.
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 ^{11}Li at Intermediate and High Energies

Mar 9, 1992

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

Jan 27, 1992

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

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*

Oct 21, 1991

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

Sep 30, 1991

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

Oct 22, 1991

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

Oct 14, 1991

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

Nov 11, 1991

Dr. Niek Lopes Cardozo
FOM-Institut Voor Plasmafysica
Rijnhuizen, The Netherlands
Perturbative Transport Experiments in Tokamaks

Nov 18, 1991

Dr. Yuji 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 Atomics, 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 Dimits
Lawrence Livermore National Laboratory, Livermore, CA
Simulations of Tokamak Turbulence Using Field-Line-Following Coordinates

Mar 26, 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
Euratom-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
Euratom-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. Sedlacek
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 17, 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 Connec-
tion Machine*

Oct 29, 1991

Mr. Don Marolf
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 Klasky
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. Piere 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. Mitskievich
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 Millonas
 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 Milonni
 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

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 Schimmrigk
 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
 $N \geq 2$ 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. Sudarshan's 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'Ralfeartaigh**, 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. Teitelboim**, Centro de Estudios Cientificos de Santiago; **Dr. K.C. Wall**, Syracuse University; **Dr. E. Wolf**, University of Rochester

Dec 4, 1991

*The Something Old, Something New
CIRCUS OF PHYSICS*

Ringmasters: Dr. K. Trappe and Prof. W. R. Coker
Department of Physics, U.T. Austin

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. Larbaestler**, University of Wisconsin-Madison; **Dr. J.R. Seeman**, SLAC; **Dr. R.M. Talman**, Cornell University; **Dr. T.P. Wangler**, Los Alamos National Laboratory; **Dr. W.H. Warnes**, 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

Mar 25, 1992

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

Apr 1, 1992

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

Apr 8, 1992

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

Apr 15, 1992

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

Apr 22, 1992

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

Apr 29, 1992

Mr. Paul Williams
Department of Physics, U.T. Austin
Puzzles in Thermal Transport Near a Liquid Crystal Phase Transition

Jun 24, 1992

Mr. John Miller
Department of Physics, U.T. Austin
Dense Atomic Point Samples for Quantum Optics Experiments

Jul 1, 1992

Mr. Martin Kykta
Department of Physics, U.T. Austin
Baseball Physics

Jul 8, 1992

Ms. Rosalie Multarie
Department of Physics, U.T. Austin
Asymmetric (e,2e) Measurements on Excited State Helium

Jul 15, 1992

Mr. Wally Buell
Department of Physics, U.T. Austin
Phaseonium: New Properties via Quantum Coherence

Jul 22, 1992

Dr. Andy Ross
Department of Physics, U.T. Austin
Video Display Technology

Qualifiers for Ph.D. Candidacy

Sep 5, 1991

Mr. Efstathios Tompaidis
Department of Physics, U.T. Austin
Persistence of Periodic and Quasi-Periodic Orbits in Dynamical Systems

Sep 12, 1991

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

Sep 17, 1991

Mr. Ali Mostafazadeh
Department of Physics, U.T. Austin
Atiyah-Singer Index Theorem and Supersymmetric Quantum Mechanics

Sep 19, 1991

Mr. Carl Bruch
Department of Physics, U.T. Austin
Nonlinear Acoustic Wave Propagation in a Pekeris Waveguide

Sep 20, 1991

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

Sep 20, 1991

Mr. Man Feng
Department of Physics, U.T. Austin
Search for Oxygen Ion Conductors in Barium Indates

Sep 23, 1991

Mr. John LaChappelle
Department of Physics, U.T. Austin
Fiber Bundles and the Standard Electro-Weak Theory

Sep 23, 1991

Mr. Jose M. Rodriguez
Department of Physics, U.T. Austin
An Effective Superpotential for the Dilaton

Sep 23, 1991

Mr. Gregory Morrow
Department of Physics, U.T. Austin
Scale Invariance in a Simple Quantum System

Sep 25, 1991

Mr. John Johnson
Department of Physics, U.T. Austin
E1140: Search for the η° Component of DCX

Sep 26, 1991

Mr. Robert Steimle
Department of Physics, U.T. Austin
Formation of Non-Maxwellian Electron Population by Electron Cyclotron Resonant Heating

Sep 27, 1991

Mr. Michael David Foegelle
Department of Physics, U.T. Austin
Measuring Magnetoacoustic Effects with a Network Analyzer

Sep 30, 1991

Mr. Steven G. Madere
Department of Physics, U.T. Austin
Lattice Gas Methods for Fluid Dynamics Simulations

Oct 28, 1991

Mr. Paul Hurwitz
Department of Physics, U.T. Austin
An ELM Monitor for TEXT-U

Nov 12, 1991

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

Nov 19, 1991

Mr. Makoto Natsuume
Department of Physics, U.T. Austin
Low Energy Non-Critical String Theory for QCD String

Nov 21, 1991

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

Nov 21, 1991

Mr. Sukkeun Kim
Department of Physics, U.T. Austin
Contact Resistance and Proximity Effect at HTSC Surface

Nov 22, 1991

Mr. Matthew Trump
Department of Physics, U.T. Austin
*Iterated Function Systems as Morphological Models
of Gravitational N-Body Systems*

Nov 22, 1991

Mr. GuoWei
Department of Physics, U.T. Austin
Ultrafast Spectroscopy of Semiconductors

Nov 26, 1991

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

Dec 2, 1991

Mr. Scott Graessle
Department of Physics, U.T. Austin
Spinor Techniques for Massive Fermions

Dec 4, 1991

Mr. Charles Russell Whitley
Department of Physics, U.T. Austin
Pion Elastic Scattering on ^{12}C , ^{90}Zr and ^{208}Pb

Dec 5, 1991

Mr. Hans Schantz
Department of Physics, U.T. Austin
Energy Levels of Superheavy Bubble Nuclei

Dec 5, 1991

Mr. Steven L. Maxson
Department of Physics, U.T. Austin
Quadrupole Lenses for Vector Optics

Dec 6, 1991

Mr. Horacio Gasquet
Department of Physics, U.T. Austin
*Electron Temperature Measurement with ECE and
Comparison with Thomson Scattering*

Dec 9, 1991

Ms. Rebecca McGowan
Department of Physics, U.T. Austin
The Micromaser Spectrum

Dec 17, 1991

Mr. Steven D. Worm
Department of Physics, U.T. Austin
Analysis of the E871 Beam Plug at Brookhaven

Dec 18, 1991

Mr. Arthur R. Smith
Department of Physics, U.T. Austin
*Scanning Tunneling Microscopy/Spectroscopy
of Semiconductor Heterojunctions*

Jan 16, 1992

Mr. Gregory McFall
Department of Physics, U.T. Austin
*A Probabilistic Approach to the Magnetostatic
Inverse Problem*

Jan 31, 1992

Mr. Guido Arnone
Department of Physics, U.T. Austin
*Searching for Low-Dimensional Chaos in a
Geophysical Signal Using Principal Component
Analysis*

Feb 6, 1992

Mr. David Brydon
Department of Physics, U.T. Austin
*Electromagnetism as Dynamic Curvature in
Einstein's Equations*

Feb 25, 1992

Mr. Diek Wheeler
Department of Physics, U.T. Austin
Hopfield-Like Neural Networks

Mar 13, 1992

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

Jun 22, 1992

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

Jun 23, 1992

Ms. Minsun Yoo
Department of Physics, U.T. Austin
*Atomic Force Microscopy of Ammonium
Perchlorates*

Jul 20, 1992

Mr. Grey M. Tarkenton
Department of Physics, U.T. Austin
Black Hole Plasma Physics

Jul 23, 1992

Mr. Henry L. Edwards
Department of Physics, U.T. Austin
*Scanning Tunneling Microscopy and Spectroscopy
of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$*

Aug 24, 1992

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

Final Defense Presentations

Oct 1, 1991

Mr. David Ambrose
Department of Physics, U.T. Austin
Cylindrical Drift Chamber Detection of Single Pion Production

Oct 15, 1991

Mr. Jing-Yee Lee
Department of Physics, U.T. Austin
Poincaré's Theorem and the Subdynamics of Time-Dependent Systems

Oct 18, 1991

Mr. Charles Andy Whitehead
Department of Physics, U.T. Austin
Deactivation of Two-Photon Excited Xe (6p, 7p, 6p') and Kr (5p)

Oct 31, 1991

Mr. Hong Lin
Department of Physics, U.T. Austin
The Turbulence and Transport Studies in the Edge Plasma of TEXT

Nov 11, 1991

Mr. Chong-Yeal Kim
Department of Physics, U.T. Austin
Breakup Fusion Theory for Cluster Transfer Reactions

Nov 13, 1991

Ms. Linda Stuk
Department of Physics, U.T. Austin
The Source of Complex Behavior in the Belousov-Zhabotinsky Reaction

Nov 18, 1991

Mr. Fawzi Hadjarab
Department of Physics, U.T. Austin
Lattice Dynamics of Semiconductor Surfaces: A Bond Charge Model

Dec 17, 1991

Mr. Albert Ballard Andrews
Department of Physics, U.T. Austin
Temperature Dependent Conduction Band Exchange Splitting in Ferromagnetic HEP Gd

Dec 18, 1991

Mr. Daniel P. Lathrop
Department of Physics, U.T. Austin
Turbulent Flow between Rotating Concentric Cylinders at Large Reynolds Numbers

Jan 29, 1992

Mr. Bright C. Domblander
Department of Physics, U.T. Austin
Application of Krylov Integration to the Scanning Electrochemical Microscope and Comparison to Standard Stiff Equation Solvers

Mar 26, 1992

Mr. Steven Breed
Department of Physics, U.T. Austin
Dual Mass and Torsion

Apr 10, 1992

Mr. Lei Chen
Department of Physics, U.T. Austin
Development of a Supersonic Beam Machine in Spectroscopic Investigations on Small Rare Gas Clusters

Apr 21, 1992

Mr. William Saphir
Department of Physics, U.T. Austin
The Nonequilibrium Statistical Mechanics of Simple Chaotic Maps

Apr 21, 1992

Mr. Donald M. Marolf
Department of Physics, U.T. Austin
A Survey of the Green's Bracket

Apr 21, 1992

Mr. José Pecina-Cruz
Department of Physics, U.T. Austin
Invariants for Gauge Theories of Gravity with Affine Symmetry Groups and Classification of their Irreps

Apr 28, 1992

Mr. Sam Cable
Department of Physics, U.T. Austin
Low Frequency Fluctuations in Plasma Magnetic Fields

Apr 29, 1992

Mr. Edward E. Ehrichs
Department of Physics, U.T. Austin
Nanofabrication with the Scanning Tunneling Microscope

Apr 30, 1992

Mr. Leon Ofman
Department of Physics, U.T. Austin
*Resistive Magnetohydrodynamic Studies of Tearing
Mode Instability with Equilibrium Shear Flow and
Magnetic Reconnection*

May 13, 1992

Mr. Samuel R. Oliveira
Department of Physics, U.T. Austin
The Two-Body Problem in Numerical Relativity

Jul 9, 1992

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

Jul 15, 1992

Mr. Pranab Das
Department of Physics, U.T. Austin
*The Dynamics of Small Asymmetric
Self-Connected Hopfield Neural Networks*

Jul 20, 1992

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

Jul 22, 1992

Mr. Mark S. Foster
Department of Physics, U.T. Austin
*The Effects of Externally Imposed Magnetic
Perturbations on Plasmas in TEXT*

Jul 23, 1992

Mr. James Koga
Department of Physics, U.T. Austin
*Beam-Beam Interaction Effects on Particle
Dynamics*

Jul 24, 1992

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

(with J.R. Myra, P.J. Catto, A.J. Wootton and P-W. Wang) "Runaway Electrons as a Diagnostic of Magnetic Fluctuations in the Edge Plasma of the Texas Experimental Tokamak," *Physics of Fluids B4*, 2092 (1992).

(with B.D. Barrett, W.C. Nunnally) "Spectroscopic Investigation of the RGS-II Plasma Armature," *IEEE Transactions on Magnetics* **27**, 195 (1991).

Herbert L. Berk

(with R.V.E. Lovelace and J. Contopoulos) "Magnetically Driven Jets," *Astrophysical Journal* **379** (1991) 696.

(H.V. Wong, H.L. Berk, R.V. Lovelace and N. Rostoker) "Stability of Annular Equilibrium of Energetic Large Orbit Ion Beam," *Physics of Fluids B3* (1991) 2973.

(with A. Ishida and L.C. Steinhauer) "Variational Form for a Viscous Plasma," *Physics of Fluids B3* (1991) 1552.

(with B.N. Breizman) "Nonlinear Kinetic Stabilization of MHD Modes Driven by Alpha Particles," ISPP-6 "Piero Caldirola," **Theory of Fusion Plasmas** (J. Vaclavik, F. Troyon and E. Sindoni, Editors), SIF, Bologna, 1990.

(with M.N. Rosenbluth, J.W. Van Dam and D.M. Lindberg, "Continuum Damping of High Mode Number Toroidal Alfvén Waves," *Physical Review Letters* **68** (1992) 596.

(with J.W. Van Dam, Z. Guo and D.M. Lindberg) "Continuum Damping of Low-n Toroidicity-Induced Shear Alfvén Eigenmodes," *Physics of Fluids B4* (1992) 1806.

(with B.N. Breizman and H. Ye) "Finite Orbit Energetic Linear Response to Toroidal Alfvén Eigenmodes," *Physics Letters A162* (1992) 475.

(with M.N. Rosenbluth, J.W. Van Dam and D.M. Lindberg, "Mode Structure and Continuum Damping of High-n Toroidal Alfvén Eigenmodes," *Physics of Fluids B4* (1992) 2189.

(with B.N. Breizman, H. Ye) "Scenarios for the Nonlinear Evolution of Alpha-Particle-Induced Alfvén Wave Instability," *Physical Review Letters* **68** (1992) 3563.

Arno Bohm

(with B. Kendrick, M.E. Loewe and L.J. Boya) "The Berry Connection and Born-Oppenheimer Method," *Journal of Mathematical Physics* **33** (1992) 977.

"Atomistic and Holistic Understanding in Physics - Constituent and Collective Models," **Sakharov Memorial Lectures in Physics**, Vol. 1, Part II, (L.V. Keldysh and V. Ya. Fainberg, Editors), Nova Science Publishers, Inc., N.Y. (1992).

(with L.J. Boya and Brian Kendrick) "On the Uniqueness of the Berry Connection," *Journal of Mathematical Physics* **33** (1992) 2528.

Phillp Candelas

(with X.C. de la Ossa, P.S. Green and L. Parkes) "An Exactly Soluble Superconformal Theory from a Mirror Pair of Calabi-Yau Manifolds," in *Essays on Mirror Manifolds*, (S.T. Yau, Editor) International Press, Hong Kong (1992).

Charles B. Chiu

(with R.C. Hwa) "Intermittency and Multifractality in e^+e^- Annihilation," *Physical Review D45* (1992) 2276.

(with E.C.G. Sudarshan and G. Bhamathi) "Hamiltonian Model for the Higgs Resonance," *Physical Review D45* (1992) 884.

"Intermittency and Multifractality in Monte Carlo e^+e^- Annihilation," Ringberg Workshop: Fluctuations and Fractal Structure (R.C. Hwa, W. Ochs and N. Schmitz, Editors) *World Scientific*, Singapore (1992) p. 290.

(with B. Kuipers, D. Dalle Molle and D. Throop) "Curvature Constraints in Qualitative Simulation," *Artificial Intelligence* **51**, 343 (1991).

W. Rory Coker

(with Robert L. Ray and Gerald W. Hoffmann) "Non-relativistic and Relativistic Descriptions of Proton-Nucleus Scattering," *Physics Reports* **212**, No. 5, April 1992, 224-328. A book-length review of ten years of theoretical progress.

Alejandro L. de Lozanne

(with T.R. Ohno, Y.-N. Yang, G.H. Kroll, K. Krause, L.D. Schmidt, J.H. Weaver, Y. Kimachi, Y. Hidaka, S.H. Pan) "Cluster-Assembled Overlayers and High Temperature Superconductors," *Physical Review B43* (1991) 7980 and **B44** (1991), 2430 (Erratum)

(with W.F. Smith and E.E. Ehrichs) "Synthesis and Study of Nanostructures," in **Scanned Probe Microscopy**, (K. Wickramasinghe and F.A. McDonald, Editors) AIP Proc. No. 214, American Institute of Physics, New York, (1992) 459-461.

(with W.F. Smith and E.E. Ehrichs) "Direct Writing of Nickel Wires Using a Scanning Tunneling Microscope/Scanning Electron Microscope System," in **Nanostructures and Mesoscope Systems**, (M.A. Reed and W.P. Kirk, Editors) Academic Press (1991) 85-94.

(with E.E. Ehrichs and W.F. Smith) "Four Probe Resistance Measurements of Nickel Wires Written with a Scanning Tunneling Microscope/Scanning Electron Microscope System," *Journal of Ultramicroscopy* **42-44** (1992) 1438-1442.

(with W.F. Smith and E.E. Ehrichs) "A Novel Ultrahigh Vacuum Manipulator Using a Shape-Memory Alloy Actuator," *Journal of Vacuum Science and Technology* **A10** (1992) 576.

(C.W. Yuan and A.B. Berezin) "Step Edge YBa₂Cu₃O_{7- δ} dc SQUIDS on Sapphire Substrates," *Applied Physics Letters* **60** (1992) 2552.

Frederik W. de Wette

"Calculations of Phonons and Related Properties of High-Temperature Superconductors," *Comments, Condensed Matter Physics* **15** (1991) 225.

(with J.E. Jaffe, A.D. Kulkarni) "Anisotropic Phonon Thermal Conductivity of YBa₂Cu₃O_{7- δ} ," *Physica C* **185-189** (1991)1405.

(with E. Hulpke, M. Huppaufl, D.-M. Smilgies, A.D. Kulkarni) "Lattice Dynamics of the Niobium (001) Surface," *Physical Review* **45** (1992) 1820.

(with A.D. Kulkarni) Comment on "Phonons and Specific Heat in High-T_cTl₁₍₂₎Ba₂Ca_{n-1}Cu_nO_{2n+3(4)} Superconductors," *Physica C*, **196** (1992)399.

Bryce S. DeWitt

Supermanifolds - Second Edition (Cambridge University Press, 1991) 90 new pages.

(with E. Myers, R. Harrington and A. Kapulkin) "Noncompact Nonlinear Sigma Models and Numerical Quantum Gravity," *Nuclear Physics B (Proc. Suppl.)* **20** (1991) pp. 744-748.

Duane A. Dicus

(with P. Roy) "Supercollider Signatures and Correlations of Heavy Neutrinos," *Physical Review D* **44** (1991) 1593.

(with D. Karatas and P. Roy) "Lepton Nonconservation at Supercollider Energies," *Physical Review D* **44** (1991) 2033.

(with W.W. Repko) "Pade Unitarization and the Production of W_L⁺W_L⁻ and Z_LZ_L Pairs at High Energy," *Physical Review D* **44** (1991) 3473.

(with J. Gunion, L. Orr, and R. Vega) "Isolating Purely Leptonic Signals for Strong W Scattering Using Anti-Tagging, Jet-Tagging and Lepton Isolation," *Nuclear Physics B* **377** (1992) 31.

(with D. Minic, V. van Kolck and R. Vega) "The Axial Vector Coupling and Magnetic Moment of the Quark," *Physics Letters* **B284** (1992) 384.

Michael Downer

(with Reitze and Ahn) "Optical Properties of Liquid Carbon Measured by Femtosecond Spectroscopy," *Physical Review* **B45** (1992) 2677-2693.

(with Wood and Siders) "Measurement of Femtosecond Ionization Dynamics of Atmospheric Density Gases by Spectral Blueshifting," *Physical Review Letters* **67** (1991)3523-3526.

James L. Erskine

(with Li, Hutchings, Dowben, Hwang, Wu, Onellion, and Andrews) "Angle-Resolved Photoemission Evidence for a Gd(001) Surface State," *Journal of Magnetism and Magnetic Materials* **99** (1991) 85.

(with Li, Hutchings, Dowben, Hwang, Wu, Onellion, and Andrews) "Development of the Gd(001) Band Structure with Film Thickness," *Journal of Applied Physics* **70** (1991) 67565 .

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

(with Bongsoo Kim, et al.) "Temperature Dependent Conduction Band Exchange Splitting in Ferromagnetic hcp Gadolinium: Theoretical Predictions and Photoemission Experiments," *Physical Review Letters* **68** (1992)1931.

(with Jian Chen) "Surface Step Induced Magnetic Anisotropy in Thin Epitaxial Fe Films on W(001)," *Physical Review Letters* **68** (1992) 1212.

(with R.L. Fink, et al.) "Spin-and Angle-Resolved Photoemission Study of Chemisorbed p(1x1) O on Epitaxial Ultra-Thin Fe/W(001) Films," *Physical Review B* **45** (1992) 9824.

Willy Fischler

(with G. Giudice, R. Leigh, S. Paban and S. Thomas) "The Invisible Majoron," *Physics Letters B* **266** (1991) 408-412.

(with L. Brekke and Tom Imbo) "Alice Strings, Magnetic Monopoles and Charge Quantization," *Physical Review Letters* **67** (1991) 3643-3646.

"Constraints on the Baryogenesis Scale from Neutrino Masses," in **Quantum Mechanics of Fundamental Systems 3**, (Teitelboim and J. Zanelli, Editors), Plenum Press, New York (1992).

Lothar W. Frommhold

(with A. Borysow and M. Moraldi) "Supermolecular Absorption and Light Scattering," (Invited Review Article) *Trends in Chemical Physics* **1** (1992) 83-107.

(with A. Borysow) "Press-Induced Absorption in the Infrared: A Data Base for the Modeling of Planetary Atmospheres," *Journal of Geophysical Research* **96** (1991) 17 501.

(with J.D. Poll and R.H. Tipping) "About the Collision-Induced Raman Trace Spectra of Pairs of H₂ Molecules," *Physical Review A* **46** (1992) 2955 .

(with V. Bafile, L. Ulivi, M. Zoppi, M. Moraldi) "Third Virial Coefficients of Collision-Induced, Depolarized Light Scattering of Hydrogen," *Physical Review A* **44** (1991) 4450.

J. David Gavenda

(with Dane Bailey) "Magnetoacoustic Effects Caused by Surface-Scattered Conduction Electrons in Copper," *Physical Review B* **45** (1992) 3669.

Richard D. Hazeltine

(with H. Xiao and R. Carrera) "Self-Consistent Radial Sheath in Ignited Plasmas," *Nuclear Fusion* **31** (1991) 2162.

(with K.W. Gentle) "A Practical Limitation on Transport by Ripple-Trapped Ions," *Physics of Fluids B* **3** (1991) 3198.

(with M.D. Calvin, P.M. Valanju and E.R. Solano) "Analytical Calculation of Neutral Transport and Its Effect on Ions," *Nuclear Fusion* **32** (1992) 3.

(with K.C. Shaing and H. Nunuki) "Shock Formation in a Poloidally Rotating Tokamak Plasma," *Physics of Fluids B* **4** (1992) 404.

(M.G. Prahovic and P.J. Morrison) "Exact Solutions for a System of Nonlinear Plasma Fluid Equations," *Physics of Fluids B* **4** (1992) 831.

(with K.C. Shaing) "Effects of Orbit Squeezing on Ion Transport in the Banana Regime in Tokamaks," *Physics of Fluids B* **4** (1992) 2547.

(with P.M. Valanju, E.R. Solano and M.D. Calvin) "The Effect of Charge Exchange on Plasma Flows," *Physics of Fluids B* **4** (1992) 2675.

(with J.D. Meiss) **Plasma Confinement**, Addison-Wesley, Redwood City (1992).

Daniel J. Heinzen

(with J.J. Bollinger, F.L. Moore, W.M. Itano and D.J. Wineland) "Low-Order Modes of an Ion Cloud in Penning Trap," *Physics Scripta* **46** (1992) 282.

(with J.J. Bollinger, W.M. Itano, S.L. Gilbert and D.J. Wineland) "Atomic Physics Tests of Nonlinear Quantum Mechanics," in **Foundations of Quantum Mechanics**, eds. T.D. Black, M.M. Nieto, H.S. Pilloff, M.O. Scully and R.N. Sinclair (World Scientific, Singapore, 1992) p. 40.

Gerald W. Hoffmann

(with L. Ray) "Nonrelativistic and Relativistic Descriptions of Proton-Nucleus Scattering," *Physics Reports* **212** (1992) 223-328.

C. Wendell Horton, Jr.

(with J.Y. Kim) "Electromagnetic Effect on the Toroidal Electron Temperature Gradient Mode," *Physics of Fluids B* **3** (1991) 3194-3197.

(with M. Kono) "Point Vortex Description of Drift Wave Vortices: Dynamics and Transport," *Physics of Fluids B* **3** (1991) 3255-3262.

(with T. Tajima) "Collisionless Conductivity and Stochastic Heating of the Plasma Sheet in the Geomagnetic Tail," *Journal of Geophysical Research* **96** (1991) 15 811-815, 829.

(with C. Liu, J. Hernandez and T. Tajima) "Stochastic Mixing of Protons from Chaotic Orbits in the Nightside Geomagnetosphere," *Geophysical Research Letters* **18** (1991) 1575-1578.

(with T. Tajima) "Transport from Chaotic Orbits in the Geomagnetic Tail," *Geophysical Research Letters* **18** (1991) 1583-1586.

(with C-B. Kim and B.G. Hong) "Fluctuation and Thermal Energy Balance for Drift-Wave Turbulence," *Plasma Physics and Controlled Fusion* **33** (1991) 469.

(with M.B. Isichenko) "Scaling Laws of Stochastic ExB Plasma Transport," *Comments on Plasma Physics and Controlled Fusion* **14**, 249 (1991).

(with A.D. Beklemishev) "Transport Profiles Induced by Radially Localized Modes in a Tokamak," *Physics of Fluids B4* (1992) 200-206.

(with S. Hamaguchi) "Modelling of Drift Wave Turbulence with a Finite Ion Temperature Gradient," *Plasma Physics and Controlled Fusion* **34** (1992) 203.

(with J.Q. Dong and J.Y. Kim) "Toroidal Kinetic η_i -mode Study in High Temperature Plasmas," *Physics of Fluids B4* (1992) 1867-1876.

John W. Keto

(with Jacek Borysow, Hossein Golnabi, Roger H. Taylor) "Techniques for Measuring Small Changes in the Intensity of a Pulsed Laser," *Applied Optics*, **31**, 2814-2819 (1992).

(with W.B. Layne, M.R. Bruce) "Harpooning Reactions of Excited Rare Gas Atoms," **Gas-Phase Metal Reactions**, A. Fontijn, ed., Elsevier (Amsterdam), p. 435-466 (1992).

Leonard Kleinman

(with I. Morrison and D.M. Bylander) "Bands and Bonds of B_{12} , As_2 ," *Physical Review B45* (1992) 1533.

(with S. Lee, D.M. Bylander and S.W. Kim) "A Computational Search for the Real B_{50} ," *Physical Review B45* (1992) 3848.

(with S. Lee and D.M. Bylander) "Elastic Moduli of B_{12} and its Compounds," *Physical Review B45* (1992) 3845.

(with D.M. Bylander) "Ab Initio Calculation of Liquid Na Properties," *Physical Review B45* (1992) 9663.

(with I. Morrison and D.M. Bylander) "Computational Study of Tetragonal $B_{50}N_2$," *Physical Review B45* (1992) 10872.

Karol Lang

(with E. Oltman et al.) "Nucleon Structure Functions from High-Energy Neutrino Interactions, "FNAL-616/701 Experiment, *Zeitschrift für Physik C53*: (1992)51-71.

Michael P. Marder

Comment on 'Universal Scaling of the Stress Field at the Vicinity of a Wedge Crack in Two Dimensions and Oscillatory Self-Similar Corrections to Scaling,' *Physical Review Letters* **68** (1992) 2253.

(with S. Kramer) "Evolution of River Networks," *Physical Review Letters* **68** (1992) 205.

(J. Fineberg, S. Gross, and H. Swinney) "Instability in the Propagation of Fast Cracks," *Physical Review B45* (1992) 5146.

"Solidification Fronts with Unusual Long-Time Behavior," *Physical Review A, Rapid Communications* **45** (1992) R2158.

Reply to 'Comment on "New Dynamical Equation for Cracks," ' *Physical Review Letters* **67** (1991) 3043.

John T. Markert

(with J. Beille, A. Gerber, Th. Grenet, M. Cyrot, E.A. Early and M.B. Maple) "Electrical Transport Properties and Superconducting Critical Temperature of $Ln_{1.85}Ce_{0.15}CuO_{4-y}$ ($Ln=Nd, Sm, Eu$) Under Quasihydrostatic Pressure up to 100 kbar," *Solid State Communications* **77**, 141 (1991).

(with B. Jiang) "Magnetization of $Sm_{1.5}Y_{0.5}CuO_4$: Observation of Ferromagnetic Remanence in a Superconducting Cuprate Parent Compound," *Applied Physics Communications* **11**, 285 (1992).

(with B. Jiang and B-H. O) "Electronic, Steric and Dilution Effects on the Magnetic Properties of $Sm_{2-x}M_xCuO_{4-y}$ ($M=Ce, Y, La$, and Sr): Implications for Magnetic Pairbreaking," *Physical Review B45*, 2311 (1992).

(with C.L. Wooten, Beom-Hoan O, M.G. Smith, A. Manthiram, J. Zhou and J.B. Goodenough) "The Pressure Dependence of T_C in the Infinite-Layer Electron-Doped Compound $Sr_{0.84}Nd_{0.16}CuO_2$," *Physica C* **192**, 13 (1992).

Richard A. Matzner

(with I. Ciufolini and R. Matzner) "Non-Riemannian Theories of Gravity and Lunar and Satellite Laser Ranging," (1992) *International Journal of Modern Physics A7*.

(with P. Laguna and H. Kurki-Suonio) "Inhomogeneous Inflation: The Initial Value Problem," *Physical Review D44* (1991) 3077.

(with P. Anninos, R. Tuluie, and J. Centrella) "Anisotropies of the Cosmic Background Radiation in a "Hot" Dark Matter Universe," *Astrophysical Journal* **382** (1991) 71.

C. Fred Moore

(with D.L. Watson, R. Gilman, C.L. Morris, J.D. Zumbro, S. Mordechai, M. Burlein, J. M. O'Donnell, H.T. Fortune, A. Kotwal, J. Puttz, J.D. Silk, J.S. McDonald, A.L. Williams and S.Y. Yoo) "Pion-Induced Double Charge Exchange on ^{12}C , ^{24}Mg , 32 , and ^{40}Ca ," *Physical Review C43*, 1318-1320 (1991).

(with A.L. Williams, J.A. McGill, C.L. Morris, G.R. Burleson, J.A. Faucett, D.S. Oakley, M. Burlein, H.T. Fortune, J.M. O'Donnell and G.P. Kahrmanis) "Pion Double Charge Exchange on $^{42,44,48}\text{Ca}$ for $300 \leq T_{\pi} \leq 550$ MeV," *Physical Review C43*, 766-770 (1991).

(with S. Mordechai, C.L. Morris, J.M. O'Donnell, M.A. Kagarlis, D. Fink, H.T. Fortune, D.L. Watson, R. Gilman, H. Ward, A. Williams and Sung Hoon Yoo) "Analog of the T>Giant Dipole Resonance in Light Nuclei," *Physical Review C43* (1991) 1111-1115.

(with S. Mordechai, H. Ward, K. Johnson, G. Kahrmanis, David Saunders, J.M. O'Donnell, M.A. Kagarlis, D. Smith, H.T. Fortune and C.L. Morris, "Comparison of the Double Giant-Dipole States Observed in (π^{-} , π^{+}) and (π^{+} , π^{-}) Reactions on ^{40}Ca and ^{27}Al ," *Physical Review C 43* (1991) R1509-R1512.

(with S. Mordechai) "Double Giant Resonances in Atomic Nuclei," *Nature* **352** (1991) 393-397.

(with K. Johnson, G.P. Kahrmanis, et al.) "Angular Distributions for the Double Isobaric Analog and a T< State at High Excitation in Pion Double Charge Exchange on ^{93}Nb ," *Physical Review C44* (1991) 2209.

(with H. Ward, K. Johnson, et al.) "Double Giant Dipole Resonance in the (π^{-} , π^{+}) Reaction," *Physical Review C45* (1992) 2723.

(with R.D. Ransome, et al.) "Pion Absorption in Heavy Nuclei," *Physical Review C45* (1992) R509-R513.

(with B. Brinkmoller, et al.) "Elastic Scattering of π^{-} and π^{+} from ^4He Between 90 and 240 MeV," *Physical Review C44* (1991) 2031.

(with D.S. Oakley) "Energy Dependence of Pion Inelastic Scattering from ^{208}Pb ," *Physical Review C44* (1991) 2058.

(with A.L. Williams, et al.) "Mass Dependence of High-Energy Pion Double Charge Exchange," *Physical Review C44* (1991) 2025.

(with M.K. Jones, et al.) " $^4\text{He}(p,pp)^3\text{H}$ Reaction near the $P_{3,3}$ π -nucleon resonance," *Physical Review C46* (1992) 52.

(with J. Bar-Touv and S. Mordechai) "Systematics of the Double Giant Dipole Resonances in Nuclei," *Physical Review C45* (1992) 197.

(with D.A. Smith, et al.) "Pion Double Charge Exchange on $^{128,130}\text{Te}$," *Physical Review C46*, (1992) 477.

(with M.K. Jones, et al.) "Pion Absorption above the $\Delta(1232)$ Resonance," *Physical Review C46*, (1992) 52.

(with N.M. Hintz, et al.) "Determination of Neutron and Proton Multipole Matrix Elements in ^{208}Pb from π^{-} and π^{+} Scattering at 180 MeV," *Physical Review C45* (1992) 601.

(with J.O'Donnell, et al.) "A Superconducting Radio-Frequency Cavity for Manipulating the Phase Space of Pion Beams at LAMPF," *Nuclear Instruments and Methods A317* (1992) 445.

(with R.A. Lindgren, et al.) "Pion Scattering to 6⁻ Stretched States in ^{24}Mg and ^{26}Mg ," *Physical Review C44* (1991) 2413-2418.

Phillip J. Morrison

(with Kotschenreuther, et al.) "Novel Computational Techniques to Predict Transport in Confinement Devices, and Applications to Ion Temperature Gradient Driven Turbulence," *Plasma Physics and Controlled Nuclear Fusion Research IAEA-CN-53* (1991) 361.

(with Bialynicki-iirula) "Quantum Mechanics as a Generalization of Nambu Dynamics to the Weyl-Wigner Formalism," *Physics Letters A* 158 (1991) 453.

(with Ye) "Action Principles for the Vlasov Equation," *Physics of Fluids B4* (1992) 771.

(with Prahovic and Hazeltine) "Exact Solutions for a System of Nonlinear Plasma Fluid Equations," *Physics of Fluids B4* (1992) 831.

(with Chen) "Nonlinear Interactions of Tearing Modes in the Presence of Shear Flow," *Physics of Fluids B4* (1992) 845.

(with Su and Horton) "Drift Wave Vortices in Nonuniform Plasmas with Sheared Magnetic Fields," *Physics of Fluids B4* (1992) 1238.

Yuval Ne'eman

"Morphological Cosmology," (P. Flin and H.W. Duerbeck, Editors) *Space Science Reviews* **58** (1991) 192. (A Book Review)

(with C.Y. Lee) "Superconnections and Electro-Weak Symmetry Breaking," *Physics Letters B264* (1991) 389-395.

(with Dj. Sijacki) "Proof of Pseudo-Gravity as QCD Approximation for Hadron IR Region and $J \sim M^2$ Regge Trajectories," *Physics Letters B276* (1992) 173.

(with J. Lemke and J. Pecina-Cruz) "Wigner Analysis and Casimir Operators of $SA(4,R)$," *Journal Mathematical Physics* **33** (1992) 2656-2659.

"La Astronomia en Sefarad," *'ABC' Journal* (Spanish) 13 May 1992, 87-88, Madrid, Spain.

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

"The Decision about the Occupation of Mt. Hermon," (Hebrew) BaMahaneh, 19 August 1992, No. 49, 4.

Qian Niu

"Quantum Coherence of a Narrow Band Particle Interacting with Phonons and Static Disorder," *Journal of Statistical Physics* **65** (1991) 317.

"Theory of the Quantized Adiabatic Particle Transport," *Modern Physics Letters B5* (1991) 923.

(with Danhong Huang and P.R. Antoniewicz) "Periodic Conductance Resonance in a Constricted Channel," *Journal of Physics: Condensed Matter* **3** (1991) 9989.

(with Chiu Liu) "Centralized Distribution of Adiabatic Current in a Split Bloch Band," *Physical Review B45* 9046 (1992).

(with Xiangming Liu) "Electron Depletion Due to In-Plane Bias on a Split 2D Electron Gas," *Physical Review B46*, (1992).

Melvin E.L. Oakes

(with Han-ming Wu, R. Carrerra and Jiaqi Dong) "Resonant Mode Analysis in Toroidal Cavities with Elliptical Cross-Section," *IEEE Transactions on Plasma Science*, **20** (1992).

Perry E. Phillips

(with K.W. Gentle, et al.) "Equilibrium and Perturbed Fluxes and Turbulence Levels in Tokamak: Implications for Models," **68** (16) (1992) 2444-2447.

(with B. Richards, et al.) "Tests of Plasma Transport Models via Perturbation Techniques," **32** (4) (1992) 567.

Joseph G. Polchinski

(with A. Strominger) "Effective String Theory," *Physical Review Letters* **67** (1991) 1681-1684.

(with D. Minic and Z. Yang) "Translation Invariant Backgrounds in 1+1 Dimensional String Theory," *Nuclear Physics B369* (1992) 324-350.

"High-Temperature Limit of the Confining Phase," *Physical Review Letters* **68** (1992) 1267-1270.

Ilya Prigogine

(with I. Antoniou) "From Microscopic Irreversibility to Macroscopic Irreversibility. Discussion Remarks and Comments to R.L. Stratonovich," *Zeitschrift fur Physikalische Chemie*, Bd. 170 (. Oldenbourg Verlag, Munchen 1991) pp. 201-221.

"Schrodinger and the Riddle of Life," in *Molecular Theories of Cell Life and Death*, Sungchul Ji (ed.), Rutgers Univ. Press: New Brunswick, NJ, 1991.

"Irreversibilite et Structure de l'Escape-Temps," *Congres de Philosophie de Dijon de 1988*, publie en 1991 dans les actes de ce colloque aux Editions Vein.

Mark Raizen

(with J.C. Bergquist, J.M. Gilligan, W.M. Itano and D.J. Wineland) "Linear Trap for High Accuracy Spectroscopy of Stored Ions," *Journal of Modern Optics* **39**, 233 (1992).

(with D.J. Wineland, J.J. Bollinger, D.J. Heinzen and W.M. Itano) "Search for Anomalous Spin-Dependent Forces Using Stored Ion Spectroscopy," *Physical Review Letters* **67** (1991) 1735.

(with J.C. Bergquist, J.M. Gilligan, W.M. Itano, and D.J. Wineland) "Ionic Crystals in a Linear Trap," *Physical Review A* **45** (1992) 6493.

(with L.E. Reichl) "The Quantum and Stochastic Manifestations of Chaos," *Physica Scripta* **T39** (1991) 90-95.

(with M. Burns and L.E. Reichl) "Nonlinear Resonance in the Hydrogen Atom," *Physical Review A* **45** (1992) 333-341.

(with M. Millonas and L.E. Reichl) "Stochastic Chaos in a Class of Fokker-Planck Equations," *Physical Review Letters* **68** (1992) 3125-3128.

(with L.E. Reichl) **The Transition to Chaos in Conservative Systems: Quantum Manifestations** (Springer-Verlag, Berlin, 1992).

Linda E. Reichl

"The Quantum and Stochastic Manifestations of Chaos," *Physica Scripta* **T39** (1991) 90-95.

(with M. Burns) "Nonlinear Resonance in the Hydrogen Atom," *Physical Review A* **45** (1992) 333-341.

(with M. Millonas) "Stochastic Chaos in a Class of Fokker-Planck Equations," *Physical Review Letters* **68** (1992) 3125-3128.

The Transition to Chaos in Conservative Systems: Quantum Manifestations, (Springer-Verlag, Berlin, 1992).

Peter J. Riley

(with M.W. McNaughton, et al.) "*np* Elastic Spin Transfer Measurements at 788 MeV," *Physical Review C* **44** (1991) 6.

(with E. Gülmez, et al.) "Elastic Scattering of N-, L-, and S-Type Polarized 794 MeV Protons from an ND₃ Target Polarized in the S-L Plane," *Physical Review C* **45** (1992) 1.

(with M.W. McNaughton, et al.) "²H(*p,n*)²p Spin Transfer from 305 to 788 MeV," *Physical Review C* **45** (1992) 6.

(with K.H. McNaughton, et al.) "*np* Elastic Spin-Transfer Measurements at 485 and 635 MeV," *Physical Review C* **46** (1992) 1.

William L. Rowan

(with S.M. Mahajan, et al.) "Closed, Form Invariant Solutions of Convective-Diffusive Systems with Applications to Impurity Transport," *Physics of Fluids B* **4** (1992) 2495.

(with A.G. Meigs, et al.) "Impurity Rotation in Hydrogen and Helium Plasmas," *Physics of Fluids B* **4** (1992) 917.

(with Jack Sugar, et al.) "Improved Wavelengths for Prominent Lines of Ni X to Ni XXVI," *Journal of the Optical Society of America B* **9** (1992) 344.

(with K.W. Gentle) "Equilibrium and Perturbed Fluxes and Turbulence Levels in a Tokamak: Implications for Models," *Physical Review Letters* **68** (1992) 2444.

(with Jack Sugar, et al.) "Extreme UV Spectra of Pd, Ag, Cd, and Sn Ions Observed in a 1.3 keV Tokamak Plasma," *Journal of the Optical Society of America B* **8** (1991) 913.

(with R.L. Hickok, et al.) "Turbulence Fluctuations and Transport in TEXT," *Nuclear Fusion Supplement* (1991) 1229.

(with D.C. Sing, et al.) "Macroscopic and Microscopic Effects of Electron Cyclotron Heating in TEXT," *Nuclear Fusion Supplement* (1991) 1757.

William C. Schieve

(with L.P. Horwitz) "Horeshoes in a Relativistic Hamiltonian System in 1+1 Dimensions," *Physical Review A* **45** (1992) 4627.

(with A. Pattanayak) "Effective Potentials and Chaos in Quantum Systems," *Physical Review A* **46** (1992) 1821.

(with P. Das) "Chaos in an Effect 4 Neuron Neural Network," *Physics Letters A* **161** (1991) 60.

Chih-Kang (Ken) Shih

(with S. Gwo, A.R. Smith, K. Sadra and B.G. Streetman) "Scanning Tunneling Microscopy and Spectroscopy of GaAs Multiple pn junctions," *Applied Physics Letters* **61** (1992) 1104.

(with Z.-X. Shen, et al.) "Electronic Structure of NiO: Correlation and Band Effects," *Physical Review B* **44** (1991) 3604.

Greg O. Sitz

(with Jassen, et al.) "Rotational Alignment of the CD3 Fragment from the 266-nm Photodissociation of CD3I," *Journal of Physical Chemistry* **95** (1991) 8007.

(with Girard) "Polarization Dependence of the ac Stark Effect in Multiphoton Transitions of Diatomic Molecules," *Journal of Physical Chemistry* **97** (1992) 26.

E.C.G. (George) Sudarshan

"Probability Distributions Over Noncommuting Variables," *Journal of Mathematics and Physics* (IIT Madras) 1992.

"Quantum Dynamics, Metastable States and Contractive Semigroups," *Physical Review A* **46** (1992).

(with C. Chiu and G. Bhamathi) "Relativistic Hamiltonian Model for the Higgs Resonance," *Physical Review D* (1992).

(with C. Chiu and G. Bhamathi) "The Cascade Model: A Solvable Field Theory," *Physical Review D* (1992).

(with J. Anandan, and T.R. Govindarajan) "A Group Theoretic Treatment of the Geometric Phase," *Physical Letters A* **164** (1992) 133.

Jack B. Swift

(with Williams) "Theory of Acoustic Properties near the Cholesteric-Twisted-Grain Boundary-A Phase Transition in Liquid Crystals," *Physical Review A* **46** (1992) 940-945.

Harry L. Swinney

(with Z. Noszticzius, et al.) "Long-Lived Oscillations in the Chlorite-Iodide-Malonic Reaction in Batch," *Journal of the American Chemical Society* **114** (1992) 4290.

(with Q. Ouyang) "Transition to Chemical Turbulence," *CHAOS Journal* (1991) 411.

(with Q. Ouyang, et al.) "Recovery of Short-Lived Species in a Couette Flow Reactor," *American Institute of Chemical Engineering Journal* **38** (1992) 502.

(with L. Gyorgyi, et al.) "Confirmation of High Flow Rate Chaos in the Belousov-Zhaborinskii Reaction," *Journal of Physical Chemistry* **96** (1992) 1228.

(with D. Lathrop and J. Fineberg) "Turbulent Flow Between Concentric Rotating Cylinders at Large Reynolds Number," *Physical Review Letters* **68** (1992) 1515.

(with K. Lee, et al.) "Turing Patterns Visualized by Index of Refraction Variations," *Journal of Chemical Physics* **96** (1992) 4048.

(with J. Fineberg, et al.) "An Instability in the Propagation of Fast Cracks," *Physical Review B* **45** (1992) 5146.

(with R. Vigil and Q. Ouyang) "Spatial Variation of a Short-Lived Intermediate Chemical Species in a Couette Reactor," *Journal of Chemical Physics* **96** (1992) 6126.

Toshiki Tajima

(with Holcomb) "A Mechanism for Gamma-Ray Bursts by Alfvén-Wave Acceleration in a Non-Uniform Atmosphere," *Astrophysical Journal* **378** (1991) 682.

(with Ryutova and Kaisig) "Propagation of Magnetoacoustic Waves in the Solar Atmosphere with Random Inhomogeneities of Density and Magnetic Fields," *Astrophysical Journal* **380** (1991) 268.

(with Horton) "Collisionless Conductivity and Stochastic Heating of the Plasma Sheet in the Geomagnetic Tail," *Journal of Geophysical Research* **96** (1991) 15811.

(with Meerson) "A Mesoscopic Linear Accelerator Driven by Super-Intense Subpicosecond Laser Pulses," *Optics Communications* **86** (1991) 283.

(with Nozawa, et al.) "Emergence of Magnetic Flux from the Convection Zone into the Solar Atmosphere: I. Linear and Nonlinear Adiabatic Evolution of the Convective-Parker Instability," *Astrophysical Journal Supplement* **78** (1992) 267.

(with Kaisig and Lovelace) "Magnetic Interchange Instability of Accretion Disks," *Astrophysical Journal* **386** (1992) 83.

(with Cable, Shibata and Kulsrud) "On the Origin of Cosmological Magnetic Fields," *Astrophysical Journal* **390** (1992) 309.

(with Roy) "The Effect of Hot Inhomogeneous Plasma on Geomagnetic Micropulsations," *Journal of Atmospheric and Terrestrial Physics* **54** (1992) 209.

(with Kamimura, Montalvo, Barnes and Leboeuf) "Implicit Particle Simulation of Electromagnetic Plasma Phenomena," *Journal of Computational Physics* **100** (1992) 77.

(Eliezer and Kulsrud) "Direct Conversion of Muon Catalyzed Fusion Energy," *Muon Catalyzed Fusion* **7** (1992) 47.

(Aranson and Meerson) "Excitation of Solitons by an External Resonant Wave with a Slowly Varying Phase Velocity," *Physics Review A* **45** (1992) 7500.

(Cable and Kulsrud) "On Zero Frequency Magnetic Fluctuations in Plasmas," *Physics of Fluids B4* (1992) 2338.

James C. Thompson

(with T.H. Koschmieder) "Prism Coupling of Light to Discrete Substrate Modes," *Journal of Modern Optics* **38** (1991) 2095-2103.

(with D.V.K. Knebel and J.C. Villagran) "An ATR Study of Ag Film Growth," *Thin Solid Films* **205** (1991) 233-235.

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

(with T.Y. Hsieh, et al.) "Study of Rapid Thermal Precleaning for Si Epitaxial Growth," *Journal of the Electrochemical Society* **139** (1992) 1971-78.

Takeshi Udagawa

(with D. Knobles) "Random-Phase Approximation Calculation of the Nuclear Response in the Continuum Using a Finite-Range Interaction," *Nuclear Physics A533* (1991) 189-214.

(with B.T. Kim) "Dynamical Fusion and Direct Reaction Polarization Potentials for Heavy-Ion Scattering and Fusion at Sub-Coulomb-Barrier Energies," *Physics Letters B273* (1991) 37-41.

(with B.T. Kim) "RPA Calculations of Nuclear Response in the Continuum for the Hadronic Inelastic Scattering," *Chinese Journal of Physics* **29** (1991) 431-439.

(with M. Naito and B.T. Kim) "Systematics of Sub- and Near-Barrier Fusion Cross Sections and the Threshold Anomaly," *Physical Review C45* (1992) 876-879.

(with P. Oltmanns and F. Osterfeld) "Δ-Excitation in Nuclei," Spin and Isospin in Nuclear Interactions (S.W. Wissink, C.D. Goodman and G.E. Walker, Editors) Plenum Press (1991) 69-73.

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

James W. Van Dam

(with H.L. Berk, Z. Guo and D.M. Lindberg) "Continuum Damping of Low-n Toroidicity-Induced Shear Alfvén Eigenmodes," *Physics of Fluids B4* (1992) 1806-1835.

(with M.N. Rosenbluth, et al.) "Continuum Damping of High-Mode-Number Toroidal Alfvén Waves," *Physical Review Letters* **68** (1992) 596-599.

(with M.N. Rosenbluth, et al.) "Mode Structure and Continuum Damping of High-n Toroidal Alfvén Eigenmodes," *Physics of Fluids B4* (1992) 2189-2202.

Steven Weinberg

"Effective Chiral Lagrangians for Nucleon-Pion Interactions and Nuclear Forces," *Nuclear Physics B363* (1) (1991) pp. 3-18.

"Axial Vector Coupling of the Quark," *Physical Review Letters* **67** (25) (1991) 3473-3474.

Alan J. Wootton

(with R.V. Bravenec, et al.) "Quasi-Linear Transport Inferred from Density Fluctuation Spectra," *Nuclear Fusion* **31:4** (1991).

(with T. Uckan, et al.) "Characteristics of Edge Plasma Turbulence on the ATF Torsatron," *Physics of Fluids B* **3(4)**: (1991) 1000-1005.

(with D.C. Sing, et al.) "Macroscopic and Microscopic Effects of Electron Cyclotron Heating in TEXT," *Plasma Physics and Controlled Nuclear Fusion Research 1990, Nuclear Fusion, Supplement 1*, (1991) 589.

(with R.L. Hickok, et al.) "Turbulent Fluctuations and Transport in TEXT," *Plasma Physics and Controlled Nuclear Fusion Research 1990, Nuclear Fusion Supplement 1991* (1991) 1229.

(with D.L. Brower, et al.) "Confinement Degradation and Enhanced Microturbulence as Long-Time Precursors to High-Density-Limit Tokamak Disruptions," *Physical Review Letters* **67:2** (1991) 200-203.

(with S.C. McCool and S.B. Zheng) "Test Particle Calculations for TEXT with Resonant Magnetic Fields," *Nuclear Technology* **19** (1991) 473.

(with David W. Ross, et al.) "Comparison of Drift Wave Models with Fluctuation Data from the Interior of the TEXT Tokamak," *Physics of Fluids B3* (8) (1991) 2251-2260.

(with J.N. Leboeuf, et al.) "TEXT Tokamak Edge Turbulence Modeling," *Physics of Fluids B3*(8) (1991) 2291-2299.

(with Peter J. Catto, Jr.) "Estimating the Runaway Diffusion Coefficient in the TEXT Tokamak from Shift and Externally Applied Resonant Magnetic-Field Experiments," *Physics of Fluids B3*(8) (1991) 2038-2049.

(with C. Hidalgo, et al.) "Plasma Fluctuations Near the Shear Layer in the ATF Torsatron," *Nuclear Fusion* **31**, no. 8 (1991) 1471.

(with Ch.P. Ritz, et al.) "Comparative Studies of Edge Turbulence in the TEXT Tokamak and the ATF Stellarator," *IAEA* **2** (1991) 589-602.

(with C. Hidalgo, et al.) "Influence of Impurities on Edge Turbulence and Transport in TEXT," *Nuclear Fusion* **31**, no. 9 (1991) 1661-1666.

(with S. Lippmann, et al.) "Effects of an Ergodic Magnetic Limiter on the Edge Plasma Properties of the TEXT Tokamak," *Nuclear Fusion* **31**, no. 11 (1991) 2131-2140.

(with X.Z. Yang, et al.) "The Space Potential in the Tokamak TEXT," *Physics of Fluids B3* (1992) 3448-3461.

(with D.W. Ross, et al.) "Effects of Beam-Attenuation Modulation on Fluctuation Measurements by Heavy-Ion Beam Probe," *Review of Scientific Instruments* **63** (4) (1992).

(with K.W. Gentle, et al.) "Equilibrium and Perturbed Fluxes and Turbulence Levels in a Tokamak: Implication for Models," *Physical Review Letters* **68**, no. 16 (1992).

(with B. Richards, et al.) "Tests of Plasma Transport Models via Perturbation Techniques," *Nuclear Fusion* **32**, no. 4 (1992).

(with R.V. Bravenec, et al.) "Core Turbulence and Transport Studies on the Texas Experimental Tokamak," *Physics of Fluids B* No. 4 (1992).

(with A.S. Ware, et al.) "Theory of Ionization-Driven Drift Wave Turbulence," *Physics of Fluids B* No. 4 (1992) pp. 877-887.

(with J.R. Myra, et al.) "Runaway Electrons as a Diagnostic of Magnetic Fluctuations in the Edge Plasma of the Texas Experimental Tokamak," *Physics of Fluids B*, No. 4 (1992) 2092-2097.

Syed Amir Ali Zaidi

"Self-Energy of the Graviton in Second Order," *Journal of Physics A: Mathematical and General* **24** (1991) 4325-4334. Printed in the United Kingdom.

**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 Mihill, 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

**Ph.D. Graduates
Spring, 1992**

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

**Ph.D. Graduates
Summer, 1992**

Lei 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
Professor Roger D. Bengtson

Fawzi Hadjarab

Lattice Dynamics of Semiconductor Surfaces: A Bond Charge Model
Professor F.W. deWette

Brian Kent Kendrick

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 Parkes

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
Fall, 1991**

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 ^{13}C 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

**M.A. Graduates
Summer, 1992**

Guo Wei

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
Sandra Elizabeth Waycott

***B.S. and B.A. Graduates
Spring, 1992***

Chad Ray Cotton
Mary Amanda Leblanc
Norma Susan Vickery
Wayne Johnathon Betts
Mark Steven Byrd
Jonathan C. Gallmeier

Nathan Eric Howard
Robert Lee Hutton
Robert Lee Jones, III
Christopher Throckmorton
Travis Scott Wall

***B.S. and B.A. Graduates
Summer, 1992***

Owen Edward Ashley
Scott Wesley Rubin
Peter Michael Abbamonte

Christopher Lee Hackert
Mark McGrew Mims





