

View From the Chair

Irving A. Lerch; NYU retired, APS retired

2005, the centennial of Einstein's *annus mirabilis*, was also the occasion for remembering the social consciousness invoked by the greatest scientist of the 20th century. In an address to Caltech students and faculty in February 1931, the *New York Times* reported his admonishment that, "*Concern for man himself must always constitute the chief objective of all technological effort ...*"

This was not a popular view at the time and Einstein's host in Pasadena, Caltech President Robert A. Millikan differed, arguing that physics was purely a cultural enterprise and scientists should not allow themselves to be distracted by the political and material struggles of humankind. Millikan insisted that government play no role in promoting and funding science. Einstein's challenge to scientists and engineers grated. The scientific establishment of the day did not see what Einstein saw—that the physical sciences harbored the potential for transforming society.

With the passing of the 20th century Einstein's view has prevailed and we must respond to his challenge anew. In March, Executive Committee member Hilda Cerdeira helped organize a symposium sponsored by FIP in partnership with the Abdus Salam International Center for Theoretical Physics in Trieste (ICTP) entitled, *Scientists from Developing Countries: is There an Effective Way to Support Meaningful Research?* The underlying premise of the symposium was that science is essential to establishing innovation systems in developing countries to combat endemic poverty. With the ICTP Director, Katepalli Sreenivasan moderating, the speakers; Zohra Ben Lakdar (Tunisia), Carlos Henrique de Brito Cruz (Brazil) and Bernard M'Passi-Mabiala (Republic of the Congo) made clear that nations at different levels of development required unique solutions. This theme was further explored in two symposia at the April meeting in Dallas (*Public and Private Funding for International Research* and *Science and Development: Innovation Systems for Fighting Poverty*) A third session entitled, *Scholars at Risk*, explored the contributions of the *Scholars at Risk Network* in providing safe haven for colleagues subject to political persecution.

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A consultation meeting was also convened at the March meeting by FIP to exchange information and views among the APS Director of International Affairs, Amy Flatten; members of the FIP Executive Committee; representatives of the Overseas Chinese Physics Association, the Association of Korean-American Physicists, the American Chapter of the Indian Physics Association and colleagues interested in organizing Iranian physicists resident in the US. The discussions centered on ways that collegial networks within APS can benefit from membership services and activities: participation in meetings, fellowship nominations and Forum governance.

With respect to an association of Iranian physicists, Hamid Javadi (Jet Propulsion Laboratory), has proposed a network of Iranian-American Physicists under the APS/FIP umbrella to provide a professional arena for activities based on their cultural heritage, to honor young physicists with awards and scholarships and to provide guidance and mentorship to physics students. It will organize public lectures to increase physics awareness within Iranian immigrant communities (much as the AKPA did during 2005) and will recognize individuals who have contributed to humanity, world peace, and the general welfare. Colleagues interested in joining or supporting this effort are encouraged to contact Hamid directly (Hamid.H.Javadi@jpl.nasa.gov).

It is impossible to name everyone and recount all the activities undertaken by FIP in a brief report, but the success and expansion of the Travel Grant Award Program developed by the retiring TGAP subcommittee chair James Vary (currently CISA chair), the continuing contributions of our “retiring” past Chair, Jerry Draayer, the vigorous participation and leadership of our “new” past Chair, Gary Steigman, the enormous efforts of our Secretary/Treasurer, Noemi Mirkin, the prodigious work of Newsletter Editor, Laszlo Baksay and Web Editor, Gyongyi Baksay, the vigorous efforts of Chair-Elect Herman Winick, and the wise counsel of Vice-Chair Satoshi Ozaki, all deserve our appreciation. They and all mem-

bers of the Forum will be called upon for renewed efforts to extend the international outreach of the Forum and APS.

The TGAP (for details go to http://www.fit.edu/fip/documents/TGAP_Nov_2005_v1.pdf) has been expanded as Gary Steigman pointed out in his report in the last newsletter with the participation of DNP, the APS Office of International Affairs and the US Liaison Committee to IUPAP. Other units are now poised to join and it is clear that the program will soon be an APS-wide effort. We must now seek to sustain it with a firm base of funding. The awardees in the third cycle of the program were Lawrence Jones (University of Michigan), Caio H.Lewenkopf (Universidade do Estado do Rio) and Jerry Peterson (Colorado University). Previous winners will be posting reports on the results of their collaborations and travel in coming issues.

We are embarked on too many initiatives to recount here but I implore all members to read this Newsletter carefully, to take special note of what is reported here, and to seek out the members of the Executive Committee on any and all issues that excite your interest. But most important, if you have something to say and wish to make a contribution to this letter or recommend an author who has something to say of interest to FIP, feel free to contact our editor, Laszlo Baksay.

We are now embarked on designing a more active future for FIP and everyone is welcome to play a role. There are many areas to be examined: we must actively seek to reward our most distinguished colleagues with nomination to fellowship; we need to expand our participation in APS meetings by developing a stronger relationship between the international scope of physics and science by organizing focus and proffered sessions; we should provide a stronger voice for our international members in Society affairs, especially those US residents who have organized ethnic and cultural networks of physicists, and we will continue to follow the muse unleashed by Einstein in Pasadena 75 years ago.

Equally important will be the strengthening of partnerships with the offices, divisions, groups and forums of the Society.

Workshop on PRC-US Cooperation in High Energy Physics

Fred Gilman, Carnegie Mellon University and Hesheng Chen, Director, IHEP

Particle physics will undergo a major transition in the next few years. The LHC is to begin operation next year, while later in the decade the Tevatron collider at Fermilab and the PEP-II B-Factory at SLAC will be shut down. Physicists who have been working at the colliders at Fermilab and SLAC have unprecedented experience in extracting physics from large data sets. While large groups of U.S. physicists will be involved in the research program of the two major detectors at the LHC, others will become engaged in accelerator and non-accelerator particle physics experiments away from the high-energy frontier.

In particular, physics opportunities exist in China working in relatively modest-sized collaborations, such as those carrying out the BESIII experiment at the BEPCII electron-positron collider and the Daya Bay reactor neutrino experiment. At the last meeting of the PRC/U.S. Joint Committee on High Energy Physics it was decided to sponsor and organize a workshop to allow U.S. physicists to explore the opportunities that are now open to join the emerging collaborations.

Consequently, the Institute of High Energy Physics (IHEP) of the Chinese Academy of Science held a workshop June 11–18, 2006 in Beijing to strengthen and promote cooperation in high energy physics between the Peoples Republic of China and the United States. During the Workshop, the current status of the Chinese high-energy physics program was reviewed with an emphasis on the physics potential of the experiments and the opportunities to fully realize that potential with increased collaboration. Concrete proposals, with strengthened Sino-American collaboration in high-energy physics, are expected to follow from the Workshop.

For further information please see the website for the Workshop at <http://bes.ihep.ac.cn/conference/PRC-US/index.htm>.



The Glass Ceiling for Women Scientists in India -tougher than ever?

Anita Mehta

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Despite apparent changes in the demographics of science, the picture at least in India remains dismal. It is true that there are more women doing more science than ever before; it is also true that the awareness of gender discrimination is seeping into Indian society, both as a reaction to activism within and legislation without. The combination ought to imply changed attitudes to women doing science, but in the experience of many women scientists, it clearly does not. It seems to some of us that the glass ceiling has not just NOT disappeared, it is now protected by an invisible plexiglas film to protect it from the occasional crack.

It can be argued that the only real effects of enforced external changes on the ingrained sexism present in the (still largely male) higher echelons of science administration are the pushing of problematic issues under the rug, as well as a form of tokenism, where pliant women are put in nominal charge of some of the more trivial issues, provided that they are considered to be 'honorary men'. This way, while the numbers game of equal opportunities regulations is (often barely) satisfied, any real attempt to change attitudes is kept at bay, and sexism rules supreme. The fact that many more young women enter science is shown to be 'progress enough', and not enough attention is given to why so many of them either drop out, or remain unhappily stagnant in positions below their levels of competence. The reality is rather stark; relatively happy women scientists often resort to irony about their professional lives, while unhappier ones frequently have dark tales of harassment to tell.

To some of us, it seems that things were more honest and upfront in the 'bad old days', when both men and women knew and accepted that gender discrimination existed; exceptional women scientists who made it to the top were recognized for their intelligence and perseverance by the entire community, given the known barriers they had to confront. With nominal anti-discrimination legislation in place, with lip service paid to gender inclusiveness in public fora, with the preponderance of committees to do with women in science in international science conferences, the impression that we are now in an egalitarian society is often falsely created. This has the effect of lulling even well-meaning and sensitive men into believing that all is really well, of making harassed women sound unreasonable (after all, can this really be the state of women in the 21st century, we are asked), and of pandering to the collective inertia of society as a whole. Last but not least, the apparent 'modernity' of societal self-images often leads to successful women scientists being regarded askance by at least a few of their male competitors; even when the opposite is the case, they are seen to have 'benefited' from their gender.

Men alone are not to blame for this, of course. There are astonishingly few women scientists who are willing to come forward to change unfair practices.

Why, I am often asked, are contemporary women scientists not activists?

In part, the reason is to do with the evolution of science itself; seen as revolutionary in the early part of the twentieth century, it has, post-sixties, cultivated a rather 'cool' self-image, where to be activist is seen to be partisan, and by some peculiar extension, not 'objective' (that word so beloved of scientists the world over) enough. The fact that objective realities sometimes DEMAND a partisan response is of course conveniently ignored in this conspiracy of silence, so cherished by scientific establishments – who will quite naturally seek their own perpetuation, and will not voluntarily relinquish their power. In this situation, women scientists are all the more under pressure to conform; watched warily throughout their careers for any signs of 'rocking the boat', the shades of activism they can afford to show are far fainter than those allowed to their male colleagues.

What happens, then, when things go wrong? This is an issue rather frequently referred to in private conversations, with at times

“There are astonishingly few women scientists who are willing to come forward to change unfair practices.”

poignant personal testimonies brought to bear. Gender-related, or sexual, harassment is a ground reality in this (as in any other minoritised) profession – unfor-

unately the image of scientist as austere, ascetic and devoted to his science, leads at least OUTSIDE the profession to societal disbelief when a senior scientist harasses, either explicitly or implicitly, a more junior woman colleague. Within the profession, there is little networking among women, leading to environmental hostility and a great sense of loneliness among such victims. The great succour to many Indian women scientists has been the existence of women's fora, both governmental and non-governmental – these provide rare and cherished environments where women can speak to each other without fear, and be listened to with understanding. It is fervently to be hoped that the interaction between women's groups and women scientists will increase, and that there will eventually be a far greater overlap between the simultaneous roles of individual women as scientists and activists. Legislation exists to protect women at work - the Vishakha legislation of the Supreme Court in 1997 being a prime mover in the Indian context - but it is up to each and every woman scientist to insist that its dictates are followed in all scientific institutions throughout the land.

The goal of every intelligent scientist is to have a science that is gender-free, where creativity, rationality and collaboration can flourish in an unprejudiced environment. Those of us who have 'made it' as successful men or women scientists have a special responsibility towards the little girls of today; we need to make sure that they, as the women scientists of our future, will not crash into invisible, fortified ceilings when they try to reach for their own little patch of sky, their own place in the scientific sun.



The Impact of Synchrotron Radiation Light Sources on Science and Society in Developing Countries

Herman Winick, SSRL/SLAC/Stanford University, winick@slac.stanford.edu

INTRODUCTION

At present there are more than 50 synchrotron radiation light source research facilities in operation in 19 countries serving about 30,000 scientists around the world, with more facilities in construction and design (see www.lightsources.org). The rapid growth in interest and activity over the past 30 years is a result of the spectacular performance these electron storage ring-based sources deliver. For example these sources deliver more than one million times higher brightness than conventional x-ray tubes. Their intense radiation over a broad spectral range, extending from the infra-red to hard x-rays, has revolutionized many scientific fields such as structural molecular biology, surface science, molecular environmental science, materials science, catalytic chemistry, drug design, x-ray imaging, and others.

In addition to facilities in the most technologically advanced countries, there are light sources in operation now in Brazil, China, Korea, and Taiwan that were begun about 20 years ago, when these countries were considerably less developed than they are now. The process that led to these projects in these countries typically included comparisons of their benefits and costs with other possible projects to promote science and technology in these developing countries.

More recently, facilities have begun operation in India and Thailand. In addition, of eight major light sources now in construction around the world two are in developing countries – the CANDLE Project in Armenia (<http://www.candle.am/index.html>) and SESAME in Jordan (www.sesame.org.jo). SESAME was described in the previous FIP newsletter. Articles from CANDLE and other relevant projects will be given in future FIP newsletters. The other light source projects now in construction around the world are in Australia, China, France, Russia, Spain, and the UK. Discussions are also underway about a possible regional



SESAME under construction in Jordan

OBJECTIVES OF AN SR FACILITY IN THE DEVELOPING WORLD

The main reasons for a light source in a developing country may be summarized as follows:

- Create a world-class interdisciplinary research laboratory
- Promote basic & applied research & technology
- Address regional biomedical & environmental issues/concerns
- Provide an environment for collaborations & individual development
- Train graduate students who will no longer have to go abroad
- Attract scientists working abroad to return
- Promote international scientific collaboration
- Promote development of high-tech industry (*capacity building*)

For the UNESCO-sponsored SESAME Project in Jordan, there is an additional objective:

- Use scientific cooperation to promote peace & understanding between people from different traditions, religions, races, & political systems.

light source in southern Africa.

Facilities in Brazil, China, Korea, and Taiwan have now been in operation for about ten years, so one might ask what benefits they have brought to their countries. The objectives of these facilities are given in the box. In this brief note we focus on perhaps the most important benefit that results from a light source in a developing country; namely, that graduate students in biology, chemistry, physics, materials science, and other fields can be trained locally with opportunities to do frontier science without going abroad. The result is that many more of them stay in their native countries, training other students and developing science and technology at home.

Here are some statistics on graduate student training:

Brazil: Since the 1.37 GeV LNLS ring first started operation for users in 1997-8 about 29 PhD theses & 21 Masters dissertations have been completed (1).

China: The 2.2 GeV Beijing facility (BSRF) began user operation (parasitic to the high energy physics program) in 1991-92. In the period 1999-2005 about 70 graduate students (PhD plus Masters) have completed their research there. (2)

The NSRL facility in Hefei also began user operation on the 0.8 GeV ring in the early '90's. Since then 58 PhD and 53 Masters projects have been completed by students from the University of Science and Technology of China (USTC) alone. They are now being produced at the rate of about 20 PhD and 20 Masters/yr. A



total of about 150 graduate students are now involved. (3)

Korea: Since the start of user operation of the 2.5 GeV ring at PAL in 1994-5 about 150 PhD theses have been completed at the Pohang Light Source by students from Korean universities. (4)

Taiwan: Since the start of user operation of the 1.5 GeV facility at NSRRC in 1994 about 100 PhD theses have been completed by students at universities in Taiwan. (5)

Thailand: Although the 1.0 GeV ring at the National Synchrotron Research Center in Thailand has only recently begun operation, and is being upgraded for higher performance, it has already produced 7 PhDs and 2 Masters degrees, with 10 PhDs and 4 Masters in progress. (6)

References: Personal communication (1) José A. Brum, (2) Ding Chang Xian, (3) Zupin Liu, (4) In Soo Ko, (5) Keng Liang, (6) Helmut Wiedemann



SIAM Light Source

The European Light Source ESRF – An International Research Environment

Jörg Zegenhagen, ESRF, Grenoble, France

The European Light Source ESRF is located in Grenoble, a town with roughly 160 000 inhabitants in the southeast of France, at the frontiers of the Alps, close to the Italian and Swiss borders. The Grenoble metropolitan area (about 600 000 inhabitants), also called the French Silicon Valley, is known for its concentration of research centers and high-tech industries. The ESRF is sharing the site with two other European Research Institutions: The neutron research laboratory ILL and an outstation of the European Macromolecular Biology Laboratory (EMBL). The ESRF is financed by 18 countries, including one non-European country, i.e. Israel. Scientists not only from these countries but from all over the world use the extremely bright x-ray beams produced by the ESRF to study a remarkably wide range of materials and phenomena. In 2005, more than 5500 scientists carried out peer-reviewed research at the ESRF, supported by its staff of about 600 of roughly 30 different nationalities.

Electromagnetic radiation is emitted when charged particles are accelerated. A common example is the emission of radio waves by electrons undergoing acceleration in a radio antenna. Synchrotron radiation (SR) is the name given to the electromagnetic radiation emitted by relativistic charged particles moving along a circular path; i.e., undergoing circular acceleration. Because the emitted intensity varies inversely as the fourth power of the mass, it is particularly strong for the lightest charged particles, electrons or positrons. Depending on the electron energy and the radius of curvature of the path, the spectrum extends from the deep infrared to gamma rays.

Starting in the late 1960's scientists began to use SR. In so-called "first-generation" SR sources, the light was just an undesired by-product of the cyclic synchrotrons or electron-positron

storage rings employed by high-energy physicists. Even though these machines were optimized for particle physics, the flux and brightness of the emitted SR was about one million times higher than that produced by conventional x-ray sources. Because of associated strong scientific advances, storage rings dedicated to the production of SR were built in the 1980's. These so-called "second generation" sources were designed to exploit SR from the ring bending magnets. With the development of wiggler and undulator magnets (periodic magnetic structures that are installed between the ring bending magnets), starting in the late 1970's on first and second generation rings, even higher flux and brightness became available, leading to a move to design and build

rings more fully optimized for these sources. The ESRF (circumference 844 m), with an electron energy of 6 GeV, is the first

such third generation hard x-ray SR source. At present it is rivaled only by two other (national) SR x-ray sources, the 7 GeV APS in Chicago, USA and the 8 GeV Spring8 at Harima Science Garden City, close to Himeji, Japan. These remarkable machines provide x-ray beams with a brilliance that is about one trillion times higher than conventional sources. Even higher peak performance will come from x-ray lasers that are now in construction, using 100 m long undulators at the end of multi-GeV electron linacs. However, storage rings are unrivalled for their ability to provide intense, stable beams over a huge range of wavelengths to a very large number of simultaneous users.

The extraordinary, almost laser-like qualities of the x-ray beams of 3rd generation SR sources triggered a remarkable development in optics and applications of x-rays. Materials and objects can now be imaged with some 10 nm resolution in almost any environment, vibration properties (phonons) can be studied with some 10

The European Light Source is jointly financed by 18 countries



keV x-rays and (sub) meV resolution, at Mbar pressure and high temperature, conditions found in the core of the earth, chemical reactions can be unraveled with sub-nano-second time resolution, to name a few examples. Synchrotron x-rays are used in physics, chemistry, biology, material science, paleontology, pharmacy, medicine,

and other disciplines. Having been the first SR source of its kind, the ESRF has pioneered many techniques and applications.

The history of the ESRF goes back more than 30 years. A European Light Source was proposed in 1975 by Prof. W.R.S. Garton from Imperial College (UK), in a letter to the president of the European Science Foundation, then Sir Brian Flowers (UK). Years of debate, negotiation, and project planning followed, until in 1988, starting with a bilateral initiative by France and Germany, twelve European countries joined forces to create the synchrotron in Grenoble. Interestingly enough, Grenoble had initially not been among the favored

sites and was chosen at the last minute to the disappointment of Strasbourg, which had been the top favorite. The ESRF was opened to the first scientific users in 1994, and the construction phase was finished in 1998. Since then, more than 40 beam lines are in operation. These experimental stations are accessible to scientists, primarily from the member countries, with the assistance by the beam line staff, which is necessary to assure a successful experiment. A fraction of the available beam time can be used by the scientists of the beam lines for their own research, which helps to assure that the best possible experimental facilities are available and continuously improved.

I became myself addicted to SR already in the early 1980's during my PhD work at DESY, Hamburg. Because of the unique properties of this 3rd generation machine, I was attracted by the ESRF and was among the first scientists using the produced x-rays in 1994. I joined the ESRF staff at the end of 1999. Besides the scientific potential (and the French food), I appreciate the international and scientifically stimulating atmosphere. The working language

at the ESRF is supposed to be English, which is stipulated in every employment contract. A little anecdote underlines reality.

On one of my first working days, I attended an "introduction to the ESRF" given by the head of personnel service. The presentation was, of course, held in English. After the first introductory sentences, one employee raised the hand. Demanding the reason, the head of Personnel service was asked (in French) to change to French, being otherwise not understood by the person. Thus, in reality every scientist, working at the ESRF, has to face the fact that there is a significant fraction of employees from the technical support staff, which may not (like to) speak English. However, if there was an international research facility in the US, where a foreign language would be mandatory, I am convinced the situation would be much the same. I know several national labs in European countries, in addition to Great Britain and Ireland, where English is de facto the working language. As a German, who lived in the US and France for quite a number of years, I'd like to remark

In 2005 over 5500 scientists carried out research at ESRF, supported by 600 staff members of 30 different nationalities

that there are more similarities between the French and the Americans than either are willing to admit.

Among others, both are proud of their country, their language, and they are mostly self-sufficient with either.

Nevertheless, despite occasional language problems, science is truly international. International collaboration between scientists can in fact be regarded as a role model for society as a whole, demonstrating of how blending of different cultures leads to enrichment. When scientists with different scientific/cultural background meet, new ideas are generated, promoting the advancement of science. Synchrotron Radiation laboratories are international meeting points and the ESRF is a prime example in this respect. With a healthy ratio of permanent to temporary scientific staff, fresh blood from the international scientific community is continuously provided while the necessary continuity is guaranteed and progress is founded on an established scientific culture. In case you became curious and would like to learn more about the ESRF, please visit the web site: <http://www.esrf.fr/>. Finally, I would like to thank Herman Winnick for some excellent suggestions.

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*A group of visitors at the well-attended
**FIP Business Meeting and
Reception**
held at the
March APS Meeting,
2006 in Baltimore*



Photo: Herman Winnick





U.S. Participation in ITER

Ned Sauthoff, Project Manager, U.S. ITER Project

For over a decade, the U.S. and world fusion research communities have recognized the scientific and technological benefits of the future study of “burning plasmas”. Key scientific issues relate to the increased self-organization associated with the self-heating, influences of super-Alfvénic ions from the fusion reactions, and the changed balance of physical phenomena due to the disparate scalings to the larger size associated with a fusion reactor. Only recently has sufficient scientific and technological readiness been achieved and recognized to proceed to construction of a capable research facility.

“The ITER partnership will test the capabilities of a global partnership in which all the international parties are jointly responsible for the project’s success.”

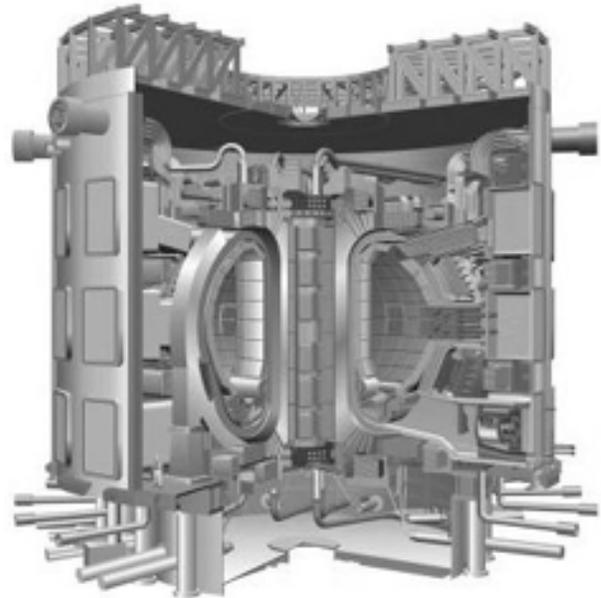
The U.S. was one of the founding partners of the International Thermonuclear Experimental Reactor, a large tokamak-based facility and program currently under design by an extensive partnership between China, the European Union, India, Japan, South Korea, the Russian Federation, and the United States. The estimated cost of the U.S.’s 9% contribution to ITER construction is roughly \$1.1B. The international partnership chose the tokamak configuration since the tokamak is the only magnetic confinement configuration with sufficient understanding-based predictability to serve as the basis for such a large experiment.

Following the U.S.’s participation in the 1992-1998 Engineering Design Activities with the European Union, the Russian Federation and Japan, the U.S. Congress directed that the U.S. withdraw from ITER due to concerns about the political feasibility of ITER construction and alleged scientific concerns about ITER’s scientific feasibility. Between 1998 and 2002, the remaining parties refined the design to reduce cost and increase the probability of achieving a slightly reduced ITER scope that nonetheless meets the original mission. In the early years of this 21st century, Canada entered the partnership with a desire to be the site for ITER, with specific resources in the supply and handling of tritium from CANDU reactors. In 2001, a subpanel of the DOE’s Fusion Energy Sciences Advisory Committee (FESAC) performed an assessment of readiness to study burning plasmas; based on the positive outcome, the U.S. fusion community in 2002 conducted an extensive Snowmass Summer Study with over 225 U.S. and international scientists and engineers who built on over 6 months of preparation; the group analyzed the scientific and technological benefits and readiness for this study and also compiled the benefits of a range of approaches to the study of burning plasmas. This assessment served as the technical basis for the development of a strategic plan for the study of burning plasmas, which was reviewed by the National Research Council. On the basis of the NRC’s initial report as well as a cost study by the DOE Office of Science, President Bush in early 2003 decided that the U.S. would join negotiations aimed at the construction of ITER. With the entry of the U.S., China and South Korea in early 2003, the parties worked to develop arrangements for the con-

struction of ITER, including the assignments of hardware scopes to the parties, planning for staffing and cash contributions, studies of management structures, and planning of diplomatic matters. In 2003, Canada, Europe and Japan proposed sites for ITER. Unfortunately, the negotiations stalled with the failure to choose the ITER site at the end of 2003. Despite early-2004 technical assessments of the sites and exploration of broader approaches to the decisions, the site decision could not be reached and the international discussions narrowed to bilateral discussions between Europe and Japan, attempting to resolve

the site-selection impasse.

In February 2004, DOE Secretary Spencer Abraham and DOE Office of Science Director Raymond Orbach unveiled DOE’s 20-year vision for future research facilities, including the ITER burning plasma science experiment as the first in the 5- to 10-year scientific priorities. In mid-2004, the DOE chose a partnership between Princeton Plasma Physics Laboratory and Oak Ridge National Laboratory as the host for the U.S. Project Office. The U.S. Project Office focused on the ITER construction project while the U.S. fusion research community struggled with developing its organizational structure for its participation in burning plasma research.



The ITER tokamak configuration

2005 and early 2006 have proved to be an up-beat period for ITER: both the international project and the U.S. project.

Following extensive bilateral discussions between the European Union and Japan, in June 2005 the European Union and



Japan completed complex negotiations and the six ITER parties unanimously selected Cadarache, France as the future site of ITER. Resolution of the site issue triggered resumption of discussions on a wide set of fronts: staffing regulations, management and organizational structure, financial regulations, privileges and immunities, and refinements of the assignments of procurement responsibilities to the parties. Multi-party meetings were held starting in September 2005 at the ITER site of Cadarache, in China and in Korea to review the status of the draft arrangements and to resume discussions aimed at finalizing the texts of the ITER Joint Implementing Agreement and its annexes. In December 2005, India joined the ITER partnership and the seven parties unanimously selected Kaname Ikeda, the then Japanese Ambassador to Croatia, as the Director General Nominee. By January 2006, the text of the ITER International Agreement had been drafted; in April 2006, the parties selected German citizen Dr. Norbert Holtkamp, head of the Accelerator Division at ORNL's Spallation Neutron Source, as the Principal Deputy Director General Nominee, to focus on the technical and construction activities. With the senior management appointed, the international project was poised to build the international team and to finalize the preparations for construction.

Following the July 2004 selection of the host of the U.S. ITER Project Office, the U.S. activities accelerated, with establishment of the initial configuration of the U.S. organization to become the U.S. Domestic Agency and the completion of the U.S. project's first DOE Office of Science review in March 2005, which focused on the estimated U.S. cost range and management arrangements for the "U.S. Contributions to ITER" project. The U.S. ITER Project concentrated its technical activity on completing the R&D, advancing the design, and reducing risk in the provisionally allocated U.S. in-kind contributions. In early 2006, the project team worked on cost estimating and management planning in preparation for the U.S. project's second DOE/SC Review which addressed the refined assignments of U.S. scope following the entry of India and technical reassignments aimed at improving the prospects for project success. The U.S. project is working closely with the newly constituted International Team and the other ITER parties to structure the integrated project team to complete preparations for construction and to commence the project itself.

The U.S. fusion community and the U.S. ITER Project Office recognized the importance of engagement of the U.S. physics and technology research communities in ITER. Following extensive discussion, in May, 2005, the DOE Office of Fusion Energy appointed Professor Raymond Fonck of the University of Wisconsin to lead a community organization aimed at the study of burning plasmas. As stated by DOE, "the general mission of the organization is to coordinate and advocate technical work in burning plasma science research, with an emphasis on support of participation in ITER." The combination of the U.S. ITER Project Office and the burning plasma organization is intended to enable the U.S. to participate in the design and construction of ITER as well as conduct research relevant to burning plasmas both in the near term and on ITER.

As such, the U.S. is positioned to address its goal of studying the science and technology of burning plasmas by international

participation in ITER. The ITER project is not only an experiment in high-temperature plasmas, but also an experiment in international partnership, addressing a global question by global collaboration in a large-scale program. The ITER partnership will test the capabilities of a global partnership in which all the international parties are jointly responsible for the project's success. Such assessments of large-scale scientific collaboration may well be important in suggesting directions for future research in big science.



Chateau de Cadarache



FIP Travel Grant Award Program Report

U. van Kolck, Department of Physics, University of Arizona, Tucson, USA and

C.M. Maekawa, Departamento de Fisica, Fundacao Universidade do Rio Grande, Brazil

Nuclear Time-Reversal Violation in Effective Field Theory

Thanks to the support provided by a FIP Travel Grant, Claudio Maekawa visited Bira van Kolck at the University of Arizona for a month in September 2005. He also presented a talk at the Fall meeting of the Division of Nuclear Physics and a paper is in preparation. His visit re-ignited our collaboration on fundamental symmetries within nuclear effective field theory.

We have started work on two aspects of time-reversal (T) violation. The first, is a calculation of the nucleon electric dipole form factor (EDFF) from the QCD q term in sub-leading order in chiral perturbation theory. This is the lowest order where the nucleon EDFF has a non-vanishing isoscalar component, which is an important contribution to the deuteron electric dipole moment (EDM). We have already computed this component, and are finalizing the calculation of the isovector part.

The second problem we have attacked is another important contribution to the deuteron EDM: T-violating nuclear forces. We are in the process of computing the less trivial of these interactions, the two-pion-exchange force.

We now plan to continue collaborating on other topics in hadronic/nuclear T violation, such as effects from other sources of T violation at the quark level.



A Visit to Xu Liangying, a Chinese Dissident

By an APS member

1989 was a year of hopes and disappointments. That year, we watched the announcement of cold fusion on TV and witnessed its meltdown; we watched the peaceful demonstration of Chinese students in Tiananmen Square and learned about their massacre by tanks and army on June 4. After the crackdown, the Chinese government rounded up many “suspects” and sentenced them to long jail sentences. By default the student movement involved science professors and students. (The most prominent physicist who had to hide in the US embassy in Beijing with his wife to avoid the Chinese government dragnet is Prof. Fang Lizhi who is currently in the University of Arizona, Tucson). Many scientists worldwide expressed outrage at the action of the Chinese government and suspended many collaborative projects.

Throughout the nineties, the APS committee on the freedom of scientists (CIFS) made numerous inquiries to the Chinese government on behalf of many scientists who were harassed, arrested or missing. Prof. Xu Liangying, who was in his late sixties at that time, came to our attention. Xu was a highly respected physics historian and translated the three volumes of the “Collective work of Einstein” to Chinese. The translated work was published in 1976.

Even before the protest in Tiananmen Square, Xu wrote about Einstein’s views on human rights and scientists’ social responsibility. He continued to speak out against the Chinese government actions and on behalf of the democracy movement. To intimidate him into silence, he was put under house arrest for more than ten years. The harassment became intense every time he spoke out on human rights issues. Visitors, especially foreigners were prevented from meeting him. In recognition of his work and the work of Professor Ding Zilin who is the founder of the Tiananmen Mother, (her son was killed on Tiananmen Square), the New York Academy of Sciences, awarded both Professors Xu and Ding the 1995 Heinz Pagel Human Rights Prize. However, several attempts by American physicists to deliver the awards failed. Finally in 1997, I was able to visit both Professors Xu and Ding in Beijing and presented them with the awards. Since then, I would visit them when possible. I learned from them the times when the police surveillance would be minimal and how to get to their homes through side streets and side entrances. At very sensitive times, Xu, Ding and their families would be sent outside of Beijing for “vacation”.

I remember vividly that in one of my visits to Prof. Ding Zilin, the situation was very tense. She had packed a suitcase for jail in case the police showed up in the middle of the night. I was completely exhausted just listening to this and stories of the June 4 victims. It is difficult to imagine how Prof. Xu and other dissidents lived through such stress of having policemen loitering outside their apartment and having their neighbors spying on them.

Recently, I went to Beijing again. I am happy to report that Xu and his wife are healthy (as shown in the photo). Without the constant harassment from the government in restricting their daily

activities, they are enjoying his retirement that was long due. They told me that since the Chinese authorities have been so busy cracking down on the Falun Gong members (classified by the Chinese government as an illegal cult) his apartment is very rarely under surveillance. Xu is very enthusiastic about 2005 being named the “World year of Physics” honoring Einstein. A book, “Getting close to Einstein”, co-edited by him was published. There are still some limits to his freedom. He said the central government has ordered that any essays written by him on political issues would not be published, especially in the prominent official newspapers such as People’s Daily.



Xu Liangying and his wife in their home

While the treatment may have improved for Xu and other elderly dissidents, there are still many scientists who are denied the freedom of expressions by the Chinese government. It is no secret that the attention of the Chinese government has turned to the critics who publish on the Internet. Some have been apprehended and jailed after the government obtained information from Yahoo. In 2004, Dr. Jiang Yanyong, a military doctor, who told the TIME reporter about the cover-up of SARS (Severe Acute Respiratory Syndrome) by the government in the summer of 2003, was detained after he wrote an “eye-witness” account about the night of June 3-4, 1989. He was jailed for nearly 50 days before he was released as a result of the outcry from the world communities.

Physicists are forever optimists. As bleak as it may look now with the Iraq war, rise of terrorisms and the Patriot act, we dare to hope that one day, there will be no restrictions on the freedom of any scientists worldwide! After all, at the end of 1989, we did witness the fall of the Berlin Wall.



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Free On-line Journals for Institutions in Sub-Saharan Africa

APS Office of International Affairs

The Committee on International Scientific Affairs (CISA) is pleased to announce that the American Physical Society is now offering free, on-line access to its journals to institutions in sub-Saharan Africa. Beginning in 2006 through 2008, not-for-profit institutions located in eligible countries can gain online access to APS journals. CISA asks the Forum on International Physics to help “spread the word” of this new program to interested colleagues in sub-Saharan Africa.

The APS is offering this access via the International Network for the Availability of Scientific Publications’ (INASP) Programme for the Enhancement of Research Information (PERI). The goal of PERI is to “support capacity building...in developing and transitional countries by strengthening the production, access and dissemination of information and knowledge.” One component of PERI is to provide countrywide access to international research findings. Research communities in developing and transitional countries are able to access scholarly literature in a wide range of disciplines. The APS is just one of a host of publishers that makes its journals available through this program. While the APS has initially begun offering free journal access to countries in sub-Saharan Africa, if this pilot program with PERI proves successful, it is hoped that the APS will be able to expand this offering to other developing regions. For additional information, please visit <<http://www.aps.org/intaff/cisa/peri.cfm>>

Background

The mission of the American Physical Society is “to advance and diffuse the knowledge of physics.” Toward this end, one of the major endeavors of the APS is the publication of some of the world’s leading physics research journals. The Physical Reviews are primary research journals among physicists worldwide. Thus, access to the Society’s journals is vital for many physicists.

For many years, the APS has strived to make its journals available in regions of the world where the cost of the journals is prohibitive. However, many institutions in the developing world that could access electronic information did not take advantage (or did not know how to take advantage) of electronic access to APS journals that were available at reduced, or no, cost. Despite this, the APS knew that physicists around the world were in need of and actively seeking out access to the Society’s journals. APS staff turned to CISA for guidance: there had to be a better way to promote journal access in the developing world.

In February 2005, CISA, led by its then-Chairman Jerry Draayer, sponsored a meeting with other organizations to discuss options for providing access to scientific literature. How do other organizations provide access to their journals in developing countries? What are the successes and barriers to encouraging countries/institutions to participate? Are there other/better models for of-

fering access in certain regions of the world? Several organizations that had faced the same challenge had increased their journal offerings through INASP, which endeavors, in part, to “promote sustainable and equitable access to information...and to strengthen local capacities to manage and use information and knowledge.” INASP’s solid reputation for arranging and facilitating access to information in the developing world ultimately led to the Society’s participation in PERI. (<http://www.inasp.info/peri/index.shtml>)

Gaining Access

1. Access to PERI resources is controlled via Internet Protocol (IP) addresses entered within the institutional administrative system. Thus, interested institutions must be registered with PERI before their users can gain access to APS publications. Registration should be completed by a librarian on behalf of the institution. (It is also possible to make access available for institutions

without an IP range through an institute-specific username and password.)

2. Institutions can learn how to register by visiting the PERI registration web site at <http://www.inasp.info/scgi-bin/peri/peri.pl>. (Choose to browse by country, select appropriate country, select desired resource, and then follow the remaining instructions.) There are “Help Documents” available on this site that explain the registration process in full.

3. Individual researchers should contact their librarian or PERI Country Coordinator (<http://www.inasp.info/peri/countries.shtml>) to determine whether their institution is registered.

Once registered, institutions will have access to the following APS publications:

Physical Review: A-E, Focus, Letters, Online Archive (PROLA), Special Topics (Accelerators and Beams, Physics Education Research), Reviews of Modern Physics.

Eligibility

Countries are selected for participation in PERI based on their Gross Domestic Product (GDP) and/or the Human Development Index (HDI). Individual publishers then determine to which countries they will offer their products. Access is made available to not-for-profit institutions in those countries.

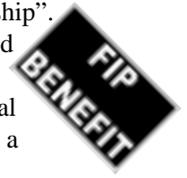
The following countries are eligible to receive free on-line access to APS journals: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Brazzaville), Republic of the Congo (Kinshasa), Democratic Rep. of the Côte d’Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

“For many years, the APS has strived to make its journals available in regions of the world where the cost of the journals is prohibitive.”



News from the Membership

We are starting a new feature on the FIP Website and in the FIP Newsletter called "News from the FIP Membership". Please send us brief news items (less than 50 words) about events of personal importance to FIP members involved with our community. For example, given the sizeable number of graduate student members in FIP, a short note on obtaining a PhD would be appropriate, as would be a promotion or a personal achievement outside the professional area, in particular if of an unusual nature. So don't delay sending in news on FIP members, be it about a colleague, a student, a friend or you. Feel free to include a small photo.



Gyongyi Baksay, Editor, FIP Webpage and Laszlo Baksay, Editor, FIP Newsletter



Anita Mehta of the S.N. Bose National Centre, India and member-at-large of the FIP Executive Committee was awarded a Radcliffe Institute Fellowship. These Fellowships are designed to support scholars, scientists, artists, and writers of exceptional promise and demonstrated accomplishments. About fifty Fellows are chosen from all over the world to spend a year at

Harvard. (<http://www.radcliffe.edu/fellowships>)



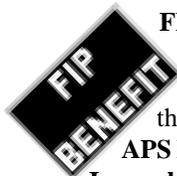
Manuel Cardona of the Max-Planck Institute of solid state research in Stuttgart, Germany, Fellow of the APS and FIP member, has been awarded an honorary doctorate from the University de la Laguna, Teneriffa, Spain. He has more than one thousand publications and has received numerous international prizes and honorary doctorates from universities in several countries.



David Ernst of Vanderbilt and Fisk Universities and FIP APS Councillor has been appointed Fellow of the Southeastern Universities Research Association (SURA) and Director of the SURA Minority Serving Institutions Program. He will be the lead in developing regional and national programs designed to increase the number of minority students in physics, astronomy, and related areas.



Gyöngyi Baksay of the Florida Institute of Technology, Melbourne and FIP Web Editor obtained her PhD in experimental high-energy physics, summa cum laude. Her thesis was the measurement of the hadronic photon structure function F_2^g with the L3 detector at LEP/CERN. L3 is a worldwide international collaboration lead by Nobel Laureate Samuel Ting.



FIP Travel Grants provide partial travel support for a physicist working in the U.S. who is a member of the American Physical Society to give a presentation at an international conference.

Wheatly Award honors and recognizes the dedication of physicists who have made outstanding contributions to the development of physics in countries of the third world, by working with local physicists in research or teaching.

APS Fellowship nominations can be made through FIP.

Journal/Book Exchange allows for the donation of books and journals to other countries.

Membership in 2 Fora comes free with APS membership but you have to sign up. Express your interest in international issues by **checking the FIP box** with your APS renewal.

To **join FIP** at any other time, sign up on the APS website <http://www.aps.org/memb/unitapp.cfm>



Photo: Herman Winnick

The APS is an international physics society : over 20% of the membership lives outside the U.S.

Speakers at the FIP Session on
"Scientists from Developing Countries: is there an effective way to support meaningful research ?"
at the March 2006 APS Meeting in Baltimore

From left to right:

Katepalli Sreenivasan, ICTP Trieste, Italy

Bernard M'Passi-Mabiala, Universite Marien NGouabi, Congo

Gary Steigman, Ohio State U.

Zohra Ben Lakhdar, U. of Tunis, Tunisia

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