APS NEWS

April 2003
Volume 12, No.4

A Publication of The American Physical Society http://www.aps.org/apsnews

Philadelphia Hosts 2003 April Meeting

The APS heads to the city of brotherly love this month for the 2003 APS Spring Meeting, April 5-8 in Philadelphia, Pennsylvania. This year's meeting is also the spring meeting of the APS Division of Particles and Fields (DPF). Astrophysics comprises a strong component of the technical program, along with nuclear physics, plasma and computational physics, particle physics, gravitation, and precision measurement and fundamental constants. There are also nontechnical sessions on such topics as physics education, international affairs, physics history, and physics and society.

In keeping with the meeting's tradition of emphasizing the unity of physics, the technical program will feature nine plenary lectures providing a general overview of a broad range of topics. These will include mysteries of extra dimensions, antimatter, quantum chaos, gamma-ray bursts, and matter, space and time at the energy frontier. There will also be lectures on recent Chandra observations of supernova remnants and young neutron stars, as well as the outlook for science done underground, such as at the SNO facility in Canada.

Nobelly Yours. In addition to being the subject of a plenary lecture on SNO, solar neutrinos are among the topics to be discussed during a special session with lectures by the 2002 recipients of the Nobel Prize in Physics, along with other APS prize recipients. Masatoshi Koshiba of the International Center for Elementary Particle Physics in Tokyo—co-recipient with Ray Davis for their independent neutrino experiments —will be on hand to discuss the birth of the field of neutrino astrophysics. He will be joined by Riccardo Giacconi of Associated Universities, Inc., in Washington, DC, who will discuss his pioneering role in the development of x-ray astronomy, and James York and Yvonne Choquet-Bruhat, co-recipients of the 2003 Dannie Heinemann Prize. Finally, Princeton's John Wheeler, co-recipient of the 2003 Einstein Prize, will offer his thoughts on the

See **APRIL MEETING** *on page 6*

The Long and Short of It

PhotoCredit: Jessica Clark

APS past President William Brinkman (right) hands the gavel, symbolic of the awesome power of the APS Presidency, to new APS President Myriam Sarachik at the meeting of the Executive Board in College Park in February.

Board Approves New Ethics Guidelines for Journals

By Pamela Zerbinos

Last year, in response to the ethics violations that infected the physics community, the APS modified its guidelines for ethical and professional conduct [see APS News, January 2003; http://www.aps.org/apsnews/0103/010301.html]. At its February meeting, the APS Executive Board has taken the further step of approving a revised set of guidelines for the handling of allegations of research misconduct related to the APS journals.

"These have been in place for some time," said APS Editor-in-Chief Martin Blume, "but they have been sharpened up and made more explicit."

Because of the large number of articles that get submitted, it isn't possible for APS to examine each for evidence of misconduct. Instead, the Society relies on everyone involved in the editorial process to safeguard its integrity.

"Before investigating," Blume said, "we have to have some indication from someone that something is wrong. That someone can be an editor, or it can be whoever's reading the manuscript at an early stage."

Allegations usually involve plagiarism, duplicate submissions, referee misconduct, improper credit assignment, or false or fabricated data.

"For some of those cases," Blume said, "there is no way in which we can carry out an appropriate investigation. For example, the fabrication of data. That's the sort of thing that is the responsi-

See **GUIDLINES** *on page 3*

APS Units, Members Get More Political

By Pamela Zerbinos

The APS Office of Public Affairs (OPA) is responsible for the Society's efforts to lobby Congress on behalf of the physical sciences. Recently, a growing number of individual APS members and units have begun participating in this effort, both within OPA and by undertaking lobbying on their own.

Last year, for example, the Division of Condensed Matter Physics supported an additional APS Congressional Fellow to assist the lobbying efforts of the OPA.

"The DCMP has felt that physics in general needed more lobbying in Congress," said division chair Donald Gubser. "The APS did have one fellow, but we felt they were overworked and needed more help." The DCMP paid for the fellow out of its own coffers for one year, and this year many of the other divisions have chipped in to help cover the costs.

"Having two fellows has definitely made the office more than twice as effective," said APS Executive Officer Judy Franz.

Gubser agrees, saying he has seen an increase in the efficacy of the OPA, but also in the lobbying

See **POLITICAL** *on page 5*

Lobbying on Capitol Hill

Photo Credit: Susan Ginsberg

Bob Behringer of Duke University (left) discusses science policy with Robert Gordon, Legislative Director for Senator John Edwards (D-NC) and Kathryn Marks, Policy Director for Senator Edwards. See story this page.

New Spanish Lab Manual Available for Physics Teachers

Science teachers in Latin America and Spanish-speaking educational districts in the U.S. now have an additional alternative to the standard English physics texts published in the U.S., thanks to a joint translation project of the APS and the Mexican Physical Society. This was first suggested at a meeting in Cuernavaca, Mexico in 1998 of representatives of South, Central, and North American physical societies and of the Spanish Royal Society of Physics. The new publication is called *Experimentos con Hilos y Cinta Adhesiva* (*Experiments with String and Sticky Tape*), and 2500 copies have been printed. It is a translation of "String and Sticky Tape Experiments", edited by Ron Edge and published by the American Association of Physics Teachers (AAPT).

The project was discussed by the working group on education at the Cuernavaca meeting. This group gave very high priority to the production of new teaching materials that described simple experiments that teachers could do with their students. APS Executive Officer Judy Franz, who was part of this working group, agreed that APS would work with the Mexican Physical Society to try to produce useful materials in Spanish. Franz and APS Director of Education and

See **SPANISH** *on page 6*

Highlights

Members in the Media

"The dark matter paradigm is so bad that truly radical ideas, like the breakdown of inverse-square law at large distances, deserve careful examination."
—Matt Visser, Victoria University, Wellington, New Zealand, the Guardian (London), February 13, 2003

✶✶✶

"We have laid the cornerstone of a unified coherent theory of the cosmos."
—Charles L. Bennett, Goddard Space Flight Center, on the latest measurement of the cosmic microwave background by WMAP, NY Times, February 12, 2003

✶✶✶

"We have a lot of Russians who have built parts. We rely on the Russians to upgrade and maintain them. If they're stranded in Russia, they have to try to diagnose it over the phone. But it's like when your car has problems, you need the experts on the spot."
—John Womersley, Fermilab, on the visa troubles of Russian scientists, Wall Street Journal, January 20, 2003

✶✶✶

"Snow is really very special. The world would be a very different place if, whenever ice precipitated out of the atmosphere, it took the form of some kind of pellet other than snow."
—Robert Sekerka, Carnegie Mellon University, Pittsburgh Post-Gazette, January 27, 2003

✶✶✶

"Would you like it to be found in a cave in Afghanistan with sections highlighted in yellow?"
—Gerald Epstein, Institute for Defense Analyses, on whether scientists should self-censor sensitive data, Science, January 17, 2003

✶✶✶

"Amanda does what it is designed to do. Of all the high-energy particles emitted from the violent, energetic events in the Universe, only neutrinos can directly provide information on these activities."
—Steven Barwick, UC Irvine, BBC News, January 30, 2003

✶✶✶

"The resistance of our school systems to change is awesome and the shortage of physics teachers a major handicap."
—Leon Lederman, Fermilab, on revising the curriculum to teach physics first, Washington Post, January 28, 2003

✶✶✶

"I was a little disturbed to see how deep the fear of math and science was in them. It was clear that if we wanted to maintain technology, we would have to prepare our youngsters."
—Usha Mallik, University of Iowa, on the Family Adventures in Science program, Iowa City Press-Citizen, February 16, 2003

✶✶✶

"In pueblo life there is a calendar of the year that consists of a series of rituals that have to be done in a particular order and at a particular time. They used astronomy to set the sacred calendar with observations of the sun and the moon."
—Michael Zeilik, University of New Mexico, on the cultural roots of astronomy in New Mexico, Santa Fe New Mexican, February 24, 2003

I'm a Little Teapot...

Photo Credit: Jessica Clark

An audience volunteer is lifted from the floor by an inflating balloon at the Conference for Physics on the Road held at Colorado State University in February. About fifty different universities sent representatives to share their experiences in taking physics on the road by bringing demonstrations and hands-on experiments into the schools. A highlight of the meeting was the open house for "Little Shop of Physics" hosted by Brian Jones of CSU, featuring about 300 exhibits and demonstrations. The Conference was sponsored by the APS, the AAPT, and the APS Forum on Education.

This Month in Physics History

April 18, 1916: Langmuir Patents the Incandescent Lamp

Born in Brooklyn, New York, Irving Langmuir was encouraged by his parents from an early age to be a careful observer of nature, and to keep detailed records.

He was also influenced by his older brother, Arthur, a chemist, who helped Langmuir set up his first lab in the corner of his bedroom.

In 1892, the family moved to Paris. Upon returning to America, Langmuir graduated from the Pratt Institute's Manual Training High School in Brooklyn and went on to earn a BS in metallurgical engineering from the Colarado School of Mines in 1903.

Langmuir attended graduate school at Gottingen University, working under Walter Nernst, who was both a theoretician and an inventor of the so-called "Nernst glower", an electric lamp.

Langmuir's PhD in 1906 was granted for research done using Nernst's lamp, attempting to determine what happened to various gases produced in the presence of a hot platinum wire. This work laid the groundwork for many of his later interests.

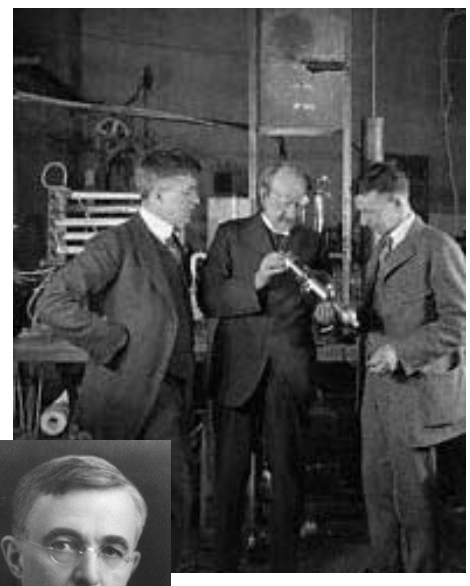
He returned to the US to teach chemistry at Stevens Institute of Technology in Hoboken, New Jersey.

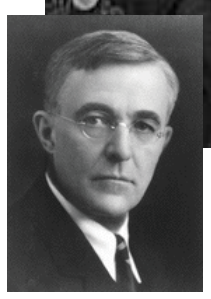
After spending the summer of 1909 doing research with the General Electric Company in Schenectady, New York, he accepted a position there as a researcher. The focus of his early research was on the use of the lightbulb for the study of gas at varying temperatures and pressures, similar to his thesis research in Gottingen.

His first project was to solve the problems the company was having with the new tungsten filament light bulbs: the lamps would "blacken" or grow dim as the inside of the bulb became coated with evaporated tungsten. Based on his investigations of the chemical reactions catalyzed by the hot tungsten filament, Langmuir found that the presence of nitrogen slowed the evaporation process, and that thin filaments radiated heat faster than thick filaments, while coiled tungsten wire radiated heat as if it were a solid rod. He suggested filling the bulbs with nitrogen (and later, argon) gas, and twisting the filament into a spiral form to inhibit the vaporization of tungsten.

His improved device, patented on April 18, 1916, soon made the Nernst lamp and others like it virtually obsolete, and is the basis for the design still used today.

However, the work for which Langmuir is best know is his work in surface chemistry, as well as his elaboration on the theory of chemical bonding in terms of electrons,





Irving Langmuir

first expressed by Gilbert Lewis.

In Lewis's model electrons formed stable groups of eight at the corners of a cube. Langmuir proposed that these octets could be filled by sharing pairs between two atoms: the "covalent" bond.

In the area of surface chemistry, he developed a new concept adsorption, in which every molecule striking a surface remains in contact with it before evaporating, thus forming a firmly held monolayer.

He was awarded the Nobel Prize in chemistry in 1932 for this work, the first nonacademic chemist to be so honored.

Throughout his long, productive life, Langmuir made many other significant contributions in both physics and chemistry.

He discovered hydrogen in its atomic form, which led to the development of an atomic hydrogen welding torch that produced a flame of such high temperature that it is still used for welding metals which are not affected by the standard oxyacetylene. His studies also offered the first clear picture of thermionic emission: the flow of charged particles from hot metals.

He was among the first to work with plasmas, and actually coined the term to describe the aggregations of ionized gas with unusual electric and magnetic properties.

And he introduced the concept of electron temperature and invented the device to measure it: the thermionic probe.

Furthermore, his research helped develop technology employed to win both World Wars: submarine detection devices during WWI, which Langmuir later drew upon to improve the quality of sound recordings; and the development of protective smoke screens and methods for de-icing aircraft wings. The latter research led to his work in the somewhat controversial area of weather control, using dry ice pellets and silver iodide crystals to seed clouds.

Langmuir's other interests encompassed far more than just science. Mount Langmuir in Alaska is named after him; he was a lifelong avid climber who climbed the Matterhorn and explored the Adirondacks. He also flew airplanes, skied, skated, and once walked 52 miles in one day. He was the subject of a 1999 documentary for public television, "Langmuir's World," directed by his grandson, Roger Summerhayes.

And his association with GE colleague Bernard Vonnegut—brother to novelist Kurt—led to his being a model for a character in Vonnegut's novel, *Cat's Cradle*.

Langmuir also contributed the notion that there might be a form of ice that remains crystalline at room temperature, which Vonnegut dubbed "ice-nine." Langmuir died in Woods Hole, Massachusetts in 1957.

APS NEWS ©2003 The American Physical Society

Series II, Vol. 12, No. 4
April 2003

Coden: ANWSEN ISSN: 1058-8132

Editor ..... **Alan Chodos**
Associate Editor ..... **Jennifer Ouellette**
Special Publications Manager ..... **Elizabeth Buchan-Higgins**
Design and Production ..... **Stephanie Jankowski**
Forefronts Editor ..... **Neville Connell**
Proofreader ..... **Edward Lee**

APS News (ISSN: 1058-8132) is published 11X yearly, monthly, except the August/September issue, by the American Physical Society, One Physics Ellipse, College Park, MD 20740-3844, (301) 209-3200. It contains news of the Society and of its Divisions, Topical Groups, Sections and Forums; advance information on meetings of the Society; and reports to the Society by its committees and task forces, as well as opinions.

Letters to the editor are welcomed from the membership. Letters must be signed and should include an address and daytime telephone number. The APS reserves the right to select and to edit for length or clarity. All correspondence regarding *APS News* should be directed to: Editor, *APS News*, One Physics Ellipse, College Park, MD 20749-3844, E-mail: letters@aps.org.

Subscriptions: *APS News* is an on-membership publication delivered by Periodical Mail. Members residing abroad may receive airfreight delivery for a fee of $15. **Nonmembers:** Subscription rates are available at http://librarians.aps.org/institutional.html.

Subscription orders, renewals and address changes should be addressed as follows: **For APS Members**—Membership Department, American Physical Society, One Physics Ellipse, College Park, MD 20740-3844, membership@aps.org.
For Nonmembers—Circulation and Fulfillment Division, American Institute of Physics, Suite 1NO1, 2 Huntington Quadrangle, Melville, NY 11747-4502. Allow at least 6 weeks advance notice. For address changes, please send both the old and new addresses, and, if possible, include a mailing label from a recent issue. Requests from subscribers for missing issues will be honored without charge only if received within 6 months of the issue's actual date of publication. Periodical Postage Paid at College Park, MD and at additional mailing offices. Postmaster: Send address changes to *APS News*, Membership Department, American Physical Society, One Physics Ellipse, College Park, MD 20740-3844.

Number Five

Unified Approach for Molecular Dynamics and Density Functional Theory,

(R. Car and M. Parrinello, Phys. Rev. Lett. 55 (1985), 2471), 2819 citations

This is the sixth in a series of articles by James Riordon. The first article appeared in the November 2002 issue. The articles will be archived under "Special Features" on the *APS News* online web site.

"It was like a short blanket," says Michele Parrinello as he explains the hodgepodge of theoretical methods available in the early '80s for describing the respective crystalline and liquid phases of silicon. "You know, you pull it over your head and your feet stick out in the cold, and vice versa." At the time, Parrinello was a professor at the International School for Advanced Studies (SISSA) in Trieste, with an interest in the phase transition of melting silicon. "It was a popular subject at the time," continues Parrinello, "Silicon is a semiconductor. It is well known in the crystalline phase. And when you melt it, which happens at about 1700k, it goes into a metallic state. People were trying very hard to devise potentials that would be suitable for the solid state phase and for the liquid state phase."

Parrinello and SISSA colleague Roberto Car decided that computer technology had advanced sufficiently that they might be able to devise a number of tricks to efficiently model the phase transition via ab-initio molecular dynamics. Density functional theory allowed them to replace the many-body electronic structure problem with an effective single particle problem. To put it somewhat simplistically, once they calculated a three-dimensional electron density, they could determine how the molecules would respond to the distribution. The new molecular arrangement would lead to a new electron density, and so on. In hindsight, the algorithm seems fairly straightforward, but as Car points out, "It was at that time considered simply not possible to use that kind of theory to base a real molecular dynamics simulation."

The unified scheme combining molecular dynamics and density functional theory, commonly called the Car-Parrinello algorithm, ultimately turned out to provide plenty of blanket to keep the researchers' toes and ears simultaneously warm, so to speak. "We had this idea that it could be useful in a variety of contexts," says Parrinello, "but what is amazing is that same code—without changing anything but the atomic number—can model ionic systems, semiconductors, metals, hydrogen bonds, water, hydrogen fluoride, protein. You see what I mean? It is the same code that can do this enormous range of applications."

"I think what was very good," says Parrinello, "was Roberto had the background in electronic structure theory, and my background was more on the side of molecular dynamics and statistical mechanics, and we could talk well to each other. Once we decided to start with exploring the possibility of calculating things abinitio it all went very fast. I mean, the code and the first results came in a few months."

The Car-Parrinello algorithm is now a standard tool in condensed matter physics, but it has perhaps been even more useful in other disciplines—a fact that is reflected in the many awards that the two have garnered. Although Parrinello and Car shared the 1995 APS Rahman Prize for Computational Physics, says Parrinello, "I personally receive more recognition from the chemists than from the physicists. I don't have training as a chemist, but most of my papers tend to go into chemical journals."

Both researchers have published dozens of papers extending their algorithm to new regimes, including the biological sciences. Parrinello is particularly interested in studying the nuances of water. "Water is interesting for two reasons; first it's a very subtle system so it's a challenge for the theory, and the other is that water is a solvent for many chemical reactions, for electrochemistry. And water is of course necessary for life, so we are trying to build toward biophysics and biochemistry. So that's why we are focused on water, because it is such an important substance for life," says Parrinello.

In recent years, Car has broadened his research to include such things as modeling electronic current in nanostructures, in addition to his continuing work on extending the Car-Parrinello algorithm. But regardless of the particular problem he is addressing, Car feels that he is still benefiting from the collaboration with Parrinello. "The way we approached the problem when we came out with the Car-Parrinello approach has given a permanent inspiration to all my subsequent activity," says Car. It has also opened his eyes to problems that he might not otherwise have recognized. "When you make some important progress in one field, this always make you think more deeply about fundamental problems," Car explains, "and you inevitably discover that in spite of your progress you did not solve all of them."

Parrinello has experienced similar benefits from the highly-cited work. "I've not been afraid of new things and new areas and new problems. That's probably my greatest virtue. To move from one subject to the other to face various new challenges. It's important because often people don't move because of fear. I'm always growing, as it were. I didn't start like that, but growing and having success with this paper and a couple of other things gave me courage to face the world."

Parrinello is now Director of the Swiss Center for Scientific Computing and Professor of Computational Science at the Swiss Federal Institute of Technology in Zurich. Car is a professor in the Chemistry department and at the Princeton Materials Institute is affiliated with the Physics department and the program in applied math. The two researchers have not worked together since their brief collaboration on the Car-Parrinello algorithm, but they continue to share awards for their method and maintain a strong personal bond. "We are brotherly friends on very good terms," says Parrinello, "but the dynamics of life have taken us to different parts of the world and different interests." And neither they nor the countless scientists who apply the algorithm must suffer with the short blanket that once hampered studies of the molecular dynamics of condensed matter phase transitions.

GUIDELINES *from page 1*

bility of the institution.

"In some cases, the institution might be unwilling or unable to carry out an investigation, and then it comes back to [the APS]." This happens primarily because of the international nature of the APS journals and the fact that there are no international standards for conduct of research or for institutional response to allegations.

"In other cases where we have to do the primary research," Blume said, "such as cases involving plagiarism or referee misconduct, ultimately the punishment is our informing the institution of that misconduct." APS also carries out the main investigation in cases of duplicate submission.

"The primary point," Blume said, "is that when an allegation is made, we must do something about it. But we're rather like a district attorney's office. We may decline to prosecute if we don't find sufficient evidence to do so."

The new guidelines are careful to respect the rights of the accused, and if the APS doesn't find evidence of misconduct, the institution won't be informed.

"We're not going to an institution if somebody makes a pie-in-the-sky accusation," Blume said. "But if somebody makes an accusation, they have to expect that accusation and the name of the individual making it will ultimately find its way to the accused."

Blume said he hopes the new guidelines, which were discussed at the February 8 Executive Board meeting, are only the beginning.

"The journals need to have uniform policies on this," he said. Blume, who chairs the International Union of Pure and Applied Physics' Working Group on Communication in Physics, has just received IUPAP's approval to have an international gathering of journal editors and publishers to discuss how journals can work together to facilitate better handling of allegations.

"I hope that journals will recognize that we have reason to take common cause in this," Blume said. "One example is, when there is suspicion of plagiarism. The journal from which the article is plagiarized ought to be notified and they should work together."

Blume does not expect this meeting to be held until late this year or possibly next year, but he said that the APS procedures might be refined once it takes place.

Putting Astronomical Budget Numbers in Perspective

Physics professors William Franz and George Spagna have found an unusual use for the budget proposal President George W. Bush sent to Congress in early February. They devised 14 real-world analogies to make the $2.23 trillion dollar total more understandable to their students at Randolph-Macon College in Ashland, Virginia.

1. A single Sacajawea dollar coin has a mass of 8 grams. Therefore 2.23 trillion of them would weigh 1.96×10^7 tons. The battleship Missouri weighs 58,000 tons, fully outfitted. Therefore, the federal budget, if cashed into Sacajawea dollars would weigh the equivalent of 339 full-sized battleships.

2. If President Bush (L = 1.8 m) were laid end to end 2.23 trillion times, the distance would be 4.01×10^{12} meters. The distance from the earth to the sun is 1.50×10^{11} meters. So if Bush were laid end to end 2 trillion times, he would stretch to the sun and back 13 times, although he might choose to do this at night, when it's cooler.

3. The list price of a 2003 Hummer H2 is $48,000. Therefore, for a modest investment of $2.23 trillion, we could instead buy 46 million brand new Hummers to help ease transportation problems.

4. If one pizza is about $10, then $2.23 trillion converts to 2.23×10^{11} pizzas. As of April 1, 2000 census, the US population was 281,421,906. This comes to 711 pizzas per person. If we fudge on the price of the pizza and correct for the change in population since 2000, we could get an answer of 730 pizzas per person — twice the number of days in a year. Therefore, the US government, instead of spending its $2.23 trillion as the President recommends, could satisfy hunger in the nation by ordering two pizzas for every man, woman and child in the US every day for the entire fiscal year.

5. Proven reserves of Iraqi oil are estimated at 112 billion barrels. At today's prices of $31 per barrel, Iraq's net worth of oil is $3.47 trillion. We could just skip spending on other things, skip the potential war, and buy all of Iraq's oil with about a year and a half's worth of federal spending.

6. A single grain of sugar is a cube approximately 0.25 millimeters on a side, with a volume of 1.6×10^{11} cubic meters. 2.23 trillion grains of sugar then have a volume of about 35 cubic meters — a cube about 10-1/2 feet on a side.

7. Using the same size for sugar grains, a five-pound bag of sugar contains about 225 million grains. If the entire federal budget were spent on that single bag, it would be about $10,000 per grain of sugar.

8. There are about 100 billion stars in our Galaxy. The federal budget could buy the entire Milky Way Galaxy for about $23 per star. Similarly there are about 100 billion galaxies in the observable university. With the federal budget, you could buy the entire thing for $23 per galaxy.

9. The Apollo program which sent American astronauts to the Moon cost a total of about $40

See **ZERO GRAVITY** *on page 4*

LETTERS

Forgotten Works and the Fragmentation of Physics

That Alpher and Herman's work predicting the cosmic microwave background is often forgotten (*APS News* Letters October 2002) is not surprising. This happens all the time. What is more surprising is the rediscovery of their prediction by Bob Dicke in seeing a signal in the noise discovered by Penzias and Wilson and making the connection with the cosmic microwave background. In this year which mourns the departure of Viki Weisskopf and celebrates the 100th anniversary of the birth of Eugene Wigner we see that physicists like Dicke who can see beyond the limits of their own specialties are disappearing.

I saw symptoms of this disease back in 1958 with the publication of Rudolf Mossbauer's first paper which was later awarded the Nobel Prize for what has since become an active field of research. His experimental result was clearly understandable from already-published theoretical papers, particularly a paper by Willis Lamb on neutron absorption in crystals. But my generation had already fragmented into nuclear and solid state physicists who did not talk to one another. Several groups of nuclear physicists were so sure that the experiment must be wrong that they repeated an already-published experiment which was clearly consistent with already-published theory, obtained exactly the same result, and published it as original research.

I was a nuclear physicist at that time, but was fortunately at the University of Illinois in Urbana, where we could ask Fred Seitz about the Mossbauer paper. Fred's first response was: "Who is this fellow Mossbauer?

Does anybody know him? Is he reliable? Give me a few days to think about it." A few day later he told me: "This work is perfectly all right. But when I first saw it I was sure it was completely crazy."

Trying to understand why Fred thought it was crazy enabled me to learn a great deal as I penetrated the barrier between nuclear and solid state physics. I found that one can make a fruitful career by discovering nothing new and only acting as an interpreter between different groups of physicists who do not talk to one another.

Harry J. Lipkin
Rehovot, Israel

Article Overstates Earth's Field

I was very interested in reading your article of "Physics News in 2002." Thank you for putting forward this excellent section.

On page 6 under the subtitle of "Microtesla nuclear magnetic resonance" the statement that the Earth's field is roughly 50mT is incorrect. It is well known that the Earth's field is about 0.5 Gs or 50 microT, not 50 milliT.

It might be possible that the line above this "...a much weaker orthogonal measuring field of 5mT" is incorrect too. My guess is 5 microT.

Dexin Wang
Eden Prairie, MN

Ed Note: *The writer is correct on both counts. The Greek letter mu was erroneously transcribed as an English m. For interested readers, the article on which this item was based is: Science 295, 102 (2002).*

Bohrs' Reaction Logical

With regard to the letter from, Klaus Gottstein in the February 2003 *APS News*: At the risk of belaboring the obvious, may I suggest that Bohr's reaction to Heisenberg's "involved language" regarding their now-famous meeting in Copenhagen—granting that Heisenberg's 25-years-after-the-fact explanation was sincere—is the only logical reaction possible.

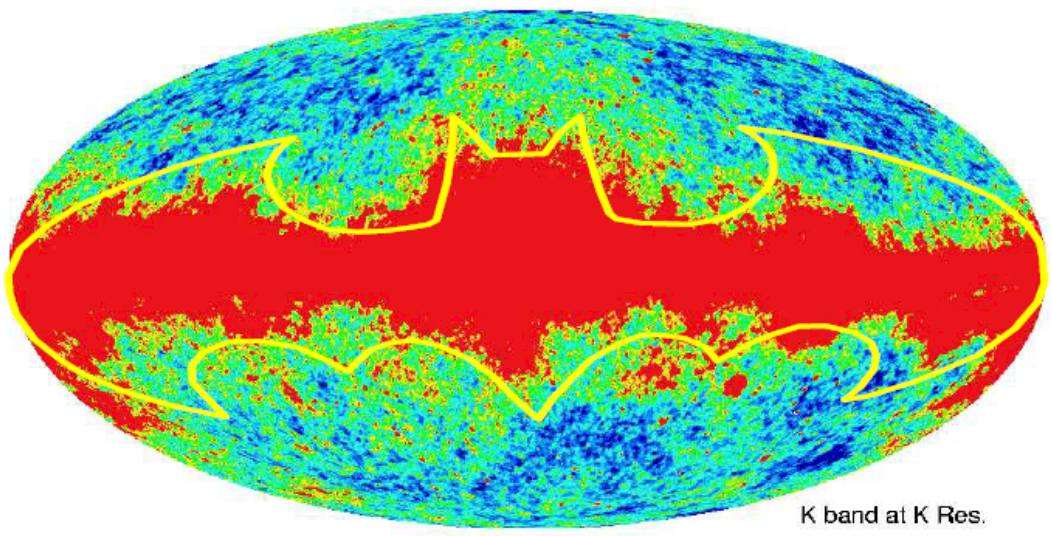
The head of the Nazi atomic bomb project, at a time when many people still believed that the Nazi's would win the war, tries to suggest that both sides abstain from pursuing this ultimate weapon. Who has the most to gain from such an absurd (at the time) proposition?

Perhaps Heisenberg sincerely (if terribly naively) actually believed that this argument would appeal to Bohr. If he actually believed that, it is simply another example of why a great physicist's views about topics outside his or her field of expertise can readily be discounted.

A less charitable interpretation would be that Heisenberg may have consciously ignored his own interest in the matter at the time and, long after the fact, could still not accept the unequal position he was in vis-a-vis Bohr at the time.

Robert A. Myers
New York, New York

Is the Universe Trying to Tell Us Something?



Stephane Coutu of Pennsylvania State University has uncovered the true meaning of the Cosmic Microwave Batground.

Viewpoint...

What I Learned Looking for A Job

By Jenny Magnes

A job search is a tedious and time-consuming process for the future employee as well as the employer. The process is essentially a learning experience. One collects information about companies, universities, laboratories, etc. There are many internet sites that allow one to do job searches and post a resume, but nobody I know has ever received a reply to any posting or resume via the web. Most correspondence, job offers and interviews that I received were after personal encounters, or through someone I knew personally. Is this because one can only find a job through "friends"? I don't think so. If I were an employer, I would want to hire someone who was competent, approachable, hard-working, and pleasantly collegial. Only one of these characteristics can be extracted from a resume. The best way to assess if somebody is a match for a position is to get to know him or her personally, but that takes time.

Future graduates should make professional connections as early as possible through career fairs, conferences and internships. The Optical Society of America has already started a mentorship program that may not only help with making connections, but also with giving feedback to the students on what their capabilities are and where improvement is needed.

Evaluating a student's capabilities is critical. A professional may know what jobs a graduate is qualified for, avoiding the waste of time applying for employment with a mismatch in qualifications. Employment centers in universities are many times not good evaluators.

I would also like to mention that while most physicists are certainly in command regarding their subject, scientists are not necessarily well-trained at presenting their knowledge or communicating in general. Especially during their coursework, students tend to work in small vacuums, a very slow and expensive way to make progress. Also, the pride of giving up some ideas may get in the way of progress. In my opinion, undergraduate and graduate physics education need some revisions geared towards producing better communicators and team players. Team spirit would certainly make us much more marketable.

Finally, it is imperative not to rule out potential employment as absurd when not too much information is known about the employer or the job. For example, many studious physicists may shy away from positions in the military based on reputation or movie stereotypes. My advice is to go to the source and find out what an employer is all about.

I hope that this assessment of my recent experiences is of some help. Perhaps it will initiate more interactions between employers and future employees. Employers also benefit from partnerships with universities, since it would provide better matches for hiring instead of firing.

Jenny Magnes is a graduate student at Temple University.

ZERO GRAVITY *from page 3*

billion. The proposed budget is equivalent to about 56 Apollo programs.

10. Round trip business rate airfare from Richmond, Virginia, to the West Coast is about $1100. You could purchase about 2 billion round-trip tickets, not counting frequent flyer miles.

11. A year is approximately 31.5 million seconds. The proposed federal budget spends money at the rate of $71,000 per second.

12. The universe is approximately 14 billion years old. Accordingly, if we wish to appear more frugal, we could spend at the rate of about $160 per year since the Big Bang.

13. Using values cited above for the mass of a Sacajawea dollar and the US population, each individual's share of the budget is $7936, which would have a mass of 63.5 kilograms and weigh about 140 pounds in Sacajawea dollars.

14. Cell phone minutes cost about 10 cents each. A $2.23 trillion cell phone call that you hang up from today would have been placed about 42 million years ago during the Eocene Epoch, probably by one of the first modern mammals to walk the earth. Calling 10-10-220, rates drop to 7 cents a minute, and the call could have been placed by a dinosaur.

A PARCful of Fellows

Photo Credit: Darlene Logan

Three APS Fellows from the Palo Alto Research Center are shown enjoying the Fellows reception held in February at the Faculty Club at the University of California, Berkeley. Left to right they are John Northrup, Noble Johnson, and Chris Van de Walle. The event, attended by about 100 Fellows from the Bay Area, was hosted by George Trilling, and the program was chaired by APS President Myriam Sarachik. The Fellows heard from APS Executive Officer Judy Franz, Director of Public Affairs Michael Lubell and Director of Education and Outreach Fred Stein.

Viewpoint...

Chatting with Little Green Men

by Anne Applebaum

I have just cloned a baby.

To be precise, I found some sticks and stones in my back yard, crushed them with my coffee grinder, threw them in a cauldron and added eye of newt and toe of frog. Then I boiled everything down, nurtured it for nine months in a test tube and—Voil"!—a cloned baby.

I would now like to be interviewed simultaneously on ABC, NBC, CBS, CNN and Fox, please, so that I can hawk my book about cloning and make a million dollars to support my future scientific research.

You don't take me seriously?

Why not? The Raelians, a cult whose leader claims to communicate with extraterrestrials, whose Web site features pictures of flying saucers and whose members believe that human beings are clones of space aliens, received utterly serious treatment when they claimed to have cloned two babies.

The Washington Post published a photograph of the group's leading "scientist," one Brigitte Boisselier, on its front page.

Leading scientists—real scientists, at real universities—were asked for their reactions by leading newspapers and, unsmilingly, gave them. CNN, like many other television stations, aired a long, deadly earnest interview with Boisselier.

Here's an excerpt:

CNN: What has happened to the independent lab tests that were supposed to be conducted . . . when you announced the findings of this alleged first birth?

BOISSELIER: So those tests have been postponed. They are still possible and I hope they will happen. . .

CNN: When would those tests take place involving the second baby?

BOISSELIER: I wish I could give you a date, but what I'm telling you is that I am the one pushing for this to happen and I'm pushing hard. But at the same time, I am a human being and a mother and I don't want these parents to be—to have their lives completely destroyed by that, so I'm careful.

Anne Applebaum

Now the journalist charged by the Raelians with the task of confirming their claims has discovered—surprise!—that it all may be an elaborate hoax. Or perhaps it's all an elaborate lesson about how little the media—and everyone else—know about science these days, and how easily, therefore, we are gulled into reporting and reading non-stories as if they had some scientific, social or any other kind of validity.

But the ludicrously straight treatment of the Raelians is only half the story.

The other half is the shock and consternation caused when actual scientific achievements are sprung on a totally unprepared public. The appearance of Dolly, the first cloned sheep, was a perfect example. None of the hundreds of experiments that led up to her birth had caused much comment. No one, aside from the cognoscenti, perused the scientific journals that described them.

The result: shock, horror and demands for congressional action—and expect more of the same.

The public is no better prepared for the next wave of genetic breakthroughs, or indeed for any scientific breakthroughs. The emergence of the new interdisciplinary field of bioethics won't solve the problem either. If the public needs "experts" in order to distinguish between a space alien cult and a legitimate scientific institute, then the problem lies elsewhere.

Indeed, there was something disturbing about the sight of the bioethicists—grown-ups, with advanced degrees—being hauled out last weekend to explain, patiently, what was wrong with the Raelian theory of alien cloning.

There is no substitute for knowledge, nothing that can replace scientific literacy. Scientists need to bend over backward to explain their work in whatever ways they can. Given the gap that has developed between the average graduate of a high school chemistry class and the average genetic scientist, it may also be time to broaden what we mean by "liberal arts education" to include more science—a lot more science.

People should not be allowed to graduate from college—or to conduct television interviews—unless they feel intuitive skepticism about a group whose leader has close personal ties to little green men from outer space.

Anne Applebaum is a reporter with the Washington Post. *The above appeared in the January 8, 2003 edition of the newspaper. Reprinted with permission.*

From Physics to Sci-Fi's Rising Star

Former physics professor Catherine Asaro is a rising star among science fiction authors.

Her books range from "hard" science fiction, with scientific plot devices and premises laid out in intricate detail, to softer science fiction novels that use futuristic technology as a kind of backdrop to character-driven plots.

Arguably, her best work includes a substantial dose of hard science fiction in addition to well-developed, interpersonal relationships.

In fact, the characters in her science fiction books occasionally have relationships that are, to say the least, steamy.

"Traditionally, you couldn't write intimate scenes in science fiction. You just turned the lights out," says Asaro. "Well, you don't have to turn the lights out anymore."

A few well-lit boudoir scenes certainly haven't hurt her book sales. Asaro's novels and short stories seem to appeal to both hard-core science fiction fans and to romance fiction fans.

In 2001 Asaro received the Nebula Award, one of science fiction's most prestigious prizes, for *Quantum Rose,* even though it is one of her softer science fiction works.

Asaro enjoys exploring the details of the scientific elements in her stories. Many of her books document the adventures of various members of the Ruby Dynasty, who rule the galactic Skolian Empire.

"You can't have a galactic empire without a way to go faster than the speed of light," says Asaro. "So I wanted to come up with a believable way to do it, even if it's not physically possible."

The solution Asaro found was a mathematical trick involving imaginary numbers.

"It's as if you're traveling in the complex plane," she explains, "It's actually kind of simple, and it's pretty." In fact, discovery of the trick led Asaro to publish a paper in the *American Journal of Physics* entitled "Complex Speeds and Special Relativity," (*Am. J. Phys*, 64 (4), April 1996, 421).

Like her novels, Asaro's personal life is a successful blend of traits that at first might seem mutually exclusive.

She initially had aspirations to be a professional dancer, and began college as a dance major. But she had always been fond of science and math, attributing her interest in science in part to her father Frank Asaro, a highly respected chemist at Lawrence Berkeley Laboratory.

She eventually completed a PhD in chemical physics at Harvard, although along the way she founded two performance companies, the Mainly Jazz Dancers and the Harvard University Ballet and served as artistic director for both groups. Asaro now lives in the Maryland suburbs with her husband John, a NASA astrophysicist, and her daughter Catherine.

More information, including a bibliography, book excerpts, and upcoming public appearances, is available on her website www.sff.net/people/asaro.

***Editor's Note**: The above was featured in January on Physics Central [www.physicscentral.com], the public outreach web site of the APS. For more profiles, cutting-edge research topics, and other fun features, access the web site regularly.*

POLITICAL *from page 1*

efforts of the members of DCMP.

"Members come a day early almost every time they come [to Washington]," he said, "they write letters at APS meetings, and this is pushed by our Congressional fellow."

Other units have taken a different approach and started to do their own lobbying.

"This all got started about two years ago," said William Carithers, vice-chair of the Division of Particles and Fields. "We set up a group to step back and take a look at what the DPF was doing, how we could better serve our membership and the field, and what new initiatives could be useful."

Two standing DPF subcommittees came out of those meetings: the Education and Outreach committee, and the Government Liaison committee, which Carithers now chairs.

"Initially," Carithers said, "we thought more in terms of the educational aspect, of just making sure the congress and state government were aware of the issues in our field. But we came to the conclusion that approach was not going to be effective enough, and that what was required was more traditional lobbying."

To that end, the committee is currently in the process of setting up a telephone and e-mail tree that will assign each congressional representative a DPF member from their district. Some congressmen, such as members of key appropriations committees, will have multiple DPF members assigned to them.

"Basically, we want to make sure that every member is covered and that key members receive a full-court press," Carithers said. When there is a key issue before Congress, such as H.R. 34, which proposes to increase the budget of the Department of Energy's Office of Science, the DPF members are supposed to call their appointed representatives and urge support of the measure.

They use what Carithers calls the "three-tier method, which is not quite as original as we first thought."

The tier-one message is the most important and the broadest, and it's the one representatives should hear first. It's also very simple: Increase funding for the physical sciences.

"It's something that all the physical sciences professional societies can get behind," Carithers said. "This way, over and over, Congress will hear this message first. Hopefully, this will head off some of the bad feelings that arise when people go to Congress and just push their pet project. The message gets too fragmented that way."

This doesn't mean Carithers advocates totally ignoring pet projects, however.

"The strategy is," he said, "if your tier-one message is well-received, you follow up and say, 'By the way, I work in the field of high energy physics and we're on the verge of doing incredible things like discovering supersymmetric partners and extra dimensions, but we're being held back by a lack of funding.' If you're still getting a sympathetic response, then you go on to tier three programs, key initiatives within the discipline like improving accelerator R&D. That's where your pet projects come in, but you only get there after you've talked about tier one and tier two."

The OPA supports this approach, and has been encouraging individual Society members to get involved with lobbying representatives from their home districts. For this year's Unit Convocation, which took place on February 1, the OPA invited the unit representatives to come to Washington one day early to do some lobbying. Of the 65 participants in the Convocation, 26 accepted the invitation.

The participants made their own appointments to see their representatives (it's much easier for a constituent to make an appointment than it is for APS to get one), and attended an hour-long crash course on lobbying given by the OPA staff.

"We spent lots of time talking about how to have a successful meeting," said Susan Ginsberg, the congressional fellow who led the course. "You start with the 'Asks,' what you want them to do for you. Their time is extremely valuable, so it's critically important to get this out of the way first and front-load your requests."

"It was a very positive and worthwhile experience," said Robert Behringer of Duke University. After the crash course, Behringer visited the offices of Sen. John Edwards and Rep. Robin Hayes, both from North Carolina, and went along for moral support to the offices of Reps. John Boozman (R-Ark.) and John Peterson (R-Pa.).

The lobbyists' key message was the same as DPF's tier-one message: Increase funding for the physical sciences, and support H.R. 34.

"Everyone was very enthusiastic and interested in what we had to say," said Anne Cattla, chair-elect of the Forum for Graduate Student Affairs. Cattla spoke with representatives from her home state of Kansas.

"I'd never lobbied before," Cattla said, "because I didn't think anyone would listen. But I read a lot of newspapers and I'm aware of what's going on and I'm always talking about what I think about these things. When I heard about this [lobbying event], I decided I should stand up for what I believe is important."

Based on their experiences, Cattla and Behringer both said they plan to do more lobbying in the future, and Cattla hopes to convince members of the FGSA to join her.

"It definitely has a nontrivial impact," Behringer said. "By the time a given office gets ten to 20 letters or phone calls, they start to take notice."

"They're very happy to hear from their constituents," said Cattla. "One of the aides had spoken to people from the APS before, but they'd never spoken to someone from Kansas. It made a big difference."

APRIL MEETING *from page 1*

origin of spacetime. [Session B6]

Never Enough Neutrinos. Providing some historical context to the topic of solar neutrinos, Allan Franklin (University of Colorado) will discuss early experiments that led to the "solar neutrino problem": the fact that the observed number of solar neutrinos was far less than predicted by the Standard Solar Model. John Bahcall (Institute for Advanced Study) will provide the theoretical perspective, while Kenneth Lande (University of Pennsylvania) will discuss the history of the Homestake Chlorine Solar Neutrino Detector. Other speakers will describe current experiments with radiochemical gallium, and the Kamioka experiments. [Session T2]

The Future of Particle Physics. The DPF will be sponsoring a Monday afternoon session at the University of Pennsylvania as part of its meeting program, exploring the future of particle physics. Noted theorist Edward Witten (Institute for Advanced Study) will be on hand to discuss theory and the future, while Peter Meyers (Princeton University) will give an overview of the next 20 months to 20 years of neutrino oscillation experiments. Homer Neal (University of Michigan) will cover the status and planned capabilities of the Large Hadron Collider currently under construction at CERN, and Michael Turner (University of Chicago) will summarize recent exciting discoveries on the composition of the universe and remaining critical questions to be answered in the 21st century. [Session R15]

Dark Energy is a SNAP. In the face of mounting evidence that the universe is accelerating, theoretical physicists are debating the implication of the existence of a new and very different type of matter in the universe: the so-called "dark energy". In a Tuesday morning session, distinguished speakers will discuss various aspects of dark energy science, focusing on two major projects. The Supernova Acceleration Probe (SNAP) is a two-meter telescope in high Earth orbit, designed to measure the time-dependent equation of state of the dark energy component. The next generation SNAP will determine the dark energy density and equation of state. Currently under construction is the Gamma-Ray Large Area Space Telescope (GLAST), a satellite-based experiment to measure the cosmic gamma-ray flux in the energy range of 20 MeV to 300 GeV. Slated to launch in 2006, GLAST is expected to open a new window on high energy phenomena, including supermassive black holes, active galactic nuclei, gamma-ray bursts, supernova remnants, and cosmic ray acceleration, as well as search for such new phenomena as supersymmetric dark matter annihilations and big bang particle relics. [Session U12]

Shaping a New Identity? Triggered by state-of-the-art nuclear physics experiments at Virginia's Jefferson Lab, the University of Mainz, and the MIT-Bates Linear Accelerator facility, physicists are revising basic assumptions about the proton and neutron. According to some nuclear theorists, the data provide evidence that the proton is not always spherically shaped but can regularly assume different shapes. Gerald Miller (University of Washington) will display pictures that show that the shape of the proton can vary from a pancake to a peanut to a sphere. Miller has also developed a new relativistic model of the neutron. Agreeing with recent Jlab data, the model shows that part of the time, a neutron is actually a proton surrounded by a negatively charged pion. Other speakers will discuss these new experiments and theories. [Session B3]

Weighty Particle Matters. Scientists at the Indiana University Cyclotron Facility have made the first unambiguous identification of a rare process: the fusion of two nuclei of heavy hydrogen to form a nucleus of helium and an uncharged pion. This process wouldn't exist without a small violation of charge symmetry—a violation which also causes to neutron to be slightly heavier than its charged partner, the proton. The rate at which this rare process occurs is expected to be a key piece of information that will point scientists toward the cause for this violation of charge symmetry. [Session C3]

Speed of Gravity. A recent controversial measurement claimed to measure the speed of gravity by looking at the gravitational lensing of a star by Jupiter. While there is no doubt that this is an impressive experiment, the interpretation of the claim that the speed of gravity can be extracted from the results is controversial. Clifford Will of Washington University in St. Louis, a leading expert in gravitational physics, will present his analysis of the problem, which indicates that the reported interpretation is flawed. [Session R12]

Telescopes of Ice. Burying string-of-pearl detectors kilometers deep in Antarctic ice doesn't sound like the usual way to make a telescope. But that is exactly what is happening with the AMANDA neutrino telescope. Steven Barwick of the University of California, Irvine, will report on the latest results from AMANDA and also discuss the upcoming ANITA experiment, which uses Antarctic ice without embedments to form the neutrino detector; instead the impacts of neutrinos are measured by an orbiting satellite looking back down at the ice. The next generation of AMANDA will be used to search the skies for gamma ray bursts. [Session P9]

Demining Detectives. Antipersonnel landmines left over from previous conflicts cause a great deal of human suffering, and while the issue has only recently received significant public exposure, the US has been investing in research to detect and defuse landmines since World War II. [*Earlier this year, the APS Council approved the commission of a study on humanitarian demining provided funding can be obtained; see* APS NEWS, *January 2003.*]

In a Saturday afternoon session, speakers will provide an overview of the topic, covering approaches aimed at detecting the casing of landmines, and those aimed at directly detecting the explosive contents. Some techniques to be discussed include electromagnetic induction, acoustics, ground probing radar, trace explosive vapor detection, and nuclear quadrupole resonance.

For example, Caltech's Nathan Lewis will describe recent results in exploiting vapor detection technology to make a low power, low cost "electronic nose", while Surajit Sen (SUNY-Buffalo) will describe efforts to apply impulse-based imaging to detect and image small nonmetallic mines. [Session C2]

Vintage Franklin. Distinguished Founding Father Benjamin Franklin is also America's earliest model of the "civic scientist," according to Neal Lane (Rice University), one of the featured speakers at a session exploring Franklin's pioneering role in this arena. "Science was his passion and expertise, but society was his concern," says Lane. He will be joined by Harvard University's Dudley Herschbach, Claude-Anne Lopes (Yale University) and James McClellan III (Stevens Institute of Technology), all of whom will provide historical background of the scientist and citizen.

Herschbach will also be giving a special public lecture at the Franklin Institute Sunday night (*See events side-bar*), entitled "Ben Franklin's Scientific Amusements". In addition, a Saturday afternoon session explores innovative ways to use science history and biography to bring physics to life in the classroom. [Sessions P1, C4]

Cultural Dichotomy. The recently reissued (2000) biography of I.I. Rabi—*Rabi: Scientist and Citizen*, by John Rigden—includes a footnote recounting a visit by novelist C.P. Snow at the Rabi home in New York City, during which Snow reportedly told Rabi's son that his father was the man who gave him the idea for his seminal work, *The Two Cultures*.

Michael Day of Lebanon Valley College in Annville, Pennsylvania, has studied the chronology of events, Rabi's published and unpublished works, and his correspondence with Snow to build a strong case for the truth of this assertion. He will present his findings in a Sunday morning session, providing an overview of Rabi's views on science and society and the mutual influence between Rabi and Snow. [Session H8]

Test Your Physics IQ. Piquing the interest of apathetic non-physics majors requires innovative educational approaches. The University of Maryland's Richard Berg has created a distinctive approach to piquing student interest: a physics IQ test. Assembled throngs vote on the outcomes of "brain-teaser" type physics questions, which are then answered by performing a demonstration experiment.

At the same session, J.C. Sprott (University of Wisconsin-Madison) will describe the outreach program he founded in 1984. Called "The Wonders of Physics", it is a series of public lectures intended to foster general interest in physics with fast-paced demonstrations, including music, costumes, skits and surprise appearances by special guests. The presentation routinely draws capacity crowds totaling over 50,000, and a traveling show was added in 1988 for school children in 19 states and provinces.

Also, Louis Bloomfield will describe a course he developed for non-science students called How Things Work, which teaches elementary physics in the context of everyday life. [Session H7]

Disarmament Goes Ballistic. Approved by the United Nations in 1996 with only three opposing votes, the Comprehensive Test Ban Treaty (CTBT) enjoys near-unanimous support by the international community. But now that India is considered a "threshold nuclear nation", it must approve the treaty if it is to enter into force, and India's U.N. representative has said the country will never sign the treaty. Ram Chaturvedi (SUNY College at Cortland) will provide an overview of the treaty's current status, including India's continued refusal to ratify it. Meanwhile, on Tuesday morning speakers will provide an overview of the current status and future prospects for the US ballistic missile defense programs, focusing on both mid-course and boost-phase technologies. [Sessions H8, T5]

April Meeting

Special Events

Friday, April 4
Student Reception
8:00 pm - 10:00 pm

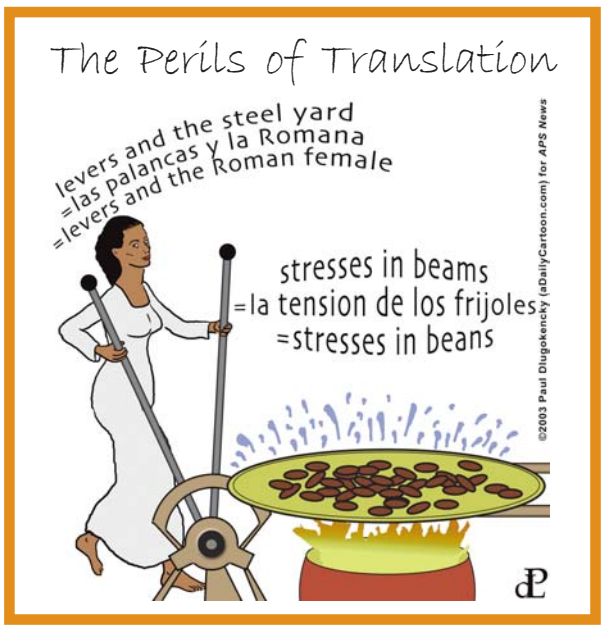
Saturday, April 5
Meet the *PR* and *PRL* Editors
3:00 pm - 5:00 pm
Welcome Reception
5:30 pm - 7:00 pm

Sunday, April 6
Awards Program
5:15 pm - 6:45 pm
Public Lecture
At the Franklin Institute
Ben Franklin's Scientific Amusements
8:00 pm - 9:30 pm

SPANISH *from page 1*

Outreach Fred Stein were able to obtain a grant of $25,500 from the National Science Foundation to offset the production costs and the project was underway. The Spanish and Mexican Physical Societies agreed to purchase some copies and this added resources.

Translation of the book turned out to be more difficult than expected. No electronic form of the book was available, so the text had to be scanned into a computer and then converted to pdf files before the translators could begin their work. As a result the initial electronic draft was full of errors. This made it very difficult for members of the Mexican Physical Society to carry out the translation. Stein enlisted the help of several other translators without much progress and finally persuaded Teodoro Halpern, an emeritus professor of physics at Ramapo college in New Jersey to help. He in turn recruited his great-nephew, Federico, a physics major at the college, to assist in



the daunting task of essentially re-writing the translated text, and cutting and pasting the original hand-drawn illustrations into the corrected text. Federico's quality work earned him co-editor status — a nice professional credit for a young scientist starting his career.

Some of the mistakes that occurred in the midst of all these efforts were amusing. For example, the scanner misread "stresses in beams" as "stresses in beans", which was then translated into "la tension de los frijoles". And "levers and the steel yard" was translated as "las palancas y la Romana", which, when translated back into English, reads, "levers and the Roman female." Such errors are frequent in translations because of the very different natures of English and Spanish. "The flexibility you have with English is infinite," says Halpern. "You can take a noun and create from it a verb, an adjective, whatever you like. You can't do that in Spanish."

There were some grammatical errors, and many problems arose from the inevitable confusion of the plethora of local Spanish variations: each region of Central and South America has its own slang and idioms, differences between which can be addressed conversationally by simply asking for clarification. A book lacks that same interactive nature. If a second edition of the translation is published, Halpern would like to include an appendix of such idiomatic terms so that readers can look up unfamiliar terms and match them with the idioms of their region. "The concept is not to reach specific Hispanic populations in the states, but all Latin Americans as well, so the translation has to be as close to 'proper' Spanish as possible." he says. "I believe that is where the APS can make the most impact in improving physics education in Latin American countries."

ANNOUNCEMENTS

Distinguished Traveling Lecturer Program in Laser Science

The Division of Laser Sciences (DLS) of the American Physical Society announces the expansion of its lecture program in Laser Science, and invites applications from schools to host a lecturer in 2003. Lecturers will visit selected academic institutions for two days, during which time they will give a public lecture open to the entire academic community and meet informally with students and faculty. They may also give guest lectures in classes related to Laser Science. The purpose of the program is to bring distinguished scientists to colleges and universities in order to convey the excitement of Laser Science to undergraduate and graduate students.

The DLS will cover the travel expenses and honorarium of the lecturer. The host institution will be responsible only for the local expenses of the lecturer and for advertising the public lecture. Awards to host institutions will be made by the selection committee after consulting with the lecturers. Priority will be given to those institutions that do not have extensive resources for similar programs.

Applications should be submitted by members of the DLS. Membership applications can be easily filled out on the home page for APS: http://www.aps.org/

Applications should be sent to the DTL committee Chair Rainer Grobe (grobe@ilstu.edu) and to the DLS Secretary-Treasurer Dan Elliott(elliottd@ecn.purdue.edu). The deadline for application for visits in Fall 2003 is April 30. Detailed information about the program and the application procedure is available on the DLS-DTL home page: http://physics.sdsu.edu/~anderson/DTL/

Lecturers for the 2003-2004 Academic Year:

Robert Byer, Stanford University.
Lee W. Casperson, Portland State University.
Eric Cornell, University of Colorado.
Jim Kafka, Spectra Physics.
Marsha Lester, University of Pennsylvania.
Christopher Monroe, University of Michigan.
Luis A. Orozco, State University of New York at Stony Brook.
Carlos Stroud, University of Rochester.
Ron Walsworth, Harvard University.

2003 – 2004 DPP Distinguished Lecturers

The Division of Plasma Physics of the APS announces the Distinguished Lecturers in Plasma Physics for 2002-2003. This Program is intended to share with the larger scientific community exciting recent advances in plasma physics.

Under the Plasma Physics Travel Grant Program funded by the Department of Energy, the lecturers are available for talks at US colleges and universities for the academic year 2002-2003. Their travel expenses will be supported by the grant; preference will be given to invitations from colleges and universities that do not have substantial programs in plasma physics. The Lecturers may be invited by contacting them directly. For questions about the DPP Lecturer Program, contact Don Correll correll1@llnl.gov

Steve Allen
allens@fusion.gat.com
Improving Tokamak Confinement with "Plasma Surgery" and "Plasma Floating"

R. Paul Drake
rpdrake@umich.edu
Connecting Laboratory Experiments with Astrophysical Phenomena

John Goree
john-goree@uiowa.edu
Making a Plasma Act like a Crystal

Raffi Nazikian
mazikian@pppl.gov
The Scientific Frontiers of Fusion Energy Science

John D. Sethian
sethian@this.nrl.navy.mil
The Science and Technology of Electron Beam Pumped KrF Lasers for Fusion Energy

John T. Slough
slough@aa.washington.edu
Development of Compact Fusion Plasmas for Deep Space Exploration

Physical Review Focus http://focus.aps.org

Down-to-earth accounts of hot research from the *Physical Review* journals—ideal for college physics majors and researchers interested in work outside their specialty. Write to **join-focus@lists.apsmsgs.org** to get weekly e-mail updates.

Some Recent *Focus* Stories:

Fast-Growing Raindrops
Raindrops may form in clouds through a nucleation process like the one that makes bubbles in soda and sugar crystals in honey.

Now Appearing in RMP Recently Posted Reviews and Colloquia

You will find the following in the online edition of Reviews of Modern Physics at http://rmp.aps.org.

Self-consistent mean-field models for nuclear structure
—Michael Bender, Paul-Henri Heenen, and Paul-Gerhard Reinhard
Self-consistent mean-field theory has now become the foremost tool for calculating properties of all but the lightest nuclei. This review discusses the various versions of the theory that have appeared, differing in their underlying energy functional. The review also surveys the applications, ranging from binding energies to transition moments of excited states.

Also Recently Posted:
Colloquium: Stars, planets, and metals
—Guillermo Gonzalez

Structure and fluctuations of smectic membranes
—Wim H. de Jeu, Boris I. Ostrovskii, and Arcadi N. Shalaginov

Under 30? Good at Physics? Win a New Car!!!
(or the equivalent)

See the Call for Nominations for

THE GEORGE E. VALLEY JR. PRIZE OF THE APS

in Box at bottom of this page

APS UNDERGRADUATE PHYSICS STUDENT COMPETITION

2003 APKER AWARDS

For Outstanding Undergraduate Student Research in Physics

Endowed by Jean Dickey Apker, in memory of LeRoy Apker

▶DESCRIPTION

Two awards are normally made each year: One to a student attending an institution offering a Physics PhD and one to a student attending an institution not offering a Physics PhD

- Recipients receive a $5,000 award; finalists $2,000. They also receive an allowance for travel to the Award presentation.
- Recipients' and finalists' home institutions receive $5,000 and $1,000, respectively, to support undergraduate research.
- Recipients, finalists and their home physics departments will be presented with plaques or certificates of achievement. The student's home institution is prominently featured on all awards and news stories of the competition.
- Each nominee will be granted a free APS Student Membership for one year upon receipt of their completed application.

▶ELIGIBILITY

- Students who have been enrolled as undergraduates at colleges and universities in the United States at least one quarter/semester during the year preceding the **JUNE 13, 2003** deadline.
- Students who have an excellent academic record and have demonstrated exceptional potential for scientific research through an original contribution to physics.
- Only one candidate may be nominated per department.

▶APPLICATION PROCEDURE

The complete nomination package is due on or before **JUNE 13, 2003** and should include:

1. A letter of nomination from the head of the student's academic department.
2. An official copy of the student's academic transcript.
3. A description of the original contribution, written by the student such as a manuscript or reprint of a research publication or senior thesis (unbound).
4. A 1000-word summary, written by the student, describing his or her research.
5. Two letters of recommendation from physicists who know the candidate's individual contribution to the work submitted.
6. The nominee's address and telephone number during the summer.

▶FURTHER INFORMATION

See **http://www.aps.org/praw/apker/descrip.html**

▶DEADLINE

Send name of proposed candidate and supporting information by **JUNE 13, 2003** to: Dr. Alan Chodos, Administrator, Apker Award Selection Committee; The American Physical Society; One Physics Ellipse, College Park, MD 20740-3844; Telephone: (301) 209-3268, Fax: (301) 209-3652, email: chodos@aps.org.

Call for Nominations for 2004 APS Prizes and Awards

Members are invited to nominate candidates to the respective committees charged with recommending the recipients. A brief description of each prize and award is given in the March 2003 *APS News Prizes and Awards* insert, along with the addresses of the selection committee chairs to whom nominations should be sent. Please visit the Prizes and Awards page on the APS web site at http://www.aps.org under the Prizes and Awards button for complete information regarding rules and eligibility requirements for individual prizes and awards.

PRIZES

Will Allis Prize for the Sudy of Ionized Gases
Hans A. Bethe Prize
Biological Physics Prize
Tom W. Bonner Prize in Nuclear Physics
Oliver E. Buckley Condensed Matter Physics Prize
Davisson-Germer Prize in Atomic or Surface Physics
Dannie Heineman Prize for Mathematical Physics
Polymer Physics Prize
Frank Isakson Prize for Optical Effects in Solids
James C. McGroddy Prize for New Materials
Lars Onsager Prize
W.K.H. Panofsky Prize in Experimental Particle Physics
Earle K. Plyler Prize for Molecular Spectroscopy
Aneesur Rahman Prize for Computational Physics
J. J. Sakurai Prize for Theoretical Particle Physics
Arthur L. Schawlow Prize in Laser Science
Prize to a Faculty Member for Research in an Undergraduate Institution
George E. Valley Jr. Prize
Robert R. Wilson Prize

AWARDS

LeRoy Apker Award ***(June 13, 2003 Deadline)***
Joseph A. Burton Forum Award
Maria Goeppert-Mayer Award
Joseph F. Keithley Award for Advances in Measurement Science
Leo Szilard Lectureship Award

MEDALS AND LECTURESHIPS

David Adler Lectureship Award
Edward A. Bouchet Award
John H. Dillon Medal

DISSERTATION AWARDS

Andreas Acrivos Dissertation Award ***(April 14)***
Mitsuyoshi Tanaka Dissertation Award ***(June 30)***
Nicholas Metropolis Award ***(Sept. 15)***
Dissertation Award in Nuclear Physics

NOMINATION DEADLINE IS JULY 1, 2003, UNLESS OTHERWISE INDICATED.

The Back Page

An American Physicist Visits Birzeit University

by Joel Lebowitz

I strongly believe that the scientific perspective makes differences between peoples based on nationality, race, religion or gender entirely trivial compared to the things all humans have in common. This places extra responsibility on scientists to use their knowledge and influence towards bridging gaps between peoples and to be responsive to the needs of our colleagues everywhere.

Like many scientists and others right now, I am deeply concerned about the continuing tragic conflict between Israelis and Palestinians. With that in mind, I was very glad to accept an invitation from Professor Aziz Shawabka, Dean of Science at the Palestinian University of Birzeit to lecture there (The contact with Prof. Shawabka was established by Prof. Vincent Rivasseau, from Orsay, France). I was visiting Israel for a conference and lectures and made the final arrangements with Prof. Shawabka over the telephone from the Weizmann Institute.

At 8 a.m. on Tuesday, January 14, Prof. Iyad Jaber, head of the Computer Science Department at Birzeit, met me with his car in front of the American Consulate in East Jerusalem. On the ride, Jaber explained that, as a resident of East Jerusalem, he has an Israeli ID and license plates, which permit him to travel on recently built roads in the West Bank from which West Bank Palestinians are excluded.

This makes his commuting possible. (However, many Israelis who don't live on the West Bank shun these controversial "bypass roads" out of fear, as there have been some shootings there.)

Jaber—who got his masters' degree in computing at the American University in Washington, DC—informed me that the computer situation in Birzeit was quite good and that he had a good staff. He mentioned that during the effective closure of Birzeit for two months the previous spring they continued lessons via the Internet so students could finish their semester. After a while we turned off the good road and then, a few kilometers from Birzeit, there was a checkpoint with a few Israeli soldiers. Prof. Jaber stopped his car and showed them his ID, I showed them my passport and we were through in a minute.

When we arrived, the village of Birzeit looked drab and dilapidated under the drizzling rain. In contrast to the village, the campus looked prosperous. It is about a dozen years old with very nice four-story stone buildings, donated mainly by wealthy Palestinians and other Arabs. To my pleasant surprise, things appeared very normal, with students milling about in front of the building. Aside from the traditional long-sleeved dresses and head scarves worn by many of the women, it could have been any small university campus in the US or in Europe. There are about 5,000 students in Birzeit and the campus has functioned normally (without closures) since the fall semester began. I then met my host, Aziz Shawabka, who had received his PhD in Physics from the University of Colorado in Boulder. He told me that the economic situation at Birzeit is quite bad and that all of last year the faculty had received only half their salaries. This led to the threat of a strike by the faculty and for the last three months they had been getting full salary but are uncertain how long that will last.

I told Shawabka that my Israeli colleagues were all very eager to cooperate with their Palestinian colleagues, but felt that Palestinians were not willing to do that. He confirmed that this is indeed the case at present, for both security and political reasons.

Security reasons are obvious at the present time and in fact the Israeli government has recently prohibited its citizens, for security reasons, to visit Palestinian areas in the West Bank or Gaza. The political situation is such that the Palestinian academics would feel uncomfortable getting special permission to go to Israel while it is difficult for other Palestinians to pass checkpoints even when on their way to hospitals. Both Shawabka and others with whom I spoke expressed the hope that this will change. When asked if they had any objection to meeting Israelis at conferences abroad or to visitors like me going to both Israeli universities and to Birzeit, everyone said emphatically no.

After a seminar given by the French mathematician Ivar Ekeland, we met with about a dozen faculty members from the sciences, who expressed their strong interest in opportunities to spend time in Europe and the US doing science. There are currently a few Fulbright fellowships for travel to the US and some programs in European countries, but these are quite limited, so additional funding is highly desired. I repeated that I had just come from visiting various Israeli universities and that there are many people there very eager to collaborate scientifically. While apparently accepting the good intentions of the Israeli scientists, they told me again that this is not the right time for that. (There was later some skepticism expressed about the Israeli academic community's sincerity in this regard. In particular it was pointed out that there are very few Arabs on the science faculties of Israeli universities (less than half a dozen and none in Jerusalem) despite the fact that there are quite a few Israeli Arabs with PhD's from Israeli and foreign universities.)

There was also a report from Ekeland on his program for teaching undergraduates mathematics applied to economics, organized about three years ago by four Parisian universities. They send lecturers to Birzeit for a few weeks at a time and offer the Birzeit faculty visits to France equivalent to a total of two months per year. They also give some fellowships to students finishing the program. The program is supposed to be taken over fully by Birzeit this year. It appeared to be popular with students, although it was not clear what jobs these students could get in the Palestinian areas at the present time. I was told that the physics department had started a program in computer simulation, since the number of students interested in majoring in physics was rather small. (One of the organizers of this program is Prof. Najeh Jisrawi, a Rutgers PhD, who is currently on sabbatical at Brookhaven.)

Photo Credit: Ivar Ekeland

Joel Lebowitz (left) at Birzeit University with Dean of Science Aziz Shawabka.

We then met with Hanna Nasir, President of Birzeit University. (He got his PhD in physics from Purdue University.) We ended up having a revealing discussion about the different perceptions by Israelis and Palestinians about the current situation. I asked Nasir about statements by Arafat and others from the Palestinian Authority, often quoted by Israelis and Americans, saying that the Oslo Agreement, which had been signed by Israel and the PLO in 1993, was for them just a first step in a program which would really make all of Israel into a Palestinian state. Nasir responded (disingenuously, I thought) that he did not know about such statements and that he was part of a committee involved in the Palestinian Authority officially recognizing Israel. (He heads the Central Elections Committee and is a member of the Palestinian National Council.) He added that of course there are extremists who disagree, but it was the official Palestinian position.

Nasir opined that maybe in the long term there ought to be just a single democratic state. I said that this would mean that Israel would no longer be a Jewish State. He agreed but said there was already a philosophical question of how Israel can be a Jewish state while the population was 20% Arab. I said I didn't see any insurmountable problem with that. After all, France has 10% Arabs and is still a French state. In any case, I don't see a one-state solution in the foreseeable future. All I can see at the present time is a two-state solution. He seemed to agree.

I also brought up the question of suicide bombers, saying that I did not see enough condemnation of it from the Palestinian leadership and intellectuals. Nasir responded that he had written statements in arabic opposing suicide attacks. He added, however, that the Israelis should think about what they have done to make these people willing to commit suicide. He noted particularly the settlements, which he said were designed to establish "facts on the ground" ' that would make a viable Palestinian state impossible. Nassir cited those around East Jerusalem as an example. (I agree with him about the settlements but was disappointed by his refusal to really come straight out and condemn those who incite the young people to hate and kill including committing suicide attacks.)

Meanwhile, his wife, Tanya Nasir, joined us. She described her experience crossing the checkpoint between Birzeit and Ramallah, where it is impossible to cross by car for a distance of about one kilometer. It was a muddy day and an elderly person was being moved across in a wheelbarrow. Seeing a sympathetic-looking Israeli soldier, she went up to him and said: "Do you see what you are doing to these people". He didn't have an answer, but other soldiers said it was just part of security because of recent attacks. (According to Israeli sources, many attacks by suicide bombers and car bombs are prevented by such checkpoints.)

Over lunch, I told Nasir that I would be seeing Yakov Ziv, the President of the Israel Academy of Sciences and Humanities, the next morning and asked whether there was any message he wanted me to convey. Nasir told me that a few weeks earlier the Israeli army had, for the first time in a long period, entered Birzeit University, forcing the gates to be opened. They came in with some jeeps, drove through the campus, and left. He said it was lucky it had happened on a Friday, when there were very few students on the campus. He was afraid, however, that if they returned during regular school time there would likely be incidents with potentially serious consequences.

On the drive back to Jerusalem in the car of Ismae'l Badran, another Birzeit faculty member, we ran into a checkpoint with a long line of waiting cars soon after leaving the campus. Badran said it might take us hours to cross the checkpoint, which normally took half an hour to forty-five minutes. Indeed, after one hour we had only progressed about 25 meters and we were still about 50 meters from the actual checkpoint. Finally Badran decided to pull out of the line and go ahead to the checkpoint in the hope that, since he had an East Jerusalem license plate and had foreigners in his car, they would let us pass instead of sending us back to the end of the line. The maneuver worked. After showing our documents we were permitted to pass and we then went along smoothly towards Jerusalem.

On the plane returning from Israel via Paris I sat next to a young French fellow, Bruno Fert (the son of a French physicist), who was returning from Ramallah and Birzeit, where he had taken photographs of young people for a book in a series "Being 20 in ...". He contrasted the quiet of Birzeit and the absence there of any posters of "martyrs" with the agitated atmosphere in Ramallah.

In a way, my visit to Birzeit confirmed my worst fears about the political and existential chasm separating the two sides, despite the many things they have in common. However, it also confirmed my belief that there are positive things we can and should do to try to help things move in the right direction. As a first step in that direction, it is very important for scientists from the outside to inform themselves properly about the way the "two" sides perceive the current situation. This is best done by establishing and strengthening contacts with colleagues on both sides. Having done this we should try to get those on each side to see how the situation looks from the other side and act appropriately. This has to be done carefully so as not to appear "pontificating", and will not be universally appreciated. But, if not we, then who? And if not now, then when?

A free interchange between scientists and academics on both sides of the conflict would of course be ideal, but clearly this did not seem feasible at this time to the Palestinians I talked to. Outside scientists must therefore assume the role of intermediaries for the present time. In addition to visiting there it is also possible to help our Palestinian colleagues in practical way, such as inviting them for extended scientific visits, using local funds and existing national and international programs. If you are interested, please contact me by e-mail.

For an extended version of this report and related matters, please visit my web site, http://www.math.rutgers.edu/~lebowitz

Joel Lebowitz is the George William Hill Professor of Mathematics and Physics at Rutgers University.