The Envelope Must be REALLY Big

By Ernie Tretkoff

For the first time in several decades, the US is seriously considering building new nuclear power plants. This change in attitude towards nuclear power prompted the APS Panel on Public Affairs to organize a study group to examine the proliferation resistance of nuclear power systems. The Nuclear Energy Study Group recently released their report, entitled "Nuclear Power and Proliferation Resistance: Securing Benefits, Limiting Risks." Global electricity demand is expected to grow by more than 50% by 2025. Nuclear power could meet a substantial portion of that demand, without carbon dioxide emissions. Environmentalists, who in the past had opposed nuclear power, are starting to change their minds because of concerns about global warming, and the US is considering building new nuclear power plants.

"For the last few years there has been increasing positive international and national attitude about the future of nuclear energy," said Roger Hagedorn, chair of the study group.

The APS has long been in favor of nuclear energy, and in 1993 the Council passed a statement supporting the development of nuclear energy as one alternative to fossil fuels. However, the use of nuclear energy increases the danger of nuclear weapon proliferation, because nuclear power technology overlaps with nuclear weapons technology.

"Nuclear power cannot be made proliferation proof," however, numerous steps can be taken--and must be taken--to make it as "proliferation-resistant" as reasonably possible. This is an urgent global security problem," says the report.

"No single diplomatic, military, economic, institutional, or technical initiative alone will be able to fully deal with this proliferation challenge."

The study group dealt only with proliferation, not with other concerns about nuclear power, said See Proliferation on page 4

New APS Open-Access Online Journal Features Physics Education Research

By Ernie Tretkoff

A new online-only APS journal, Physical Review Special Topics-Physics Education Research, will provide a place for researchers in the rapidly growing field of physics education research to publish articles on the teaching and learning of physics. The journal began accepting submissions in May. The APS journal is co-sponsored by the American Association of Physics Teachers and the APS Forum on Education.

"Physics education research is a bit of a side street where our other journals have led, but it is an important element in the Physical Society," said Martin Blume, APS Editor-in-Chief.

In 1990 the APS Council passed a statement favoring physics education research as a valuable topic for research in physics departments.

First-PER will be edited by Robert Beichner, a physics education researcher at North Carolina State University. Beichner, a recently elected APS fellow who has worked in physics education research for years, emphasized how quickly the field has been growing recently. For instance, said Beichner, over the past six years, an average of ten new faculty hires in physics education research have been made per year. "The physics education research field is growing very rapidly," he said, "Most of this work is done by physicists in physics departments."

But with the rapid expansion of the field, it has often been hard to find places to publish this type of research, said Beichner. "I've been working in the field for a long time, and I know how difficult it is to get things published." Physics education researchers need a recognized journal in which to publish their work.

Until now, the primary place to see siblings on this page.

High School Students Measure New Value for Earth’s Radius to Celebrate World Physics Year

By Robert Beichner, a physics education researcher at North Carolina State University.

Has the radius of Earth mysteriously grown by about 3%? According to data taken by 183 high-school classes participating in a World Year of Physics project, "Measure the Earth with Shadows," the radius of Earth is 6363 km, compared to the accepted value for the mean radius of 6371 km.

Of course, no one is claiming the size of Earth has actually changed. Nor is the data submitted in the correct way. It was submitted by so many groups, sometimes in less than ideal conditions, came so close to the right answer." The data were submitted by high school classes all around the US, as well as some in Canada and Mexico, working in pairs. Each pair measured the angle of the sun, and the same way that the Greek philosopher Eratosthenes did more than 2,000 years ago in Alexandria, Egypt--by comparing the length of an object to the length of its shadow, measured at local noon.

Eratosthenes made his measurement on the summer solstice, and had the additional knowledge that on that day the sun was directly overhead at a location a known distance south of Alexandria, on the Tropic of Cancer. This enabled him to see Earth’s radius on page 3.

APS Election Preview Inside

The APS election for Society-wide positions is underway. Voting opened on June 15 and will close on September 1. Biographies of the candidates appear on pages 6 and 7.

This year the election is somewhat unusual, because members are being asked to vote not only for Vice President but also for President Elect. John Bahcall, the current President Elect, decided that he would not be able to serve as President in 2005 because his health has put restrictions on his ability to travel widely. He very much regrets this. The current APS Vice President, John Hopfield, will serve as President in 2005.

Members with valid email addresses should be looking for a message containing their own personal ID that will enable them to vote on the web. Paper ballots will be mailed to members without such addresses, or upon request.

Highlights

8 Back Page Making the Case for University Research

By Robert Beichner, a physics education researcher at North Carolina State University.


INSIDE THE BELTWAY: Washington Analysis and Opinion

The Sky, The Sky Is Falling. I Must Go Tell the King.

by Michael S. Lubell, APS Director of Public Affairs

Honesty does pay off, even in Washington... sometimes. Case in point: the President's Fiscal Year 2006 budget request for science at the Department of Energy, which Ray Orbach, the Director of the DOE Office of Science, was frank enough to admit last February would wreak havoc with university research programs and facilities operations.

Three months later, the House of Representatives responded by subcutting a 1.5 percent increase for FY 2005 that cut the White House had proposed. And Orbach still has his job.

Three years ago, Mike Parker, who was then Assistant Secretary of the Department of Energy, could have justified the presidential budget request for the Army Corps of Engineers. Under questioning by the Senate Budget committee, Parker, a former Republican congressperson from Mississippi, admitted to his ex-colleagues on the Hill that the Senate Budget requested a $4.5 billion cut in the presidential request for science at the Department of Energy, which Ray Orbach was more fortunate–some might argue, more savvy.

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prize winners of the PhysicsQuest, a World Year of Physics 2005 educational project aimed at 5th to 9th graders across the United States. They were randomly chosen from among 87 classes who submitted correct responses in time for the April 22 deadline.

Mooney, two other chaperones, and her group of nine students flew to Washington for the PhysicsQuest "secret treasure" in person at the appointed time and location somewhere on the grounds of the prestigious, for Advanced Study in Princeton, N.J. Arranged as a treasure hunt, PhysicsQuest was a set of four experiments designed to promote awareness of basic physical principles in the areas of harmonic motion, the defraction of laser light, magnetism, and soap bubble configurations on a wire frame. It was made possible by financial support from the National Science Foundation, the Department of Energy's Office of Science, and the Institute for Advanced Study in Princeton, N.J.

Though the Institute grounds sprawl over 800 acres of forest and fields, the treasure spot was beneath an enormous linden tree near the back of Ful Hall, the Institute's central building. Revealed at the 2 o'clock hour on May 21, the treasure consisted of a 5-inch reflecting Meade telescope with automatic drive for the class, and iPod Shuffles for each student.

This was the first time ever in New Jersey for Mooney, her husband Greg, fellow teacher Randy Schmitz, and her students, including her daughter Kelsey, who has her mom as a teacher in two classes.

"There are so many trees and buildings to set up," said 5-year-old Michael Hoffmann. He contrasted the leafy suburban landscape of central New Jersey to the open rural spaces around Walnut, Iowa, where he lives and where his grandfather owns and operates a family farm 10 miles outside of town.

Like his classmates, Hoffmann volunteered to do the PhysicsQuest experiments and play the scavenger hunt.

In the afternoon, a hydrogen-filled balloon with a flame, Matullo pointed out how close Princeton is to Lakehurst, N.J., site of the Hindenburg disaster in 1937. Following the visit to the institute, the group spent the afternoon at the Six Flags Great Adventure amusement park.

EARTH'S RADIUS from page 1
to compute the Earth's radius. In the current experiment, each pair of hosts first knew the known north-south distance between them and the angle of the sun at each location to determine the radius. For various reasons, about one-third of the schools were unable to work with their assigned partner school, but they did the measurement anyway, on the verbal question, using the knowledge that the sun is directly overhead at the equator on that day.

“The Eratosthenes Project really gets kids to think in a special way,” said Hoffman. “It makes them look at it from the outside. Learning to think imaginatively and creatively like this is an important part of physics.”

Rebecca Messer, a physics teacher in Northfield, Minnesota, wrote in an email “My students were thrilled going up in the past few years, so it is expected that the number of new PhDs will soon begin to turn around. In 2001 and 2002 about 50% of PhD degrees went to foreign students, but their degree completion rate was only about 15% left the US after receiving their degrees. In 2002 the proportion of new PhDs taking postdoctoral positions rose for the second consecutive year. Over half (53%) of the new physics PhDs who responded to the survey took postdocs. Another 6% accepted other temporary positions, and 39% were in a potentially permanent position six months after receiving their degree. Only 2% of these recent PhD graduates reported being unemployed. Slightly less than 20% of the new PhDs with potentially permanent positions reported that their employment was not directly related to physics. 40% said their employment was "somewhat related" to physics and 26% said they were employed primarily in physics. Among the non-physics jobs, work on areas of computer science, manufacturing, computer software, business or finance were the most common. Of those employed outside of physics, the most common reason for the choice was a change of interests, followed by pay and promotional opportunities. A less than 10% indicated they couldn't find employment in physics.

Most respondents, even those employed outside of physics, felt that their physics PhD was an appropriate background for their position. “When obtaining a PhD they are aware of the problem solving abilities, advanced math, software and laboratory skills, as well as a basic understanding of the fundamental principles of science. Thus PhD physicists are excellent candidates for a broad range of positions,” said Casey Langer.

Overall, physics PhDs who responded were satisfied with their employment and training: 88% of those surveyed would accept a job that would still get a PhD in physics if they were given the opportunity to do it again. This high satisfaction is significant for recruiting postdocs for researchers in temporary as well as permanent positions, and it is an important component as well, the report states.

The AIP study also reported on bachelor's and master's degree recipients from 2001 and 2002. Unlike PhDs, physics bachelor's degree production increased significantly in these years and in fact continued to rise thereafter. In 2001, 4091 students earned bachelor's degrees and in 2002, 4305 students earned bachelor's degrees. About half of physics bachelor's degrees went directly to graduate school (30% in physics or astronomy, 34% in applied physics) which had been the case for many years.

According to the report, the private sector continues to be the dominant employer for physics PhDs. Though the Institute grounds are shrinking, as fewer graduates took computer-related jobs in 2002, 70% of the new physics PhDs who received a World Year of Physics 2005 ceremony on Capitol Hill. The May 18 ceremony was sponsored by the American Institute of Physics (AIP), the American Association of Physics Teachers (AAPT). It was co-hosted by Reps. Vern Ehlers (R-MN) and Rush Holt (D-NJ) and Reps. James Sensenbrenner (R-WI) and James Sensenbrenner (R-WI). In Congress. In conjunction with the ceremony, Ehlers also placed a statement in the Congressional Record congratulating the Team.

This year's international competition will be held in Salamanca, Spain, from July 3 to 12. At the end of the training camp, the top five highest performing solutions were chosen to represent the US at the 2005 International Physics Olympiad. The members of the traveling Team are: Timothy Credo, Illinois Math and Science Academy, Aurora, IL, Nickolas Forino, Phillips Academy, Andover, MA, Eric Mecklenburg, Thomas Jefferson HS for Science and Technology, Alexandria, VA, Eric Mecklenburg, Hawken School, Gates Mills, OH, Dan Walen, Whelan, Physics Academy, Andover, MA, Altronah, William Thibeault, Thomas Jefferson HS for Science and Technology, Wading River HS, Shoreham, NY. Since 1986, AAPT and AIP, with support from APS and other recipients from 2001 and 2002, and trained teams to compete in the International Physics Olympiad. The US Team has enjoyed great success over the years, bringing home gold two, silver, and one bronze medals from the 2004 Olympiad in Pohang, Korea.
**Encouraging Women in Physics is Based on Rudimentary Sense of Fairness**

By Gary White

Ed Note: The following Viewpoint is a rebuttal of a letter in the April APS News. For those who missed the letter when it first appeared, it is available on the APS News website at http://www.aps.org/public_e/news/0405/040508.cfm.

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**Hagengruber, “We felt the greatest risk was not cost or safety, but proliferation.”**

**Nuclear reactors now provide about 8% of the country’s power in the US. Worldwide, 30 new nuclear plants were under construction in March 2005, with 20 of them in Asia. Many countries have expressed interest in nuclear power.**

**“As evidenced by the current situation in Asia, many countries are advancing and institutional changes are required to avoid proliferation by taking advantage of the global spread of nuclear power,”**

**says the report. It is important to make sure safeguards are in place, whether the US pursues nuclear power or not.**

**The report therefore recommends, as a high priority in the near term, significantly strengthening the federal Technical Safeguards R&D program. Technical safeguards technology is intended to detect or destroy theft or diversion. Environmental sample analysis and surveillance analysis have proved effective, but for technical safeguards to remain functional at containing theft, diversion, and breakout, they must advance at least as quickly as a proliferator’s techniques and potential opportunities,” the report says.**

**The report recommends increasing resources for safeguards technology development, identifying near-term technology goals, formulating a technology roadmap, and improving interagency coordination and scientific collaboration.**

**“Revitalizing Safeguards R&D is the most significant technical investment that can enhance the proliferation resistance of nuclear power within the next five years,”**

**the report says. The report lists some specific objectives for development of safeguards technology.**

**In the longer term, as the next generation of nuclear reactors is developed, it is essential to incorporate proliferation-resistance into the design, the report says.**

**“Processes, designs, and initiatives that might appear to be a cost-effective solution to proliferation, power and other consideration should not be pursued if they are not proliferation-resistant,”**

**states the report. New reactors should be constructed to continuously monitor for any misuse. It is also essential for educational organizations and the US government to engage in international collaborations on key proliferator-resistant technologies, the report says.**

The report also advises against reprocessing spent fuel at the present time, saying there is no urgent need to reprocess nuclear fuel. The US does not currently reprocess spent nuclear fuel. Reprocessing could reduce waste, and would make it possible to produce more energy from the original uranium, but reprocessing spent fuel has inherent proliferation risks because it leads to separated plutonium, which can be used directly for nuclear weapons. Furthermore, in order to reprocess, stored fuel emits intense radiation, which deters theft, the report says. In order to make possible further study, the report recommends delaying any decision on whether to reprocess fuel.

All of the report’s recommendations are based on the premise that proliferators in the nuclear industry may be able to use advanced technologies to make nuclear weapons in the future, regardless of existing safeguards and controls.
The APS North West Section holds Spring Meeting

The APS North West Section held its spring meeting on May 13–14 at the University of Victoria. Among the talks about high energy physics, a talk was a talk by Montana State University’s Neil Cornish on results from the Worldwide Microwave Anisotropy Probe (WMAP). At Mølndal of the University of Alberta, John Gardiner talked about the silicon nanoclusters. These nanocomposites emit a broad photoluminescence spectrum in the near infrared. Mølndal’s group has been able to “tune” the emission spectrum to specific colors in the visible and near infrared.

Dear Jordan,

As an APS member, I would like to have your opinion and guidance concerning an apparent misconduct in publication practice by one of our physics faculty.

APS’s established publication standards require that “Proper and complete referencing is an essential part of any physics research publication. Deliberate omission of a pertinent author or reference is unethical and unacceptable.”

However, a faculty member has recently published research papers in different journals on practically the same experimental data. In some cases, one paper has several coauthors. Thus, by rearranging the names of the authors, another paper by a lesser number of coauthors or just himself as a single author. Worse yet, there was never any cross-referencing among them although some data were published three times.

Resumed padding by this seasoned physicist actually resulted in his reaching higher administrative positions and getting undeserved rewards.

Sincerely,
Name withheld

Jordan Moiers replies:

Dear Name withheld,

You are absolutely right that it is unethical to intentionally leave out relevant citations. It seems pretty clear that the omissions are intentional. It is also unethical to incompletely list coauthors, or to add unidentified authors to the list of the original authors.

APS’s established publication standards require “Proper and complete referencing is an essential part of any physics research publication. Deliberate omission of a pertinent author or reference is unethical and unacceptable.”

The new statement recommends extending the validity of the policy to any check entitled Vissis Mantus, allowing students and scientists to at least begin a visa revalidation process before leaving the U.S. through the issuance of visa reciprocity agreements; developing a national strategy to promote science and technology education and research in the U.S., and emphasizing student applicants’ “academic intent and financial means to complete their degrees.” It also recognizes “the ability of the visa bar to prevent certain students and scholars from entering the U.S. to pursue their education.”

The full text of the statement is available at http://www.aau.edu/homeland/05VisaStatement.pdf.

–Courtesy of F1I, the American Institute of Physics Bulletin of Science Policy News (http://aip.org/afnp)
2005 APS General Election Preview

It's that time of year again, when APS members have the opportunity to elect next year's leadership from a slate of candidates selected by the APS Nominating Committee. Brief biographical descriptions for each candidate can be found below. Those elected will begin their terms on 1 January 2006. This year, in addition to electing the usual positions—President, Chair-Elect of the Nominating Committee, two General Councillors and an International Councillor—members will elect a President-Elect, since the current APS President-Elect, John Bahcall, will be unable to fulfill his tenure due to health reasons. The current APS Vice President, John Hopfield, will serve as President in 2006. All votes must be entered by Noon, Central Daylight Time, September 1, 2005. Full biographical information and candidates' statements can be found at www.aps.org/exec/election2005.

FOR PRESIDENT-ELECT

RICHARD HAZELTINE
University of Texas, Austin

Hazeltine is a physics professor at the University of Texas at Austin. A graduate of Harvard College (A.B., 1964) and the University of Michigan (Ph.D., 1968), he spent two years at the Institute for Advanced Study before joining the physics faculty of the University of Texas in 1971. In 1980 he helped establish the Institute for Fusion Studies at Texas, and served for ten years, beginning in 1985, as its director. His work in plasma physics, Hazeltine has worked in transport theory, plasma stability theory and nonlinear fluid modeling. His scientific interests extend from basic plasma physics and plasma confinement to such topics as nonlinear dynamics, astrophysics and the theory of fluctuations. He is co-author of the books Plasma Confinement (1992) and The Framework of Plasma Physics (1999). His teaching has won an Excellence Award from the University of Texas. He has been chair of the APS Division of Plasma Physics, as well as an APS Divisional Councilor. Previously on the editorial boards of Physical Review and The Physics of Fluids, Hazeltine served some 8 years as an associate editor of Reviews of Modern Physics.

LEO P. KADANOFF
University of Chicago

Kadanoff received his AB, MA, and PhD from Harvard in Physics, and followed up with a postdoc in Copenhagen. He taught at the University of Illinois (1962-1969), Brown University (1969-1978), and then moved to the University of Chicago where he is presently John D. and Catherine T. MacArthur Professor of Physics and Mathematics, Emeritus. He has served as vice-president of the Urbana Chapter of the NAACP, as a member of both the Board of Governors of Argonne National Laboratory and the Board of Physics and Astronomy of the National Research Council (US), and twice as Director of the University of Chicago Materials Lab. Kadanoff has won the APS Buckley and Osmanski Prizes, the National Medal of Science (US), and the Grande Médaille d’Or of the French Academy of Sciences. His theoretical work has focused on condensed matter and statistical physics, and he helped establish the scaling and universality basis of phase transition theory.

FOR CHAIR-ELECT, NOMINATING COMMITTEE

ERIC D. ISAACS
Argonne National Laboratory & University of Chicago

Isaacs is the Director of the Center for Nanoscale Materials at Argonne National Laboratory and Professor of Physics in the James Franck Institute at the University of Chicago. He received his PhD from Massachusetts Institute of Technology in 1988 and was a postdoc at Bell Laboratories (1988-1990) studying magnetism and superconductivity, mostly with synchrotron-based x-ray and neutron techniques. During this 13-year tenure at Bell Laboratories he was a Member of Technical Staff (1990-2000), Director of the Materials Physics Research Department (2000-2001), and Director of the Semiconductor Physics Department (2001-2003). He has served on the APS Division of Materials Physics (2002-2003). His current research centers on studies of novel electronic and magnetic materials with a particular focus on creating images of new phenomena in reciprocal and real space at the nanoscale.

FOR VICE PRESIDENT

ARTHUR BIENENSTOCK
Stanford University

Bienenstock received his BS and MS in physics from the Polytechnic Institute of Brooklyn in 1955 and 1957, respectively, and his Ph.D. in applied physics from Harvard in 1962. After an NSF Postdoctoral Fellowship, he joined Harvard's Division of Engineering and Applied Physics in 1963. He joined Stanford University's Materials Science and Applied Physics Departments in 1967. In 1978, he took on the Stanford Synchrotron Radiation Laboratory directorship and held that position through the summer of 1997. In November 1997, he was confirmed as the Associate Director for Science of the White House Office of Science and Technology Policy (OSTP) and remained in that position until 2001. Bienenstock's early research is primarily solid-state theory, focusing on symmetry theory, vibrational and electronic states in crystalline solids and order-disorder phenomena. Subsequently, he turned to the physical properties of amorphous materials, with a focus on determining atomic arrangements. Bienenstock served as an APS general councilor, on the APS Committee on Applications of Physics, on the Audit Committee, on the Panel on Public Affairs, and as chair of the Ethics Committee.

ROBERTO PECCEI
University of California, Los Angeles

Peccei is the Vice Chancellor for Research at the University of California at Los Angeles (UCLA). Peccei obtained a B.S. from MIT in 1962, an M.S. from NYU in 1964 and a Ph.D. from MIT in 1969. After a brief period of postdoctoral work at the University of Washington, he joined the faculty of Stanford University in 1971. In 1978, he became a staff member of the Max Planck Institute in Munich, Germany. He joined the DESY Laboratory in Hamburg, Germany, as the Head of the Theoretical Group in 1984. He returned to the US in 1989, as a faculty member of the Department of Physics at UCLA. Soon thereafter, he became Chair of the Department, a position he held until becoming Dean of the Division of Physical Sciences of the College of Letters and Sciences in November 1989. Peccei is a theoretical particle physicist whose principal interests lie in the area of electroweak interactions and in the interface between high energy physics and cosmology. He is probably best known for his work on CP Violation. The so-called, Peccei-Quinn symmetry predicts the existence of axions, which could be the source of the dark matter in the Universe. He is presently interested in neutrino models of dark energy. He chaired the APS Division of Particles and Fields in 1989-90, and served on the APS Council from 1998 to 2001.

FOR GENERAL COUNCILLOR

CHRISTINA BACK
General Atomics

Back is an experimental physicist with expertise in the study of radiation in high energy density plasmas. She received her B. S. in Physics from Yale in 1984 and earned her Ph.D. in plasma physics from the University of Florida in 1989. Her thesis work led to the first measurement of resonance fluorescence in a laser-produced plasma. Following her Ph.D. she worked in France at the Ecole Polytechnique for two years and was also a visiting scientist at the UK Rutherford-Appleton Laboratory. In 1992 she joined Lawrence Livermore National Laboratory. This year, she became the Center Head of High Energy Density Physics Targets and Research at General Atomics. Her publications include significant contributions to the study of high efficiency x-ray production, opacity, hohlraum physics, and spectroscopic diagnostics. Back currently serves on the APS Division of Plasma Physics Executive Committee.

OLIVER K. BAKER
Jefferson Laboratory & Hampton University

Baker is an Endowed University Professor of Physics at Hampton University and, jointly, a Staff member in the Physics Division at Jefferson Lab. His current research interests include studies of proposed exotic Physics phenomena, specifically extra dimensions, at the energy frontier in ATLAS at the Large Hadron Collider, and precision studies of nuclear and particle systems with strangeness degrees of freedom at Jefferson Lab. He is the Director of the NSF-funded Physics Frontier Center in particle and nuclear physics at Hampton University. He has won several awards for his research success, including the APS Edward Bouchet Award. He has served on the Nuclear Science Advisory Committee and the High Energy Physics Advisory Panel, as well as on the Quadratic to the Cosmos Committee that produced the report "The Quantum Universe" in 2004. Baker received his B.S. in Physics from MIT (1981), and his Ph.D. in Physics from Stanford University (1987). He is a Fellow of the Southeastern Universities Research Association and the National Society of Black Physicists.

GARY FELDMAN
Harvard University

Feldman, Barst Professor of Science at Harvard University, is an experimental particle physicist whose current research interests lie in neutrino physics. He was Chair of the Harvard Physics Department from 1994 to 1997. Feldman received his B.S. degree in physics from the University of Chicago in 1964 and his Ph.D. degree from Harvard University in 1971. After graduating, he joined the staff of the Institute for Advanced Study in Princeton before joining the faculty of Harvard University in 1971. He has served on the editorial boards of Physical Review and The Physics of Fluids, Hazeltine served some 8 years as an associate editor of Reviews of Modern Physics.
of the Stanford Linear Accelerator Center. His research at SLAC was primarily in the physics of electron-positron annihilation with the Mark I and II experiments, where he was fortunate to be able to participate in the many discoveries of the “November Revolution.” In 1990, Feldman joined the faculty of Harvard University and turned his attention to the study of neutrino oscillations. He is currently the co-spokesperson of the NOνA collaboration, which represents a large off-axis detector for the NuMI beam line at Fermilab. Feldman has served on the Department’s High Energy Advisory Panel. He chaired the APS Division of Particles and Fields in 1992.

Wendell T. Hill, III
University of Maryland, College Park

Hill holds the rank of Professor at the University of Maryland, College Park, with appointments in the Institute for Physical Science and Technology and the Department of Physics. He received a B.A. in physics from the University of California, Irvine, in 1974 and a Ph. D. in physics from Stanford University in 1980. He is a guest worker at NIST, where he was a postdoc before joining the faculty of the University of Maryland in 1982. His current investigations are centered around ultrasonic dynamics, coherent control of optical and infrared quantum dynamics, and the development of quantum nanoscale devices. He leads the first group to combine ultrashort pulses and coinciding imaging with position-sensitive detectors to extract correlated ejection details previously not possible. Most recently, his group demonstrated an all-optical atom switch to transfer atoms between two different guides. Hill was a member of the Executive Committee of the APS Division of Laser Science, the APS Committee on Minorities, and chaired the Nomination Committee for the APS Division of Atomic, Molecular and Optical Physics.

FOR INTERNATIONAL COUNCILLOR

Abraham Aharony
Tel Aviv & Ben Gurion Universities

Aharony is the Moses Nussenzweig Professor of Statistical Physics at Tel Aviv University, Israel, where he has been professor of physics since 1975. He is also a visiting professor at Ben Gurion University and an adjunct professor at the University of Oslo, Norway. He received his B. Sc. in physics and mathematics (1963) and his M. Sc. in nuclear physics (1964) from the Hebrew University and his Ph. D. in high energy physics (1971) from Tel Aviv University. He then switched to statistical physics, and was a post-doc at Cornell (1972-4), Harvard, UCSD, and Bell Labs (1974-5). In 2005 he will be a visiting professor at the University of Tokyo. He is affiliated to universities and research institutes in Germany. Aharony is a theoretical condensed matter physicist, with contributions to critical phenomena, magnetism, liquid crystals, disordered systems, percolation, electron localization, and mesoscopic physics. Aharony was the chairperson of the IUPAP Commission on Statistical Physics and a member of the IUPAP Commission on Magnetism. He has been a member of the editorial boards of several international journals, including Physical Review E.

ONLINE JOURNAL from page 1
to publish physics education research articles has been the American Journal of Physics, which is published by AAPT. But the AJP, which mainly publishes pedagogical articles, rather than primary research, isn’t large enough to handle all the new physics education research articles that need to be published. PRST-PER will have the same review process and high standards as the other Physical Review journals. The well-known quality of the Physical Review journals should help enhance the status of the physics education research field, said Becherer.

The journal will publish a range of experimental and theoretical research on the teaching and learning of physics, including review articles, replication studies, descriptions of new assessment tools, presentation of research techniques, and methodology comparisons or critiques.

The new journal will be published online only, and expects to initially publish about 50 articles a year. PRST-PER will be distributed free of charge, financed by publication charges. Authors or their institutions will be asked to pay a per-article charge of $700, plus a length-dependent charge of $80 per 125 lines. Authors who cannot pay these charges can request a waiver. As a special incentive, manuscripts submitted in 2005 will have the $700 charge waived.

This “open-access” model, in which the author pays the publication charges, makes sense especially when the au-

INSIDE THE BULLETIN from page 2
too fond of the proposed spending plan either.

But it didn’t hurt that the House Appropriations Subcommittee for Energy and Water Projects has David Hobson (R-OH) as chair-

The only solution is to increase taxes and cut entitlements. But both political parties have learned their lessons well. Whoever blinks first and utters the “T” word loses: the Republicans sacrificed the Social Security system in 1986 after the Reagan increase and the White House in 1992 after the Bush increase, and the Democrats gave up the House and the Senate in 1994 following the Clinton increase. And whoever suggests cutting back on Social Security, Medicare, and Medicare will be out of office in an instant.

So where does that leave us? Well, in a $2.4 trillion budget deficit with the federal treasury collecting less than any time in the post World War II era. The culprit is the 2001 tax cuts that are about to become permanent. They have left a $300 billion hole that will have to be financed somehow. The federal government is facing a daunting job, trying to increase tax revenue. The only reasonable approach would be to increase the capital gains tax rate to 25%. There are a few better ways to increase revenue. The only solution is to increase taxes and cut entitlements.

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The real budget deficit this year will be about $600 bil-

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So where does that leave us? Well, in a $2.4 trillion budget deficit with the federal treasury collecting less than any time in the post World War II era. The culprit is the 2001 tax cuts that are about to become permanent. They have left a $300 billion hole that will have to be financed somehow. The federal government is facing a daunting job, trying to increase tax revenue. The only reasonable approach would be to increase the capital gains tax rate to 25%. There are a few better ways to increase revenue. The only solution is to increase taxes and cut entitlements. But both political parties have learned their lessons well. Whoever blinks first and utters the “T” word loses: the Republicans sacrificed the Social Security system in 1986 after the Reagan increase and the White House in 1992 after the Bush increase, and the Democrats gave up the House and the Senate in 1994 following the Clinton increase. And whoever suggests cutting back on Social Security, Medicare, and Medicare will be out of office in an instant.

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The role of research universities in underpinning our nation's standard of living is of profound importance. However, in recent years, we have heard much talk that we are on the verge of losing the global position long held by the United States. While the cost of living in the United States has increased by more than double the amount of funds that the government appropriates to the industrial sector seems to have been badly neglected. In the creation of such agencies as the NSF, NIH and DARPA and the DOE science program. The bad news is that our nation's investment in research in the physical sciences and engineering is only about one-tenth of one percent of the nation's GDP. But the good news is that major proportionate increases can therefore be achieved with relatively modest overall impact on the federal budget. For example, the federal research effort in engineering, math and the physical sciences could be doubled by increasing the gasoline tax by a dime per gallon. For perspective, the entire research budget in all these fields is less than one percent of the federal budget. But increased costs in America increase every two months. There is enormous lever- age available for research to recover increased investment.

I would like to close with a poem attributed to Richard Hodgson that, to my mind, captures the intense competitiveness of the global marketplace.

Every morning in Africa a gazelle wakes up. It knows it must outrun the lion or be eaten. Every morning in Africa a lion wakes up. It knows it must either run faster than the gazelle or be eaten.

That's why you see a gazelle and a lion running up a mountain. The lion can't catch the gazelle. The gazelle can't outrun the lion, but the gazelle can outlive the lion.

Norman R. Augustine is the retired Chairman and CEO of the Lockheed Martin Corporation. He is now a Senior Advisor to the Secretary of the Army. This article is adapted from his 2005 book, "The Case for Innovation: What America Must Do to Build a Better Future." The full text of the lecture can be found at the website of the American Association for the Advancement of Science: www.aas.org/press/2005augustine.pdf.