NJAAPT NEWSLETTER

Rowan University

Volume 16 Number 2 Dec.98/Jan.99

New Jersey Section American Association of Physics Teachers

Dedicated to the Improvement of Physics Teaching

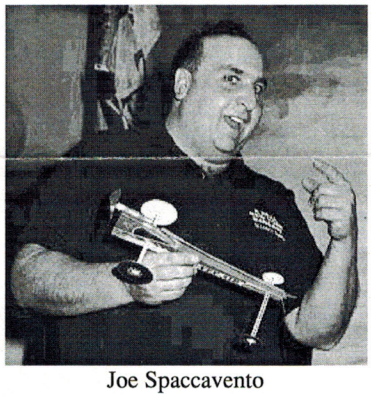
CONTENTS

[Below: Some scenes from the Holiday Treats Workshop. More photos on page 5.]

Holiday Treats at Discovery House

By Joe Spaccavento

Once again this year our annual holiday get together was a resounding success! Thirty-five NJAAPT members carted away enough goodies to keep them very busy for a long time. Recognition must go to Rich Urban, as the chair of the workshop. Rich did all the things that no one else wanted to do; then he did a little more! I was fortunate enough once again to be asked to act as the master of ceremonies for the event and as in the past had a blast presenting all of the objects in our "box of treats" as well as this years' addition of some twenty-six different door prizes. My assistant once again for the presentation was the effervescent Jay Waldstein and of course Brian Holton and Discovery House was our gracious host. I would also like to thank everyone who helped fill the boxes. I won't mention any names for fear of leaving someone out, but thanks, you were a great help!



Joe Spaccavento

When you put a great deal of time and effort into something like this it is a very satisfying feeling when it is over. It is even more satisfying when all involved declare this year's program the best ever! We had an incredible package of material assembled. Some highlights included: Dick and Rae's Demo Book, Lou-Vee air cars, Cartesian Diver set, courtesy of Esched Science, Graphs and Tracks, courtesy of Physics Academic Software, and the Cutnell and Johnson text CD, courtesy of John Wiley & Sons. Also, The World of Physics CD, courtesy of Intellectum Plus, and the World in Motion CD courtesy of Physics Curriculum and Instruction. The package also included our famous center of mass Santa Clauses, Sound tubes, magnets demo and balancing nails puzzle. I could go on and on, but I'll stop here. It was a great feeling watching everyone's reaction when he saw what they were getting! The icing on the cake, so to speak, were the twenty-six door prizes that were distributed, which ranged from a Ti92 and CBL, courtesy of Texas Instrument, to the Physics of Star Trek Book courtesy of HarperCollins Publishers.

Now the best part of the whole event is that many of the items that were distributed to all, as well as the individual door prizes, were **donated** to NJAAPT. I have already mentioned several of those supporters and here is the complete list of sponsors for the Holiday Treats Workshop: • Texas Instrument Inc.

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- Knowledge Revolution
- Lockheed Martin Michoud Space Sys.
- Archie McPhee & Co.
- Lou-Vee-Air Car Systems
- HarperCollins Publishers Academic Promotions
- Goddard Space Flight Center
- Classroom Connect, Inc
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- Esched Science
- Ward Science
- NASA ERC Georgian Court College
- Compaq Computer
- Kidnetix
- OWL Software
- Raytheon TI Systems
- National Headquarters, Civil Air Patrol
- Discovery House Museum

I would like to thank these sponsors again, publicly, and would like our entire membership to know that each company or organization mentioned above contributed either thirty-six of something, or a door prize, and in some cases both, to our efforts! These are the loyal supporters of the NJAAPT Physics Holiday Treats Workshop and I would ask you as members to support them whenever the opportunity arises!

As we look forward to next year, we will have a difficult task to surpass this year's program. We will once again seek corporate/government support for next year. If you have a contact in a company that might be interested in supporting our cause, please drop me an e-mail at jspac@intac.com with his e-mail address or, better yet, join the Holiday Treats committee yourself and let us work towards

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1999 NJAAPT Schedule of Events

Date	Event/Location	Contact
Jan. 16, 1999 (Saturday)	Ring Flinger Make and Take Workshop High Technology H.S., Lincroft, NJ	Brian Holton: 732-842-8444 (W); 238-3078 (H)
Jan. 30, 1999 (Saturday)	Teaching waves and using video cameras Marine Academy of Science & Technology	Jessie Blair: 732-531-4569 (H);jessie@monmouth.com
Feb. 26, 1999 (Friday)	Dave's Demo Night at Rutgers Rutgers Physics Lecture Hall, 7:00 P.M.	Dave Maiullo: 732-445-3872 (W); 572-5760 (H)
Mar. 12, 13 (Friday, Saturday)	NJ/SEP Joint Section Meeting Princeton University	Harry Rheam: 609-768-1532;rheam@cybernet.net
Apr. 23, 30, 1999 (Fridays)	Physics Days at Great Adventure Jackson, NJ	Jessie Blair (See above)

From the president:

Anyone wishing to be do a workshop should share his program with the Executive Board at its meeting on January 5, 1999 at Discovery House (East Brunswick, NJ or contact Jessie Blair at 732-531-4569 or by e-mail - jessie @ monmouth.com. We also invite you to **join** our Executive Board and help plan some of our future programs.

Edmund Scientific Hosts Workshop

By Harry Rheam

On Saturday, November 21st, a group of 15 Science teachers participated in a workshop on geometric optics at Edmund Scientific. The day started with coffee and bagels. What is a workshop, if people aren't well fed? We went outside to check the sky with polarizing filters. Is sunlight polarized? Do parts of the sky change brightness when observed with a rotating polarizing filter? We also looked at the sky and the clouds and asked: What causes the sky to be blue and the sunset to be red? What causes clouds to be white sometimes and dark other times?

The participants checked these questions out using a plastic shoebox, water, a flashlight and milk. We were able to see that milk reddened the flashlight going through it and scattered some of the other light. The idea that light was refracted was also demonstrated with this equipment.

The participants constructed cardboard spectroscopes from Learning Technologies. These were then used to check out the sky. If you look carefully with one of these spectroscopes, you can see several absorption lines. Really good spectroscopes for the price! The participants also received a holographic diffraction grating compliments of Learning Technologies.

Next we made a polarizing demonstration box from polarizing filters and a shoebox. The polarizing filters were cut to fit an opening in the sides of the shoebox. The polarizing filter was cut into pieces so that looking straight through you looked through two filters aligned the same way. However, at an angle, the filters are at right angles so there appears to be a barrier. However there is no barrier. A windup toy can walk through the apparent barrier.

Refraction was studied using a fishtank, milk, glass lenses and air lenses, and lasers. The group saw how the index of refraction changed the focal length of a lens. Air lenses give results opposite of what we normally teach. The students can understand this without math. However, if you teach honors Physics, you can give them the math behind what is happening. The group constructed air and water lenses using-

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Physics News Update

By Phillip F. Schewe and Ben Stein

The American Institute of Physics Bulletin of Physics News Number 407 (Dec. 17, 1998)

Relativistic Laser light is a convenient way of transporting both electric and magnetic fields. When an electron encounters light, however, it is usually the electric field that does the talking; the magnetic part of light is less influential since its effect on the electron is proportional to the electron's speed as a fraction of the speed of light (c).

In new experiments at the University of Michigan this is all changed since the intensity of the laser light used is so great (a terawatt of power, compared to a milliwatt for a laser in a CD player) that the electrons in an oncoming supersonic beam of helium atoms are stripped from their parent atoms and accelerated to relativistic speed (a fair fraction of c). With the magnetic component now exerting a tangible force, the electrons' motions become loopy—that is, the electrons do not scatter in straight lines from the laser electric field but instead acquire a figure-eight motion. This "nonlinear Thomson scattering" causes the electrons to emit higher-frequency versions (harmonics) of the original laser light in a characteristic pattern. It was precisely the emission of harmonic light by intense light striking slow electrons bound to atoms (also at the University of Michigan) that helped to establish nonlinear optics in the early 1960's. Now the scattering of intense light from fast free electrons helps to establish an era of relativistic nonlinear optics, one goal being the generation of coherent x rays. (Chen et al., Nature, 17 Dec.; contact Donald Umstadter, dpu@eecs.umich.edu,734-763-2284.)

Gluon Fusion might be the shortcut to finding Higgs bosons. As the hypothetical particle which supposedly endows other particles with mass, the Higgs is an important ingredient in the standard model of particle interactions and one of the chief quarries at present and future accelerators. In fact, a new calculation shows that the Higgs might even be found at the rejuvenated Tevatron at Fermilab if the Higgs mass (still unknown) is less than 180 GeV. This prognosis counts on the ability of colliding protons and antiprotons to send forth gluons which then fuse to form a Higgs, which would thereafter decay into a pair of W bosons (carriers of the weak force). Previous studies pondering the likelihood for Higgs production were based chiefly on the notion that the proton-antiproton collisions would make a Higgs via quark-antiquark fusion in the company of a W, and had estimated that the Tevatron would be capable of spotting Higgs particles with masses no larger than about 130 GeV. At a recent meeting at Fermilab on Higgs prospects in the next round of work at the Tevatron, experimentalists were heartened by the new estimates since naturally they would like to explore as large a Higgs window as possible. (Tao Han and Ren-Jie Zhang, Physical Review Letters, tent. 4 Jan 1999; e-mail: than@pheno.physics.wisc.edu or 608-262-2865.)

A multiwave semiconductor laser, one which emits light at three separate colors using only a single material, has been achieved at Lucent Technologies. This result is an extension of Federico Capasso's work with cascade lasers (see Updates 322, 359), in which the laser wavelength is determined not by semiconductor chemistry but by the thickness and spacing of a series of tiny semiconductor layers. The present device can emit three different mid-infrared wavelengths simultaneously, making it useful as the basis for a detector of trace gases (e.g., in monitoring pollutants). (Tredicucci et al., Nature, 26 Nov. 1998.) ✍

Frederick and Florence Bauder Scholarship

By Harold Lefcourt

Funding, up to $500. is available from the New Jersey section of the American association of Physics Teachers, as a result of the generous contribution of Frederick and Florence Bauder and the efforts of the late Achille Capecelatro. This money is to provide scholarship aid to physics teachers who are taking workshops and/or courses designed to enhance their subject knowledge and teaching skills. This would supplement aid from other sources in paying expenses such as tuition and laboratory fees.

For further information please contact: Harold Lefcourt, Morris Knolls High School, 50 Knoll Drive, Rockaway, NJ 07866, 201-989-2750 or by e-mail at lefty@cybernet.net. ✍

Dumont Sharing Session

By Ray Polomski

Joe Spaccavento using one of the new G3 computers in the newly renovated Dumont physics room

Golda Steiner Jim Cuviello Mary Lou Ciavarra Nick Piccione

The Dumont sharing group is back in business with two meetings this fall. As it has been in the past, our focus is the introduction of alternative strategies in teaching physics as well as functioning as a support system for the new and experienced

(continued on page 5, col. 2)

Physics at Rowan University

By Jeff Hettinger

Physics is a science dedicated to finding and describing the fundamental properties and laws that govern physical processes. A discipline critical to every contemporary technological advance, the field of Physics is productive and dynamic and remains an exciting career choice. If you have an inherent interest in understanding the way things work, a career in the physical sciences may be right for you. However, it is important to emphasize that career choices with a physics degree are not limited to those which are extremely technical. Physics is also an extremely marketable liberal arts degree.

Career Opportunities

The physics program at Rowan University will prepare you for a variety of careers. Obvious career tracks for physics majors include technical support for R & D activities, secondary education, sales representatives for companies specializing in technological equipment, technical writer, various computer application and support opportunities, and graduate school in physics or engineering to name a few. Non-traditional career opportunities also exist. The analytical skills demonstrated by one holding a BS in Physics allow access to any career where analytical and computer skills are important such as an economic analyst or insurance actuator as well as valuable preparation for Medical, Law, or Business schools. With the help of an advisor, you can design a program that meets your needs.

Curriculum

Rowan's Physics program provides a broad array of experiences which prepare the participating student for a number of interesting and challenging career opportunities. The program offers general physics courses geared toward the development of analytical skills which are important for any career choice. Upper level courses develop and refine these analytical skills and provide advanced problem solving capabilities which are important to current areas of scientific inquiry. Research projects provide a capstone experience allowing students to integrate the concepts learned in classes into a single activity. The ten physics/astronomy faculty in the physics section at Rowan encourage students to collaborate with ongoing research projects preparing students for future research activities, providing students with a basis for developing new educational activities, and providing evidence of the students analytical skills in the form of public presentations and/or published reports.

Research Opportunities

Rowan University Physics faculty are active in research and encourage student participation in their current areas of interest. These activities give the student an opportunity to acquire and demonstrate an advanced knowledge of physics and reinforce their knowledge of basic concepts. Four presentations were given at the 1997 National Conference on Undergraduate Research by Rowan Physics students. A list of faculty and their current research interests are listed below.

Eduardo Flores, Ph.D., University of Michigan, Theoretical High Energy Physics
Physicists and mathematicians have been looking for a better mathematical language for the theory of relativity. Much progress has been made but a simple mathematical language, accessible to the non-specialist, has not been found. We have found a natural and simple language for special relativity. Another important aspect of this project is that it clarifies the concepts in relativity, which will ease interpretation of new research results and make the subject more accessible to beginning students. Clear concepts in relativity could help open new frontiers in physics.

Quantum mechanics predicts many experimentally supported results and is considered one of the most successful theories in physics. In spite of this success Albert Einstein and others do not accept a theory of physics that contains inherent uncertainties anticipating that a "more exact" model could be developed. With its built in uncertainties, many critics ask if quantum mechanics is a reasonable description of physical reality. In this work we are searching for the origins of these uncertainties hoping to clarify the problematic situation.

E. J. Guerra, Ph.D., Princeton University, Radio Astronomy & Theoretical Astrophysics
Radio astronomy gives us a glimpse of the most distant (and thus oldest) known objects and structures in the universe. Active Galactic Nuclei (AGN) often emit vast amounts of energy in radio waves which can be observed at great distances. Many of the radio-loud AGN studied are so distant that their radio waves originated at a time when the Universe was much younger than it is now. Also, many advances in cosmology, the study of the universe as a whole and single system, have come from precise measurements of the cosmic microwave background at radio wavelengths, and more insight will be gained in the next decade with such measurements.

My research includes the use of various radio telescopes and theoretical studies of AGN. Various National Radio Astronomy Observatory (NRAO) telescopes are utilized, including the NRAO 140-foot telescope in Green Bank, West Virginia and the NRAO Very Large Array (VLA) in New Mexico. Data are analyzed with Linux workstations running on Intel-based computers. These studies are aimed at understanding the physics of AGN and Big Bang cosmology.

Jeffrey Hettinger, Ph.D., Boston University, Experimental Solid State Physics
Experimental solid state physicists investigate properties of solid matter. Recent Nobel prizes have been awarded to solid state physicists for the invention of the scanning tunneling microscope, discovery of high-temperature superconductors, and the discovery of the quantum Hall effect.

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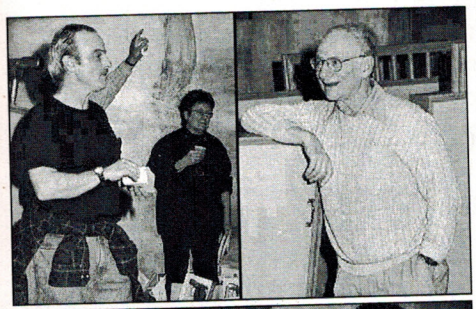
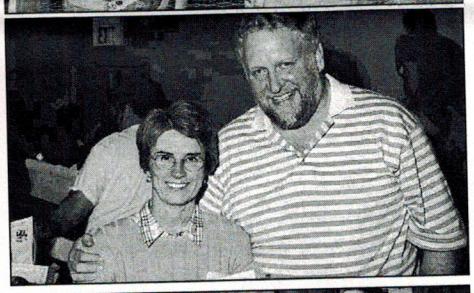
next year's program together!

Please accept my best wishes for a happy and joyous holiday season and a great 1999!

[Below, some more scenes from the 1998 Holiday Treats Workshop at Discovery House.]





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baseball holders, tennis balls, weights, and PVC pipe. Also, a telescope, compliments of Learning Technologies, was made available to the participants.

A corner cube was constructed from plastic flat mirrors. These are used in the space program to reflect signals back from the Moon. A floating mirror box was also demonstrated for the participants. This box makes a teacher seem to fly. It is also the basis for several types of magic banks.

Somewhere there was a lunch break. The high point of the day, as always, was the shopping at Edmund's. Their back room with all the surplus in it is a great spot for any teacher on a limited budget.

Support was provided by Edmund, NJAAPT, AAPT PTRA+ program, and Learning Technologies.

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teacher. To this end we've been able to provide a series of activities for our members that include information about the latest trends in technology and teaching and demonstration materials for the average physics classroom.

Upon our return in October, I informed the members of NJAAPT of all the special activities planned in the upcoming year, including the joint NJ/SEPA meeting in March at Princeton. I then presented the Core Curriculum Standards for Physics as set by the State Board of Education.

Joe Spaccavento of North Arlington High School presented a synopsis of the modeling workshop he attended this past summer at the University of Maryland. The focus was on how students learn. By teaching each other, participants experienced first hand the difficulties students encounter. A non-traditional approach which depends greatly on students being actively engaged in discovery of the concepts in physics.

Along the same line of thought, Steve Henning of Clarkstown South High School in Clarkstown, NY did a small presentation on the C3P program, which has its origins in the discovery method, too. The program involves the use of various materials for learning, and the entire curriculum is on one CD ROM. He hopes to present this material as a workshop to interested teachers in the area in the near future.

Dumont has been fortunate to have had the physics labs renovated and, as a result, the author was able to demonstrate a few of the features of the computer interfacing and interactive programs available. The room is now equipped with twelve Macintosh G3 computers and seven printers.Interfacing is accomplished by use of the Vernier system utilizing various probes, Data LoggerPro, and Physics with Computers software. Dave Mulholland, of Northern Valley Regional High School in Demarest, used these computers to demonstrate the use of Interactive Physics, as an example of its capability. He showed how he could simulate the law of universal gravitation, projectile motion, and free body diagram problems.

In December we were able to share reports with those who attended the Northeast Regional Meeting at Yale University in November. Jay Waldstein of Rahway High School and Joe Spaccavento told us about the goodies to come at the Holiday Treats party at Discovery House!

The sharing session is proud of one of its members, Erik Gundersen, of Pascack Valley High School in Hillsdale. He just had a book published entitled, *The Handy Physics Answer Book* in which he takes a non-mathematical approach to physics in layman's terms, by using a question and answer format. The book covers a range of topics in chapters titled from "Work, Energy, and Simple Machines" to "Deep Theories." The latter is a section about the fundamental theories of the universe. It is published by Visible Ink Press. Our congratulations to a great young physics teacher!

Our next meeting will be on Thursday, January 21 at 4 P.M. For information, call me at 201-387-3098 (W), or 201-664-3920 (H). E-mail: R7429@AOL.com.

Astrophysics Summer Institute

By Eugenia Etkina, Terry Matilsky, and Michael Molnar

A huge gap exists between the level of science practiced by researchers and public knowledge of these fields. In our schools, science is often taught as if it were a body of completed knowledge. Yet, the essence of what scientists do is to study the new and unknown. Unfortunately, this is not what most elementary and secondary students perceive science to be. The emphasis on transmitting only what is known in science contradicts its very essence. As Richard Feynman so aptly pointed out: "Science is not about what we know; it is about what we don't know."

Most high school physics programs include limited material in contemporary physics. While studying physics, students concentrate mostly on mechanics. This leaves them at the level of the physics of the 18th century and does not demonstrate how physics knowledge helps people understand their place in the Universe. The same is true for astronomy. Even if astronomy is taught at the high school level, most of the time is spent on the oldest parts of the field, the motion of celestial objects. This does not generate interest in the subject and does not tell the students what astrophysicists are doing today. Astrophysics Research by High School Students is a project which helps to bring real science into high schools. Rutgers University faculty in astrophysics and science education work collaboratively with the schools by involving high school students and their teachers in actual research in X-ray astrophysics. Spectral and timing data from X-ray telescopes stored in NASA archives currently available to the public via the Internet make it possible. The study of astrophysics from space has captured the minds of many. and it is natural to build on this interest by initiating real scientific inquiry using the databases freely available through NASA. This project provides opportunities for interested students and their teachers to investigate fundamental questions of astrophysics, and to understand the nature of the research process by doing authentic research in X-ray astrophysics.

Several topics are suitable for the basic understanding of astrophysics concepts. To find out about this, we invite interested high school physics teachers and their students (teams of a teacher and two students) to apply for the next summer Astrophysics Institute. The Institute will start on June 28th and end on July 23rd. Information about the program is available at http://www.rci.rutgers.edu/~etkina/astro.htm. We urge you to take advantage of this opportunity. Check that web site or call Eugenia at 732-932-7496 at your earliest opportunity! ✍

NJAAPT MEMBERSHIP FORM

American Association of Physics Teachers
New Jersey Section

To apply for membership in NJAAPT, fill out the form below, enclose a check payable to NJAAPT for $10.00 (1997 - 1998) or for $25.00 (1997 - 2000) , and Mail to:

Harry Rheam
1122 Beechwood Dr.
Atco, NJ 08004

Your Name _____ Employer's (School) Name _____

Home Address _____ Employer's (School) Address _____

City/St./Zip _____ City/St./Zip _____

Check, as appropriate: Industry_____ 4-yr. Coll./Univ._____ Comm.Coll._____
Pre-Coll._____ Retired_____ Nonprofit Org._____

Home Phone (____)_____ Work Phone (____)_____
E-mail address _____

If you are interested in joining a mini-workshop or a sharing group, check here_____
(Information will be sent to you on how to join or initiate one.)
Please list the names and schools of other teachers who may be interested_____

_____

_____

(Current members: If your address has changed, please fill out the form below.)

NJAAPT Change of address Form

From the Treasurer

Mail to:
Harry Rheam
1122 Beechwood Drive, Atco, NJ 09004

New Mailing Address:

Street _____

Box _____

City, State, Zip _____

Phone ( )_____

e-mail address _____

Each of these advances have the potential to significantly impact the technological future of our society. My research investigates physical properties of layered superconducting materials which may be used for high-current transport (power lines) or electronic applications (switching devices). The experiments involve resistivity measurements as a function of temperature and magnetic field. Resistivity is measured from room temperature down to -450F. Properties are also measured in magnetic fields which are several orders-of-magnitude larger than the earth's magnetic field. The primary focus of the research is to determine how the underlying crystal lattice and microstructure influence physical properties in these very important technological materials.

David Klassen, Ph.D., Univ. of Wyoming, Planetary Astronomy
Planetary astronomy is the study of objects in our solar system using Earth-based telescopes. This science complements, expands, and even directs NASA's spacecraft explorations. The strengths of Earth-based observing lie in temporal coverage and spectral range and resolution. My research uses infrared spectral images gathered at the NASA Infrared Telescope Facility on Mauna Kea, Hawaii. The infrared spectral range contains many diagnostic features of ices and minerals thought to be on Mars based on in-situ measurements by the Viking landers in 1976. These images are used to make maps of these spectral features to search for these, and other minerals which are important to piecing together the climatic history of Mars. The ice features allow the determination of the composition of the Martian clouds which sets limits on the atmospheric temperatures and also allows the measurement of the total Martian water budget. This work is done in collaboration with scientists at Cornell University and the US Geological Survey.

Hong Y. Ling, Ph. D., Drexel University, Theoretical Optics
Quantum optics studies the interaction between matter and light with the emphasis on the effect of wave-particle duality on the light properties. The wave aspect of the electrons inside atoms can be utilized to produce light without population inversion, and to reduce or eliminate the absorption of the light by atoms. Atom optics, on the other hand, uses the momentum exchange between atoms and photons to change the translational degree of freedom of the atoms. Such changes can result in cooling atoms to a very low temperature, and altering the course of atomic motion without destroying the wave property of the atoms. Students with a good background in mathematics and modern physics can participate in these research activities.

Sam Lofland, Ph.D., Univ. of Maryland, Experimental Solid State Physics
Everyone is familiar with microwave radiation, as people use it often in heating their leftovers in their microwave oven or by making a call on their cellular phone. However, microwaves can be used to study the properties of materials. For instance, the fact that microwaves can heat water and metallic pots while heating neither glass nor plastic tells us something about those particular materials. More accurate measurements of the microwave absorption in samples can give us a great deal of information.

Microwaves are also useful in studying magnetic materials. Using microwaves, one can do magnetic resonance experiments, which are basically similar to the technique of MRI (magnetic resonance imaging). Other magnetic information is also such as the strength of the magnetism and its temperature dependence. These data are crucial in attempting to develop a theory of magnetism for a system of materials.

Karen Magee-Sauer, Ph.D. , University of Wisconsin-Madison, Planetary Science
Research in planetary sciences also includes analysis of comets. Through evaluation of signature radiation emitted by comets, their composition and origin can be determined. Characteristic energies of typical cometary molecules are in the infrared energy range of the electromagnetic spectrum. The telescope used to study the infrared emission from comets Hyakutake and Hale Bopp was the NASA Infrared Telescope Facility atop of Mauna Kea (14,000 ft) on the Big Island of Hawaii. Undergraduate students are involved in all aspects of this research and present their work at national conferences highlighting undergraduate research.

This program is supported through grants awarded by the National Science Foundation's Research at Undergraduate Institutions (RUI) program and NASA's JOVE program. This work involves collaborates with scientists in the Laboratory for Extraterrestrial Physics at the NASA Goddard Space Flight Center in Greenbelt, MD.

Maureen O'Halloran, Ph.D. Stanford University, Experimental Molecular Physics
Light from high power pulsed lasers is used to study small molecules such as hydrogen, carbon dioxide and oxygen. By taking advantage of modern optical techniques we can generate far-ultraviolet light and probe very highly excited states of these molecules. These studies help us understand the basic physics of how these molecules are "put together" and how they fall apart (dissociate and ionize) after absorbing high energy ultraviolet light. Students working on these research projects learn about lasers, electronics, and vacuum technology as well as studying the principles of quantum mechanics involved in molecular physics.

Jon Sagle, Ph. D., Lehigh University, Experimental Atomic Physics
Measurements of atomic structure help to further our understanding of the atom. The strength and nature of certain fundamental atomic interactions are revealed through measurements of this structure. A variety of atomic states can be populated by the state-of-the-art high-power laser systems available at Rowan University. Atoms excited by lasers emit light. Detection of this light and analysis of its properties provide measurements of important atomic properties such as excited state hyperfine structures and lifetimes. Students may do atomic structure measurements in the Rowan laser laboratory for course credit as early as their sophomore year.

Facilities
The Department of Chemistry and Physics is located in Bosshart Hall, where there are separate laboratories for chemistry, physics, biology and astronomy. Enrollment in all laboratory based physics class-

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es is limited to 24 students per section, ensuring personal attention. All of our physics lectures and labs are taught by faculty (no teaching assistants). Research laboratory space is presently undergoing renovation. The Atomic and Molecular Physics Laboratory is part of the renovation. This facility houses several lasers which access a large range of wavelengths allowing investigations of large ranges in energy. The Solid State Physics Laboratory is also undergoing renovation. This facility houses a superconducting electromagnet/cryostat system capable of reaching magnetic fields of six tesla and temperatures of 1.8K as well as other instruments designed to investigate the properties of solid materials.

Please visit our web page: follow links from www.rowan.edu.

For more information contact: Jeff Hettinger, (609)256-4500, ext.3595, e-mail: hettinger@rowan.edu ✍

NJAAPT NEWSLETTER


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Contributors: Jessie Blair, Eugenia Etkina, Harold Lefcourt, Dave Maiullo, Terry Matilsky, Michael Molnar, Ray Polomski, Harry Rheam, Phillip Schewe, Joe Spaccavento, Ben Stein

NEW JERSEY SECTION
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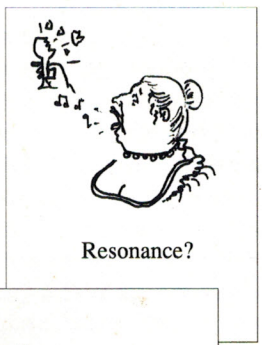

Resonance?

Conservation of Angular Momentum?

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TO: