APS Selects 26 as 2002-2003 Minority Scholarship Recipients

The APS has awarded Corporate Minority Scholarships to 26 students who are majoring or planning to major in physics. Since its inception in 1980, the program has helped more than 290 minority students pursue physics degrees. Fifteen new scholars and eleven renewal scholars were selected as winners of this year’s competition, which consists of $3,000. Each new scholarship consists of $2,000, which may be renewed once, and each renewal scholarship consists of $3,000.

A member of the Cherokee tribe, Corporate Scholar John Tannenbaum grew up with parents who were both chemists, and he became interested in physics and astronomy through high school and college. He is interested in the physics community to communicate more effectively with its representatives in Congress.

The APS has awarded Corporate Scholar Gabriel Mitchell has always been interested in astronomy and space exploration and hopes to one day hold a research position in the aerospace industry. As a junior at McNicholas High School in Wyoming, he completed a special research project involving planning for robotic planetary space probes, analyzing several candidates to determine the cost and success rate of robotic space exploration, and designing a simulation program to compare the performances of the candidates. He is also interested in a career as an aerospace engineer.

Leaders of Industry Fall From Political Grace

By Michael S. Lubell, APS Director of Public Affairs

The “golden parachute” and the “poison pill” that will take them to victory in November. And Republicans recognize that continuing to cozy up to corporate America is the “poison pill” that could make the Democrats’ dreams come true.

They lost their luster as the Edens of basic research years ago. Now their fall from scientific grace has a new partner: an ignominious fall from political grace.

Along with Enron, Worldcom, Halliburton, Quest, Tyco, and Adelphia, these bastions of the American economy have been more than tainted by allegations of executive malfeasance and misfeasance. So strong is the belief that their corporate malfeasance and misfeasance. So strong is the belief that their corporate leaders raped and pillaged investors and employees, alike, that no politician of sane mind will enter politics for even one minute the thought of sitting at a table with any of them—least of all for at least some.

Some are on the venemous list, so far as public offices are concerned. But memories are short. It wasn’t too long ago that academia was struggling to rebuild its image. As the decade of the 1990’s opened, Ronald Kennedy, former INSIDE THE BELTWAY: A Washington Analysis

Department Chairs Confer, Drop In On Congress

One hundred eleven physics department chairs from around the country convened at APS headquarters in early June for the biannual Physics Department Chairs Conference sponsored by APS and the American Association of Physics Teachers (AAPT). The conference focused on education and outreach, with talks ranging from how to increase the number of physics majors to how to prepare future high school physics teachers. Shown in the photo is David Hertzog of the University of Illinois who spoke about his department's program to teach...
“There are some people out there saying to the public, ‘Buy my thing and you’ll be safe.’ It’s just not true.” —Richard Garwin, Council on Foreign Relations, on the utility of home radiation detection devices, ABCNews.com, June 4, 2002

“I don’t think it’s really possible to throw Einstein’s theory out entirely, because it certainly holds to a fantastic degree of precision.” —Alan Sokolov, Indiana University, on whether atomic clocks on the space station might overturn relativity, in whether atomic clocks on the space station might overturn relativity, National Journal, June 22, 2002

“This is the most marvelous sandbox of physics that we can play in for a long time to come.” —Stirling Colgate, Los Alamos, on building a model of a black hole in the laboratory, AP, June 6, 2002

“The physics we’ve learned is so different than the normal big things that we’re used to. It really isn’t communicated well until you get into college.” —Franz Gross, William & Mary, on new results about the neutron from Jefferson Lab, Hampton Roads Daily Press, June 8, 2002

“We’re having a hard time convincing students they ought to do push-ups and eat bran flakes for breakfast instead of cotton candy. It’s a general trend that students don’t want to take anything harder than they have to in order to be successful (but) that’s just human nature.” —Jerry Woolf, Yale University, on the difficulty of recruiting students in engineering, UPI, June 13, 2002

“There is nothing in my think that would make a naked tissue test necessary.” —Bruce Goodwin, Livemore National Laboratory, Contra Costa Times, June 13, 2002

“Condensed-matter physics is like fine wine—you have to develop a taste for it.” —Marvin L. Cohen, University of California at Berkeley, UPI, June 15, 2002

“I figured if I got a Ph.D. in physics, people couldn’t make dumb-blonde jokes anymore.” —Tina Baerdaers; House of Representatives Science Committee, The National Journal, June 22, 2002

“...it’s difficult to believe, in this Internet age of laptop and handheld personal computers, that such machines and the ideas from which they developed were once shrouded in mystery and that even scientists and engineers were slow to grasp the implications of the influential occurrences that helped create that minced word was a series of 48 lectures held from July 8 to July 27, 1947, for the University of Pennsylvania’s Moore School of Electrical Engineering. With speakers drawn from all facets of the field of computation, the lectures were designed to disseminate the current knowledge and progress in electronic computation, in which the Moore School was preeminent. The ideas presented during the Moore School lectures profoundly influenced the direction of computer development for many years afterward. In 1945, the Moore School had become the center for the development of electronic computers. World War II in response to urgent military needs. During the national emergency, the school’s differential analyzer, now the world’s most sophisticated computer, was available for scientific use in 1945, ENIAC ran successfully for a total of 80,223 hours of operation. In addition to ballistics, applications included weather prediction, atomic energy calculations, cosmic ray studies, the atomic bomb, random number studies; and wind tunnel design. While ENIAC was built to process random number studies, its influence on the logic and circuitry of succeeding machines is minimal, its development and the interactions among people, environments, and ideas impacted future generations of computers. led to von Neumann’s disassociation with EDVAC’s development team, but he nevertheless was on hand for the 1946 lecture series, entitled ‘Theory and Techniques for the Design of Electronic Digital Computers’. The Moore School lectures featured talks by some of the biggest names in the field, officially, 28 people from both sides of the Atlantic attended, but many others attended at least one lecture. Most expected the sessions to focus on ENIAC, but many speakers discussed designs and concepts for EDVAC. Together with von Neumann’s report, the Moore School lectures circulated enough information about EDVAC that its design became the basis for several later machines. Meanwhile, in 1948, ENIAC was reassembled and converted into an internally stored fixed program computer through the use of converter code. Many other improvements were made in 1949. Among the most important advances was a new and improved memory system. In June 1945, he invented the first computer’s instruction book. In June 1945, he invented the first computer’s instruction book. 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I vividly remember the first time I was hijacked on the radio. I had agreed to participate in a Florida radio program that special- ized in alien visits and UFO sightings. My better judgment sug- gests that I should not have agreed, though if I kept my focus purely on the phones, I could have got away with it. Throughout the show I persuaded some listeners to be skep- tical of the claims that aliens were regularly visiting, abducting and ex- perimenting with our fellow earthlings.

I should have known better. Af- ter 43 minutes defending myself against those who were trying to con- vince me that it was all possible, and politely re- sponding to demands that I must first scrupulously review all the evidence, I was hijacked on the radio. I had been waiting to be swayed prob- ably found themselves merely confused at the end of the show.

In a debate that confronts the results of science with pseudoscience, from alien abduction and crop circles on one hand to the health benefits of weak magn- etic fields or young earth proponents on the other, the odds are stacked against part.

Science is not fair. All ideas are treated as questions, and it is the responsibility of the proponent to prove his or her case. The burden of proof is not placed on the scientific community to demonstrate that a claim is false. Proponents of pseudoscience are not held to the same standards as scientists. The burden of proof is on the proponent to demonstrate that their claims are true. This is not a fair system of science.

Science belongs to all hu- mans, and it does not accept notions that are impossible to fly! Although true, people would have said it impossible to fly. At the present time for perhaps a de- cade. As difficult as debating ultimate limits of the possible may be, there is another debate that is even harder to win. It is a debate that may be even more important. It is about our faith in the fairness of science. The rea- son for the difficulty is simple. Science is not a religion, nor is it erected equally. Only those that have been satisfied with the test of experiment or can be tested by experiment have any currency. Beautiful ideas, el- egant ideas and even saccrass notes are not immune from ter- mination by the chilling knife edge of experiential test. In Ohio, a debate is raging over whether to teach intelligent design alongside evolution in high school biology class. Intelligent design is based on the belief that life is too complex to explain by natural causation. If a significant number of people do not believe that evolution provides an adequate explanation of the ori- gin of species, they argue, then is it only fair to present both sides of the argument in a high school science class.

But at least half of Americans polled in a recent survey by the National Science Foundation did not know that Earth orbits the Sun and that it takes a year to do so. Does this mean we should teach that Earth is the center of the universe? Obviously not. But it does mean that we are not doing a very good job informing the public about physics. Physics is not a democratic process. It does not proceed by majority rule and it does not accept notions that are impossible to fly.


demand for boycott of Israeli science

The political turmoil in the Middle East has spread to over 150 institutions in the United States and Canada. Peti- tions have been circulating, mostly in Europe, calling for sci- entists to boycott Israeli scientific institutions. See the petition at http://www.pajpo.org/. It is critical to understand that ex- cellence in science and sound security are not incompatible. To pursue graduate studies in biophysics, that interest was sparked by a debate that confronted the results of science with pseudoscience, from alien abduction and crop circles on one hand to the health benefits of weak magnetic fields on the other, the odds are stacked against part.

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I wish to express my strong reservations concerning the APS statement on military research (APS NEWS June 2002).

Support of basic research should be based primarily on the desire to discover more about the nature and our universe. Emphasizing applications tends to undercut some science at the frontiers of knowledge such as cosmology and elementary particle physics. I remember with embarrassment the attempts of a Texas congressman to describe the wonderful applications to arise from the SSC; they only served to hasten the demise to scientific interests of a Texas congressman.

It is important and correct to emphasize that all the wonderful applications of science in our modern world have as a foundation the results of basic research. The examples that we point to should to the contrary benefit all of mankind. Unfortunately, it is hard to say whether applications that augment only served to hasten the demise to scientific interests of a Texas congressman. In conclusion, for moral reasons as well as to achieve the results we desire, we should refrain from delving into military applications of science in our modern world.

FELLOW, from page 2

From whom they received a firm grounding in math and science, he earned his BS in physics from Grinnell College in Iowa in 1990 and decided to pursue graduate study in physics. In 1993 he completed his PhD at Michigan State University in 1993. He completed his PhD in the theoretical physics group in Mexico four years later, with a thesis on the search for chargino-neutralino production using the CDF detector at Fermilab’s Tevatron collider.

Tannenbaum’s interest in the public policy aspect of science began when he was a graduate student. He helped found the Graduate Student Association at Fermilab, which acted as a liaison between the graduate students and the lab’s Directorate. As the CDF representative on the Association, Tannenbaum traveled to Washington, DC to meet with funding and policy agencies and to discuss the lab’s scientific direction with Congressmen. He currently chairs Fermilab’s User’s Executive Committee—which acts as a liaison between the users and the lab’s Directorate, as well as representing their interests in Washington—and is an active member of the Executive Committee of the Union of Concerned Scientists that focuses specifically on arms control issues, intelligence, and national missile defense.

Tannenbaum is also a strong advocate of increasing scientific literacy. While he was in Michigan State, he helped found Science Theater, an NSF-sponsored group that designed demonstrations to interest students and the general public in science and physics. The theater has performed at schools, at local malls, and for Girl Scout troops, and in 1993 received the AAAS Award for Public Understanding of Science and Technology.

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Letters Reveal New Insights Into the Bohr-Heisenberg Meeting
By Frederick Seitz

The final public release earlier this year of several drafts of a letter written by Werner Heisenberg in the mid-1950s, but never sent, gives us a somewhat deeper insight into the meeting between Heisenberg and Niels Bohr a decade and a half later, Heisenberg indicated that he had visited the US on several occasions, and Bohr could not help but be ap- prehensive about the visitors from an enemy country, in spite of what he described as their friendly relationship. Although the record makes it clear that Heisenberg brought up — in what appears to be a heavy-handed way — two issues that were guaranteed to raise Bohr’s ire. Since German victory in the war now seemed assured, Heisenberg stated that Bohr takes steps to promote friendly relations between Den- mark and Germany. Bohr could only have been incensed at the proposal. He was a very loyal Dane, a notable distinguished father-figure in his country, and he well knew that his fellow citizens were outraged by the German occupation. The notion that Bohr would support any official form of friendly relationship was simply beyond comprehension under the circumstances. On the more personal side, Bohr was partly lessened by the fact that he had insisted on the German leadership for promoting the anti-Semitic Nuremberg Laws.

In a similar manner, Heisenberg stated that a group of col- leagues were in the process of developing a nuclear chain reaction based on the uranium isotopes. If we can trust Bohr’s memory a de- cade and a half later, Heisenberg implied that he had a fairly com- plete understanding of the steps needed to achieve such a success, but would not go into details. He also stated that work of this kind would ultimately lead to the develop- ment of a weapon of clear moral wrong that would probably play a crucial role in bringing the war to an end if they succeeded. He could not stay there, however, because the war fre- quently presided since he was, since the Pacific war was far away and the US was not yet engaged. Clearly such an admission would have an- gered Bohr at least as much as the proposal that he cooperate with the existing German government. What are we to make of this, beyond concluding that Heisenberg proved to be a poor diplomat dur- ing the war, and that he seemed much like the proverbial bull in a china shop? It is likely that the first proposal to Bohr, suggesting that he take the lead in developing cul- tural links with German counterpart was, the primary goal of the visit as conceived in the dip- lomatic offices in Berlin, and was made a condition for permission to visit Denmark. Had Heisenberg possessed more sensitive feelings regarding Bohr’s special position as a leading Danish citizen, he would have refused, realizing that it would only pour salt in an open wound and severely damage what had once been a warm, valuable friendship.

Perhaps the key to the situation lies in Heisenberg’s personal pride at that moment, both in German military prowess and what he viewed as the significant strides he was making on the road to releasing high levels of nuclear energy. Had Heisenberg possessed a more cosmopolitan and had political and economic affairs in Germany stabilized, Heisenberg’s intellectual life would undoubtedly have continued to take place in physics and the academic world. However, he came from a pietistic family, and felt very strongly that he should do his best to preserve what he could from the shambles in his intellectual world created once Hitler came to power. He also felt a particular duty as a German citizen to take his place in military service and related matters.

Yet Heisenberg faced many diffi- culties: confrontations with German government leaders over matters of socio-ethical policies. A small group of physicists who were highly supportive- ly of Hitler designated him a “White Jew” in the official press of the Nazi Party for giving lectures on Einstein’s theory of relativity. This caused the government to carry out an in-depth investigation of his status, making him a marked individual. One wonders if his willingness to cooperate with the government by carrying out “cultural missions” in the occupied countries before and during the war stemmed from the hope that he could regain some degree of credibility with officialdom and exert positive influence on behalf of the scientific community.

He did have opportunities to ex- cept, particularly in the summer of 1939, when he came to the US to give a lecture at the University of Michigan summer school. There he met his good friend Ernest Fermi, who had just succeeded in emigrating from Italy with his family. Fermi informed him to remain in the US, where he would enjoy a top-flight position, emphasizing that Heisenberg could never accomplish anything significant back in Germany, because those now in charge of the government had no appreciation for his ideals and goals. Heisenberg, in turn, stated that he feel an obligation to try and save something out of the wreckage that was emerging in his country. Moreover, he would have had to “See BOHR-HEISENBERG on page 7

OLYMPIA, from page 1

that you’re joining an international world, a world which will cross bor- ders. And I guarantee you into that world, you’re going to have a lot of international experiences. Physics is perhaps the most univer- sal of sciences today. Electronics travel with the same speed and the same spin no matter what language is spoken, no matter what borders they cross.”

The Physics Team also received a behind-the-scenes’ tour of the Smithsonian Air and Space Mu- seum. Following the awards ceremony, students enjoyed a priva- te viewing of “Space Shuttle 3-D” at the Museum’s IMAX theater.

Speaking Out In Support of Science Education Funding

In conjunction with the US Olympiad Team’s visit to the nation’s capitol, AAPT sent a brief policy statement to Congress, also endorsed by the APS, the Optical Society of America, the American Astro- nomical Society, and the Acousti- cal Society of America. Nearly 200 members of Congress were invited to join in “celebrating the achievements of these young American students” by supporting full funding for federal programs to improve K-12 science education. If some people took

The text of the statement follows:

“We urge Congress to support K-12 science and math education, particularly programs that enable professional development for teachers and preparation of new teachers, by funding the Math and Science Partnership programs at the Bush administration’s requested authorization level: $450 million for the Department of Education Partnerships in PL. 107-120, and $200 million for the NSF Partnerships in the House-passed H.R. 1588.”

Proposed New Department Complicates Outlook for Visas
By Destrie Scorcia

As a result of last fall’s terrorist attacks and a growing fear that the US borders are poorly guarded, the federal government is instigating major changes in the way visa ap- plications are screened and foreign students are tracked in the US. Many of these changes have the academic community concerned that the benefits of free, international collaboration will be devalued and science and technology will suffer. The uncertainty began last Oc- tober, when President Bush signed the USA PATRIOT Act (Uniting and Strengthening America by Providing Appropriative Tools Required to Intercept and Obstruct Terrorism) into law. It ordered the creation of an interagency panel to screen long- term visa applications and prevent possible terrorists from entering the country. The situation got more com- plicated when the president announced his intention to build a new Department of Homeland De- fense, which could dramatically change the distribution of authority over border controls.

The White House Office of Science and Technology Policy (OSTP) and the State Department designed the Interagency Panel on Advanced Science and Security (IPASS) without any knowledge of Bush’s plan to propose the new Department of Homeland De- fense. The new department will oversee intelligence and law enforcement, and will control the borders, duties that now belong to the INS and the Department of Justice.

“The Homeland Security Department won’t affect how IPASS works,” says Wendy Half, senior policy analyst at the OSTP. “It’s still going to work as it in- tended earlier, and it should be operational in a short time.”

Under the present system, INS counselors, many of whom have little or no science training, hold all of the responsi- bility for visa issuance in foreign embassies. Often, they need help distinguishing science that merely sounds suspicious from that which is clearly national security from science that might pose a real risk. While the per- manent panel is issuing these ad- visories, if IPASS works as envisioned by the OSTP, the consular officials will refer suspicious-looking visa applications to IPASS. While no firm definition exists, OSTP says it will probably look carefully at applicants from terrorist-sponsor- ing countries and those who wish to study in fields “unusually avail- able” in the US or its closest allies. Many in the scientific and aca- demic communities were alarmed by the increase in screen science visas and feared stringent restrictions might prevent those with honest intentions from en- tering the US. The OSTP is aware of this concern.

From its inception, we have been serving important roles in academic and science commu- nity,” said Kathryn Harrington, communications director at OSTP. “We met with representatives from that community, let them know about IPASS, and asked for their thoughts and feelings.”

President Bush’s science advisor and OSTP director John Marburger said the panel expects to review 2,000 of nearly 200,000 science student visa applications the INS processes each year. He also con- firmed that the panel would be crucially advisory, and the final au- thority to issue visas would remain with the counselor official who ini- tially submitted the application for review. “Hopefully it will have a very

See VISA on page 7

Olympiad Team’s Compliments Outline for Visas

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Photonic Crystals
By E. Yablonovitch

Photonic crystals are the electronic analogs of electronic semiconductor crystals. They are artificial crystal structures that do for electromagnetic waves what semiconductors do for electron waves. In today's world, electronic semiconductors are the backbone of the electronic telecommunication, and computer industries. We are just now beginning to understand the exciting possibilities that photonic crystal structures might offer to the electronic and communications fields.

The powerful analogy between photonic and semiconductor crystals has unleashed the collective scientific imagination of many creative physicists, engendering a profusion of synthetic electromagnetic crystal structures. These usually have an electromagnetic bandgap, a band of frequencies in which electromagnetic waves are forbidden. Various 2-dimensional and 3-dimensional photonic crystal structures have now been conceived for application in high-capacity optical fibers, color pigments, and especially nano-optical and nanoelectronic integrated circuits, that might be included in standard microelectronics.

A Little History
In electronic semiconductor crystals, electron waves scatter off the faces of the periodic rows of atoms. Bumping into periodic row after row of atoms, the back-scattering is reinforced if the electron wavelength matches the spacing of successive layers. Venturing off in different directions, the electron waves meet other layers of atoms. No matter which direction they go, they just can't get through if their wavelength matches the layer spacings. The result is the forbidden bandgap of electronic semiconductors like silicon.

While it took thousands of years of metallurgy and materials science to discover and bring to perfection electronic semiconductor crystals, photonic crystals are in principle more accessible. Since electromagnetic waves appear equally well at all wavelengths from giant radio waves to tiny gamma rays, artificial electromagnetic crystal structures can be made with any convenient wavelength. The key is to make the spacing of successive layers roughly match the layer thickness. The result is the forbidden bandgap of electronic semiconductors like silicon.

Some Real Life Photonic Crystals
Nature already makes photonic crystals, in the sparkling gem opal, and in the colors of buttercups and poppies. These have photonic band structures, though not full photonic bandgaps. A complete bandgap seems to have eluded nature—it seems to require too much refractive index contrast. Nevertheless, we are now learning that some artificial photonic crystals might be very useful. Novel forms of synthetic opal can be self-assembled in titanium dioxide particles, the white pigment used in paint and to make printer paper white. Coherent scattering of light can give more whiteness for less pigment, as for trapping light, in spite of being open top and bottom. Indeed, they are intriguing that they could be easily patterned by standard integrated circuit production methods. When one of the holes is left plugged up, the result is a “donor” cavity, a local enhancement of optical gain in a region surrounded by an otherwise forbidden bandgap.

Surprisingly, these 2-dimensional cavities can be very effective for trapping light, in spite of being open top and bottom. Indeed, they are intriguing that they could be easily patterned by standard integrated circuit production methods. When one of the holes is left plugged up, the result is a “donor” cavity, a local enhancement of optical gain in a region surrounded by an otherwise forbidden bandgap.

3-d Photonic Crystal

Figure 1: The first photonic crystal was formed by drilling three intersecting arrays of holes into a block of ceramic material. Each array is angled 35° into the plane, producing a structure now called Yablonovite. The pattern of triangular holes in this cubic material was formed by drilling three intersecting arrays of holes into a block of ceramic material.

Figure 2: Left: the cladding of several hundred capillary tubes confines light with a refractive index of up to 1.45. Right: the pattern of colors shows that the optical confinement of a bandgap fiber depends strongly on wavelength.

Russell of Bath University. Normally light is trapped in optical fibers by total internal reflection in a high-refractive-index region at the core of the fiber. In contrast, bandgap confinement in photonic crystals has a lower refractive index, in order to consist of an empty hole. These “holey” fibers allow new freedom in fiber design that can be valuable even when photonic bandgap confinement is absent. It is predicted that holey fibers may carry up to 100 times the information of conventional telecommunications fibers, potentially with much lower losses than optical amplifiers and repeaters would be unnecessary.

A photonic crystal is often most functionally useful when all the layers of a 3-dimensional crystal are not the same. Layers that are equivalent to “acceptor” doping. Added dielectric material is introduced, similar to doping in electronic semiconductors like silicon. By layering different types of photonic crystal materials, an engineer can give more whiteness for less pigment, as for trapping light, in spite of being open top and bottom. Indeed, they are intriguing that they could be easily patterned by standard integrated circuit production methods. When one of the holes is left plugged up, the result is a “donor” cavity, a local enhancement of optical gain in a region surrounded by an otherwise forbidden bandgap.

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search and communication skills to undergraduates. On June 7, in a spe-
cial session, conference participants heard from White House Sci-
ence Advisor Jack Marburger and Director of the Department of Energy’s Office of Science Raymond Orbach. Senator Judd Gregg (R-NH), who co-sponsored the conference took advantage of being in the nation’s capital and spent one day visiting with their Congres-
sional offices. OPA staffers pointed out that making personal visits to Congressional offices is a valuable tool for conveying their interests to Con-
gress. “It’s easy to assume enough that we department chairs/physical scientists need to do a better job getting their message across to Washington,” he says. “It’s easier to assume that we don’t have the time or the means to do lots of homework.”

BOHR-HEISENBERG, page 3

leaving his family behind, since it would have been impossible to gain per-
misssion to take them abroad at that late date. Restrictions on foreign travel had become very tight. Further-
more, he may well have thought that he might be called upon by the U.S. to help develop a nuclear bomb that would threaten his homeland.

Fermi not only had some 15 years of experience living under a dictator-ship led by individuals with the same mentalit-ty as the Nazi leaders, but had by nature or acquisition developed ad-
prominent “street-smarts” that enabled him to understand exactly what was at stake: Heisenberg possessed neither the experience nor the gifts of insight that Fermi did. He was guided by a code-
probably closely related to that of his patrician family, which demanded that he go back and support his country and possibly save some of the residual scientific structure in Germany. The re-
sult was a disaster for which he paid a great personal price. He accomplished essentially nothing except to

BELTWAY, page 1

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Engaging Cuban Physicists Through the APS/CPS Partnership

By Irving Lerch

In his reflections on Cuban physics below, Marcelo Alonso urges APS to take steps to promote interactions between Cuban and US physicists. As an introduction to Marcelo’s essay, the note will summarize past and current activities. After a prolonged period of political estrangement, we have actively engaged colleagues in Cuba in a number of collaborations over the past two years. In many ways, this joint effort mirrors the APS policy of engagement pursued during the Cold War, with the physics communities of the USSR and China. But scientific communications with the Soviet Union and China were not hampered by extraordinary legal impediments. When the US embargo levied against Cuba in 1960 somehow, this past April, more than 30 US medical physicists participated in an in-Havana (International Conference in Medical Physics, April 8–10, 2002) and many more are expected to at- tend the VIII Inter-American Conference on Physics Education to be convened July 7–11, 2003, in Havana.

The policy that underlies this relationship was enunciated by the APS Council in 1949 with a “Statement on the International Nature of Physics and International Cooperation,” which, while advocating the rights of physicists, strongly promoted open international exchange (see http://www.aps.org/statement/99.2.html).

With far more than 11 million people on an island smaller than Pennsylvania, Cuban physicists were little in number, known to colleagues in Latin America and the Soviet Bloc, but practically unnumbered in the US. In the early 60’s, during Ernest Henry’s Presidency, the APS made a commitment to integrate its ties with colleagues in Latin America and embarked on a series of initiatives to include the organization of joint Cuban-American-US physics meet- ings called CAM–Canadian Association of Physicists, American Physicist Society, Sociiedad Mexicana de Fisico. These, in turn, led to regular meetings with the Academy of the Federation of Latin American Physical Societies, a consortium of 17 national physical societies. By 1989 with a “Statement on the Interna- tional Cooperation,” which, while advocating the open international exchange (see http://www.aps.org/statements/89.2.html). The policy that underlies this relationship—to include the sponsorship of most international organizations of which both Cuba and the US are members (although the law specifies that the organi- zation may not have its headquarters in either country) thus the APS sponsor- ships—to include the sponsorship of most other international disciplinary opportunities are in educational institutions. To be considered for a position (research and teaching) in a uni- versity, the “licenciado” in Physics must have graduated with an aver- age of at least 4.0 points out of 5.0 and must take advanced courses related to the field in which they will teach. Cuban physi- cists work in research centers of the Cuban Academy of Sciences, Technology and Environment, in hospitals and biomed- ical research centers, and in industrial and technical services. Many fields in which Cuban physicists work are: (1) optics, lasers and spectroscopy, (2) condensed matter and materials physics, (3) electronics and computa- tion, (4) non-conventional energies, mostly solar, (5) biophysics and medical physics, (6) geosciences, (7) theoretical physics (complex systems, cybernetics, particle physics, field theory, etc.), (8) nuclear physics, (9) teaching, and (10) physics education research at all levels. In some instances it is a combination of fields.

An important difference with the US is that Cuban physicists have very few teaching opportunities. To be considered for a position (research and teaching) in a university, the “licenciado” in Physics must have graduated with an average of at least 4.0 points out of 5.0 and must take advanced courses related to the field in which they will teach. Cuban physicists work in research centers of the Cuban Academy of Sciences, Technology and Environment, in hospitals and biomedical research centers, and in industrial and technical services. Many fields in which Cuban physicists work are: (1) optics, lasers and spectroscopy, (2) condensed matter and materials physics, (3) electronics and computation, (4) non-conventional energies, mostly solar, (5) biophysics and medical physics, (6) geosciences, (7) theoretical physics (complex systems, cybernetics, particle physics, field theory, etc.), (8) nuclear physics, (9) teaching, and (10) physics education research at all levels. In some instances it is a combination of fields.

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