Fusion Power Report

Complete Coverage Of Worldwide Fusion Developments

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SLANTS & TRENDS

President Bush has signed the U. S. Energy Policy Act of 2005. U. S. participation in ITER authorized subject to certain conditions.

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European Scientists urge construction of new fast ignition laser facility for inertial fusion energy and high energy density science research

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The U. S. Senate has adopted an FY 2006 appropriations bill for the Department of Energy that includes funding for fusion. The Senate bill provides $290.6 M for the DOE Office of Fusion Energy Sciences (OFES), compared to $296.2 M provided in the House bill and $290.6 M requested by the President. For inertial confinement fusion, within DOE's National Nuclear Security Administration (NNSA) the Senate bill provides only $314 M, compared to $541 M provided by the House and $460 M requested by the President.

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An upgrade of the neutral beam system on the Joint European Torus (JET) in the UK, planned for installation in 2008, will deliver 35 MW of power for up to 20 seconds, compared to the 22 MW for 10 seconds currently available.

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Fusion in the Energy Policy Act

House-Senate Conferees approved the text of the U. S. Energy Policy Act of 2005 on July 27 and the House of Representatives passed the bill on July 28. The Senate is passed the bill on July 29 and the President signed it into law.

Included in the Act is a section on The Fusion Energy Sciences Program. The Act states, "It shall be the policy of the United States to conduct research, development, demonstration, and commercial applications to provide for the scientific, engineering, and commercial infrastructure necessary to ensure that the United States is competitive with other countries in providing fusion energy for its own needs and the needs of other countries, including by demonstrating electric power or hydrogen production for the United States energy grid using fusion energy at the earliest date."

The Act calls upon the Secretary of Energy to submit a plan within 180 days that ensures, among other things, that "existing fusion research facilities are more fully used" and that "inertial confinement fusion facilities are used to the extent practicable for the purpose of inertial fusion energy research and development," and that "attractive alternative inertial and magnetic fusion energy approaches are more fully explored."

The Act authorizes the Secretary of Energy to "negotiate an agreement for United States participation in ITER" but specifies that "no federal funds shall be expended for the construction of ITER until the Secretary has submitted to Congress ... a report describing how United States participation in the ITER will be funded without reducing funding for other programs in the Office of Science (including other fusion programs), and 60 days have elapsed since that submission."

The Act says that "fusion science, technology, theory, advanced computation, modeling, and simulation" should be strengthened and that "new magnetic and inertial fusion research and development facilities (should be) selected based on scientific innovation and cost effectiveness, and the potential of the facilities to advance the goal of practical fusion energy at the earliest date practicable." It says the "facilities that are selected (should be) funded at a cost-effective rate."

The Act specifies that the Secretary of Energy should ensure that "communication of scientific results and methods between the fusion energy sciences community and the broader scientific communities is improved." It says that "to the extent practicable, the recommendations of the Fusion Energy Sciences Advisory Committee in the report on workforce planning, dated March 2004 (should be) carried out, including periodic reassessment of program needs."

The Act says "The plan shall also address the status of and, to the extent practicable, costs and schedules for (A) the design and implementation of international or national facilities for the testing of fusion materials; and (B) the design and implementation of international or national facilities for the testing and development of key fusion technologies."

The Act specifies that "Any agreement for United States participation in ITER shall, at a minimum (i) clearly define the United States financial contribution to construction and operating costs, as well as any other costs associated with a project; (ii) ensure that the share of high-technology components of the ITER manufactured in the United States is at least proportionate to the United States financial contribution to the ITER; (iii) ensure that the United States will not be financially responsible for cost overruns in components manufactured in other ITER participating countries; (iv) guarantee the United States full access to all data generated by the ITER; (v) enable United States researchers to propose and carry out an equitable share of experiments at the ITER; (vi) provide the United States with a role in all collective decisionmaking related to ITER; and (vii) describe the process for discontinuing or decommissioning the ITER and any United States role in that process."

The Act says "The Secretary (of Energy), in consultation with the Fusion Energy Sciences Advisory Committee, shall develop a plan for the participation of United States scientists in the ITER that shall include (i) the United States research agenda for the ITER; (ii) methods to evaluate whether the ITER is promoting progress toward making fusion a reliable and affordable source of power; and (iii) a description of how work at ITER will relate to other elements of the United States fusion program."

Interest in Inertial Fusion Rising

International interest in applying the inertial fusion for energy applications is rising. A new facility, FIREX (Fast Ignition Realization Experiment) is under construction at Osaka University in Japan and recently a panel of laser physicists from seven European countries, chaired by Prof. Henry Hutchinson of Rutherford Appleton Lab (H. Hutchinson@rl.ac.uk), has put forth a proposal that Europe build a 735 million euro facility (called HIPER) to achieve high energy gains using fast ignition in combination with laser compression of fusion fuel pellets. The proposed facility would consist of a long-pulse (ns) 200kJ laser to compress the pellet and a short-pulse (ps) 70kJ laser to ignite the fuel.

Fast ignition was first proposed by Max Tabak and others at LLNL. Aspects of it were demonstrated experimentally at the Gekko XII laser at Osaka University by R Kodama and colleagues in 2001. Experiments and simulations are also underway or planned in the U.S. at several sites. Fast ignition is of interest to inertial fusion physicists because it holds the potential for reducing symmetry requirements on pellet compression and predicted higher energy gain.

Rising interest in inertial fusion is also due, in part, to the nearing completion of construction and beginning of operation of the LMJ laser in France and the National Ignition Facility (NIF) in the U. S. The NIF project recently announced operation of the second set of four beams, producing 137 kJ (compared to a design goal of 125 kJ). When fully operational, NIF will have 192 beams producing 1.8 MJ. Ignition experiments are set to begin in 2010.

Fossil Fuels Lead Energy Growth

According to the Energy Information Administration (EIA), total U. S. energy consumption grew nearly 2% in 2004, to 100.3 quadrillion Btu. Petroleum and natural gas supplied most of the increase, the EIA reported. The use of so-called "renewable" energy sources grew by less than 1% in total, despite robust growth in the use of wind energy and ethanol. Renewable-generated electricity actually fell 1%, even with a 27% increase in wind power. If hydropower is excluded, renewable power provides 2% of U.S. electricity needs, the EIA reported. Wind power accounts for 0.36% of the electricity mix.

Of the total 100 Quadrillion Btu, petroleum contributed 40%, natural gas and coal each provided 23%, nuclear energy contributed 8% hydroelectric and biomass each provided about 2.76%, geothermal contributed about 0.36%, wind provided about 0.12% and solar provided about 0.06%

The EIA report, "Renewable Energy Trends 2004," is available at
http://www.eia.doe.gov.

Senate Fusion Appropriations

The Senate has adopted an FY 2006 appropriations bill for the Department of Energy that includes funding for fusion. Differences with a House-passed appropriations bill must be ironed out in a conference.

The Senate bill provides $290.6 M for the DOE Office of Fusion Energy Sciences (OFES), compared to $296.2 M provided in the House bill and $290.6 M requested by the President. For inertial confinement fusion, within DOE's National Nuclear Security Administration (NNSA) the Senate bill provides only $314 M, compared to $541 M provided by the House and $460 M requested by the President.

With respect to the OFES allocation, the Senate report says it has reduced ITER funding by $28 M (from the requested level of $55.5 M) and directs that same amount to be spent on domestic fusion research "to ensure full operations on the DIII-D, Alcator C-Mod and NSTX fusion research facilities."

With respect to the NNSA inertial confinement fusion program, the Senate report says that it has provided no funds for continued NIF construction (hence the $146 M reduction from the President's request). However, within the $314 M appropriated, the Senate report calls for a considerably different programmatic distribution than requested. For example, the Senate bill restores funding for inertial fusion energy efforts that Congress has supported in the past and for which the NNSA has once again not requested funding and directs that more funds than requested be provided for the Omega laser program at the University of Rochester and the Z-machine at Sandia National Laborato-

ries. The Senate also directs that more money be spent on petawatt lasers than requested.

The Senate also adopted an amendment offered by Senator Domenici (R-NM) calling for a review of the U. S. fusion program by the General Accountability Office (GAO) and stating, "The GAO shall consider any other magnetic fusion confinement system as a possible fusion demonstration facility that will follow ITER and, given the NNSA investment in the physics of inertial confinement fusion, the GAO shall evaluate the opportunities for the Office of Science to develop the appropriate science and technology to leverage the NNSA investments as an alternative to the tokamak concept."

US ITER Project Announcement

With the announcement in July of the ITER site in Europe and US participation in ITER, the US ITER Project Office (USIPO) is moving forward with establishing its team for management, R&D, design and engineering oversight.

The USIPO is planning to fill a number of critically needed positions in the organization that will result in building the strongest possible team to make the US ITER Project a success. This expansion is to provide the top-level management and some of the technical support teams necessary to perform R&D and design of the various hardware systems and subsystems presently identified as the US contributions to ITER.

The USIPO has a new link on its web site, which contains a Request for Expressions of Interest (RFEI) that seeks to gather information on interested performers for these roles. Also included is an overview of the US contributions to ITER hardware systems and information on the specific positions that are available in the USIPO organization. There will also be a general announcement in FedBizOps to identify this RFEI and enable and encourage participation from all interested organizations.

Additional information is on the US ITER Project Office public web site at http://www.iter-us.org where individuals and organizations can identify areas of interest and submit expressions of interest using the web input form.

Leaders Comment on ITER Siting

French President Chirac, accompanied by French Minister for Education and Research G. de Robien, visited Caderache, the site designated for ITER construction on June 30. Chirac said of ITER, “This project is essential for our future and the future of the planet.”

Speaking from Moscow, following the June 28 announcement that ITER would be sited in France, EU Commissioner for Science and Research Janez Potocnik said, “As a project of unprecedented complexity spanning more than a generation, ITER marks a major step forward in international science cooperation.”

EU Industries Mobilize for ITER

EU officials met with representatives of European industries June 1-2 in a two-day workshop in Madrid “to promote the interaction between the Associations and industry, which will be crucial to ensure transfer of essential know-how during the period of ITER construction and beyond.” Of the 120 participants, 50 were from the Associations and 70 were from industry.

JET Upgrade Planned

An upgrade of the neutral beam system on the Joint European Torus (JET) in the UK, planned for installation in 2008, will deliver 35 MW of power for up to 20 seconds, compared to the 22 MW for 10 seconds currently available. The system can also be used to provide about 18 MW for 40 seconds.The upgrade will allow scientists to study ITER optimization scenarios, such as ELMy H-Mode, Improved H-Mode and other advanced operating regimes. In particular, the improved facility should contribute to the demonstration of high density scenarios compatible with a metallic wall as foreseen in ITER by including installation of a metal wall in JET.

The neutral beam power will be increased primarily by changing the magnetic configuration of the ion sources. Other changes include replacement of eight of the existing 80kV/60A power supplies with 130kV/130A units.

July Stellarator News Available

The July issue of the Stellarator News is now available on the web. at
http://www.ornl.gov/sci/fed/stelnews/sn99.pdf

The components of the Wendelstein 7-X electron cyclotron resonance heating beamlines have been tested using a new gyrotron from CPI (USA). Although the system was not fully optimized for this tube, 0.9 MW was transmitted for 30 min. All measured parameters, in particular the gas pressure in the tube, the temperature in the collector wall, and the temperature of the most loaded mirrors, became stationary; the longest measured time to achieve this state is about 5 min. The quasi-optical multibeam waveguide system demonstrated its favorable transmission characteristics and the most loaded components showed an excellent performance under full-power CW conditions. 1

The Columbia Non-neutral Torus (CNT), a stellarator designed to study non-neutral plasmas and the effects of strong ExB drifts on confinement, has started its first campaign to create pure electron plasmas. Good confinement of significant amounts of electrons has been achieved, and it appears that the toroidal electron cloud satisfies the plasma criterion.

For further information or to receive notices, contact:

James A. Rome
E-mail: jar@ornl.gov
URL: http://www.ornl.gov/~jar

DOE Small Business Grants

The U. S. Department of Energy will soon begin accepting Phase I grant applications from qualified small businesses for the upcoming FY 2006 Small Business Innovation Research (SBIR) and Small Business Technology Transfer
(STTR) Program.

A detailed Funding Opportunity Announcement, Opportunity Number DE-FG01-05ER05-28, describing research areas in which applications are sought will be available beginning September 21, 2005, at http://e-center.doe.gov <http://e-center.doe.gov/> . Small businesses with strong research capabilities in science or engineering in any of the research areas sought are encouraged to apply. The deadline for submission of grant applications is December 2, 2005, at 8:00 p.m. EST. Applications will only be accepted electronically.

Successful applicants (approximately 260 for SBIR and 30 for STTR) may receive up to $100,000 for a Phase I grant for a period of about nine months to develop the feasibility of the idea. Phase I awardees may apply for Phase II funding up to $750,000 for those ideas with the highest potential to meet program objectives. For more information pertaining to the programs including a list of the research areas, go to www.science.doe.gov/sbir or call 301-903-1414. DOE IS NOT ACCEPTING APPLICATIONS UNTIL SEPTEMBER 21. APPLICATIONS RECEIVED PRIOR TO THE OPENING DATE WILL NOT BE REVIEWED.

In order to apply, you MUST have a Dunn and Bradstreet Universal Number (DUNS) and be registered in the Central Contractor Registry (CCR). A DUNS number is free by calling 1-866-705-5711 A DUNS number is required to register with CCR. Call 1-888-227-2423 to register in CCR.

For further information contact:

DOE SBIR/STTR Program Staff
SC-21.2/GTN
Office of Science
U. S. Department of Energy
Washington, DC 20585
301-903-1414
301-903-5488 (Fax)

NNSA to Support Research -- In Libya

In an August 24 press release, the U. S. Department of Energy's National Nuclear Security Administration (NNSA) announced it had signed an agreement with Libya's National Bureau of Research and Development to conduct "joint activities" on nuclear research reactor applications, including nuclear medicine and "other applied scientific endeavors." The announcement said the agreement "demonstrates the commitment of the United States and Libya to the peaceful uses of nuclear energy ...."

The NNSA has steadfastly refused to request funds from Congress to conduct research in the U. S. on inertial fusion for civilian energy applications,

saying it is not within their mission. For several years, however, the Congress has steadfastly added funds to the NNSA budget for this purpose.

NNSA states "The arrangement is a result of ongoing collaboration involving the United States, the United Kingdom, and Libya, following Libya's historic decision to dismantle its weapons of mass destruction programs." U. S. laboratories currently involved are Lawrence Livermore National Laboratory, Los Alamos National Laboratory and Oak Ridge National Laboratory.

The press release can be accessed at http://www.nnsa.doe.gov

Burning Plasma Workshop

A U.S. Burning Plasma Workshop will be held December 7-9, 2005 at the Oak Ridge National Laboratory, Oak Ridge, Tennessee.

This meeting will be one in a series to facilitate community discussion among working scientists with the aim of delineating and prioritizing the issues and approaches for burning plasma science and technology research in the U.S., both during the ITER construction phase and after operations commence.

Topics will include:

. Burning Plasma activities since Snowmass 2002
. Status and plans for ITER (domestic and international)
. Planning U.S. Burning Plasma research activities in general, and for ITER specifically

The meeting will consist of invited plenary overview presentations, and contributed sessions in which members of the community will present ideas and plans for burning plasma research. The sessions will be organized by topic, with interest groups formed around each topic. Summaries of topical group discussions will be reported at the meeting and distributed to the community.

Further information on the Agenda, meeting format, abstract submission, travel information, registration, and local arrangements will be posted at the Workshop web site:
http://www.burningplasma.org/WS_05.htm

FPA Leadership and Distinguished Career Awards

Fusion Power Associates Board of Directors announces the recipients of the FPA 2005 Leadership and Distinguished Career Awards.

The Board has selected Ronald D. Stambaugh (General Atomics) to receive the FPA 2005 Leadership Award. FPA Leadership Awards have been given since 1980 to recognize individuals who have shown outstanding leadership qualities in accelerating the development of fusion.

In selecting Ron, the Board recognizes his outstanding leadership of the DIII-D tokamak program at General Atomics over many years, resulting in many important scientific contributions to the fusion venture, and his focus on finding ways to improve the ultimate fusion product, an economic fusion power plant.

The Board has selected Charles C. Baker (UCSD) and Dale M. Meade (PPPL) as recipients of the FPA 2005 Distinguished Career Awards. These awards have been given since 1987 to individuals who have made distinguished, lifelong career contributions to fusion development.

In selecting Baker, the Board recognizes his decades of outstanding contributions to the fusion effort, including but not limited to his roles in leading the fusion technology program and his inspirational leadership of several important planning and FE-SAC panel activities.

In selecting Meade, the Board recognizes his decades of outstanding contributions to the fusion effort, including but not limited to his roles in leading the TFTR and Next Step Options programs and his inspirational guidance in the search for an affordable path to fusion power.

The awards will be presented at Fusion Power Associates annual meeting and symposium, October 11-12 in Washington, DC. Names of previous recipients are posted at http;//fusionpower.org

Stambaugh can be reached at
stambaugh@gav.gat.com
Baker can be reached at cbaker@vlt.ucsd.edu
Meade can be reached at dmeade@pppl.gov

Morley Noted for Excellence in Fusion Engineering

The Fusion Power Associates Board of Directors has selected Dr. Neil Morley of UCLA to receive its 2005 Excellence in Fusion Engineering Award. These Awards, in memory of Prof. David J. Rose of MIT, have been presented since 1987 to individuals in the early part of their careers (maximum age 42) who have shown both technical accomplishment and potential for becoming exceptionally influential leaders in the fusion field.

In selecting Dr. Morley, the Board recognizes his outstanding technical contributions to fusion development in areas such as high heat flux components, liquid walls and MHD fluid flow and heat transfer. The Board also recognizes his leadership qualities in such areas as the US program for the ITER Test Blanket Module and the liquid surface divertor module on the NSTX facility at the Princeton Plasma Physics Laboratory.

Dr. Morley received his Ph.D. from UCLA in 1994 in Nuclear Engineering. He has since become a recognized expert in the fields of high heat flux components, liquid walls and MHD fluid flow and heat transfer. For the past two years he has played a major role in establishing the US program for the ITER Test Blanket Module and has been responsible for the liquid surface divertor module on NSTX at PPPL. He presented an invited paper summarizing all the the US technology programs at the ISFNT-7 conference in Tokyo in June 2005.

A list of previous recipients is posted on the FPA web site, http://fusionpower.org

The Award will be presented at the FPA Annual Meeting and Symposium in Washington, DC on October 11. Details of that meeting are also posted on the FPA web site.

Mike Roberts to be Honored

Fusion Power Associates Board of Directors will honor Dr. Michael Roberts of the US Department of Energy Office of Fusion Energy Sciences with a Special Award for the Advancement of Fusion Power. FPA Special Awards have been given periodically since 1980 to recognize individuals who have made some special contribution to the cause of fusion power development.

Roberts will be honored for his "tireless efforts over the past two decades to make ITER a reality." He will also be recognized for his "early efforts to promote the construction of the first U.S. DT-burning tokamak, that led ultimately to the construction of TFTR, and his continuing devotion to international collaborations and to the technology and facilities needed to make fusion power a reality."

The award will be presented at Fusion Power Associates Annual Meeting and Symposium, October 11-12 at the Capitol Hill Club in Washington, DC. The presentation will be in the morning of October 11.

Previous recipients of Fusion Power Associates Special Awards are posted at http://fusionpower.org

Ed Moses Named LLNL Associate Director

Edward Moses, an engineer and physicist with an extensive background in laser science, technology development, systems engineering and program management has been named Associate Director for Lawrence Livermore National Laboratory's National Ignition Facility (NIF) Programs Directorate.

The appointment was made by LLNL Director Michael Anastasio and confirmed by the University of California and by the National Nuclear Security Administration. Moses, who has worked at the Lab for 20 years, has been Acting Associate Director since May, and NIF Project Manager since 1999.

Moses replaces George Miller, who was named Associate Director-At-Large earlier this year. Moses' appointment became effective July 1. He will be responsible for an organization with nearly 850 employees and a combined annual budget of $385 million.

"Ed has expertly guided NIF forward to its current position as the world's largest operating laser system. NIF is a project of tremendous scale and complexity," said Anastasio. "Ed's leadership as NIF project manager has demonstrated his strong scientific and organizational capabilities, as well as his ability to manage and inspire a safe and diverse

workforce. I am confident NIF will continue to achieve its scientific and national security goals."

In his new role, Moses will be responsible for completing construction and activation of NIF and transforming it into a national user facility. This includes fostering the development of advanced diagnostics and laser technologies for national security, competitiveness and energy needs. He will lead the National Ignition Campaign to achieve fusion ignition, fulfilling the Inertial Confinement Fusion Program's role as a vital and integral part of the overall Stockpile Stewardship Program.

The project is a collaboration between government, industry, academia, and a multitude of partners throughout the nation and the world.

"I am honored to lead the NIF team," said Moses. "We have already come a long way toward achieving our goals of creating the world's largest laser system. I'm proud of what we've done so far, meeting all of our goals and milestones for the last five years. I am especially proud of our outstanding safety record of more than four million hours without a lost workday. We still have significant challenges ahead, but our team has shown its ability to overcome obstacles in building one of the world's most important scientific tools for the 21st century. The promise of NIF cannot be overstated in terms of keeping our strategic defenses safe and effective, in guiding our nation toward the goal of the potential for fusion energy, and in exploring physics at extreme conditions. I look forward to the completion of our project in the coming decade, and the beginning of a new era in applications of this technology for our nation's needs."

In addition to his NIF management experience, Moses served as Assistant Associate Director for Program Development in the Physics and Space Technology Directorate from 1995 to 1998. One of his most interesting efforts was leading a program called Peregrine that developed more accurate ways to treat cancer with radiation. He led the Isotope Separation and Material Processing program and served as Deputy Associate Director for Lasers from 1987 to 1990, with several other previous assignments in the Laser Directorate. During a five-year leave from 1990 to 1995 from the Lab, he was Executive Vice President for Advanced Technology Applications. His career as a laser scientist began at Hughes Aircraft Company in 1977.

Moses holds seven patents in laser technology and computational physics. He has received the National Nuclear Safety Administration Defense Programs Award of Excellence for Significant Contribution to the Stockpile Stewardship Program, the D.S. Rozhdestvensky Medal for Outstanding Contributions to Lasers and Optical Sciences, as well as numerous awards for outstanding achievements in project and construction safety. He has B.S. and Ph.D. degrees in Electrical Engineering from Cornell University.

Ed is a member of Fusion Power Associates Board of Directors. He can be reached at moses1@llnl.gov

Ed Synakowski Named LLNL Fusion Energy Head

The Lawrence Livermore National Laboratory (LLNL) has announced that Dr. Edmund Synakowski from Princeton Plasma Physics Laboratory (PPPL) has accepted the position of Fusion Energy Program Leader in Physics and Advanced Technologies.

Ed is currently the Research Director of PPPL's National Spherical Torus Experiment. His leadership roles in the national fusion program have included chairmanship of the U.S. Fusion Transport Task Force (TTF) and U.S. co-leadership of the International Tokamak Physics Activity (ITPA) Internal Transport Barrier group. Ed received his Ph.D. from the University of Texas in 1988 and was named a fellow of APS in 2000.

His start date at the Lab is still being finalized in order to ensure a smooth transition to his new duties. Don Correll will continue his acting role until Ed is available to begin serving as the new FEP Leader. The announcement was made by William H. Goldstein, Associate Director, Physics and Advanced Technologies, LLNL.

In Memoriam: Dieter Sigmar

Dr. Dieter J. Sigmar, a man who devoted his life to fusion and his family, died on July 31 st, 2005 after a long and courageous battle with multiple sclerosis. During his long and productive career he played a key role in the U. S. domestic and international magnetic fusion energy and plasma science programs.

While at MIT he helped develop and maintain a superb theory program, that has made many outstanding contributions to magnetic fusion energy research, and enhanced the visibility of the Plasma Science and Fusion Center (PSFC) and its Alcator C-Mod experimental program in the world fusion community. During his years at MIT and Oak Ridge National Laboratory, Dr. Sigmar made important contributions to the understanding of collisional transport in tokamaks and the behavior of alpha particles in fusing plasmas, and played a leadership role in the development of an edge and divertor physics program in the U. S. fusion effort.

Dr. Sigmar retired from MIT in 2001 because of ill health. Upon his retirement, the Department of Energy recognized Dr. Sigmar's efforts on behalf of magnetic fusion by presenting him with a Distinguished Associate Award. The citation read as follows. "For your contributions to our understanding of plasma confinement, the physics of burning plasmas, and the role of the plasma edge, and your untiring efforts which have enhanced the standing of the MIT Plasma Science and Fusion Center as a major intellectual center for plasma physics research. Your commitment to international fusion collaboration and stimulation of theory programs around the world has been critical to our progress in fusion science research."

Dr. Sigmar received his PhD in 1965 from the Technical University of Vienna and came to MIT as a postdoctoral fellow in the Physics Department working with Professor Bruno Coppi and stayed on as a Associate Professor in the Nuclear Engineering Department until 1976. For the next eleven years he worked at the Oak Ridge National Laboratory where he became the Associate Head of Theory. He returned to MIT in 1985 where at various times served as Head of Theory, Acting Director, and Deputy Director of the PSFC while maintaining his ties to the Nuclear Engineering Department. His distinguished service to MIT spanned twenty years altogether.During his first stay MIT Dr. Sigmar did seminal work on collisional transport in tokamaks, including a classic review article with Dr. Steven Hirshman on the role of impurities. Collisional transport remained an interest, even during retirement, and is the subject of a superb textbook he co-authored with Dr. Per Helander. While at ORNL and then as Theory Head at the PSFC he pursued his interest in the role of alpha particles in burning tokamak plasmas. He energized the national and international fusion communities to focus their attention on stability and transport issues associated with fast particles, and to develop techniques to observe alpha particle related phenomena in present experiments. While Acting Director of the PSFC he realized that the U.S. edge physics program needed strengthening because of the increasingly important role of the edge region and the need for a divertor at the edge of a tokamak reactor to handle the heat load. He responded by establishing a divertor physics program at the PSFC and was then elected as Head of the U.S. Divertor Task Force. His work and the work of other members of the Task Force provided many new insights into our present understanding of divertor operation and developed important capabilities in the numerical modeling of divertors. Both the alpha particle and divertor research efforts at the PSFC led to productive collaborations with the international fusion communities. These research endeavors are now considered crucial aspects of the current U.S. and world fusion programs as they head towards their goal of building the International Thermonuclear Experimental Reactor (ITER).

Dr. Sigmar was made a Fellow of the American Physical Society in 1979. He was also a member of the American Nuclear Society and the Austrian Physical Society. He was appointed A. O. Professor of Plasma Physics at the Technical University of Vienna in 1981 and in 1996 was elected a Corresponding Member of the Austrian Academy of Science. He established theory exchanges between MIT and Chalmers University of Technology in Sweden and the Culham Laboratory in England and fostered U.S. collaboration with Russian and Japanese scientists. As a result of his pioneering work on alpha particle theory, he served on the Tokamak Fusion Test Reactor Deuterium-Tritium Program Advisory Committee and was a co-organizer of an international alpha particle workshop. He served on many other DOE committees including the Theory Coordinating Committee and the U. S. ITER Steering Committee, was a member of the Board of Editors for the plasma physics journals Nuclear Fusion (10 years) and Physics of Fluids (4 years), and helped organize several other national and international meetings. Dieter will be greatly missed by his many friends and colleagues.

Expressions of sympathy may be sent to his wife, Lisl at 21921 Mockingbird Street, Lago Vista, TX 78645 USA

Calendar

Sep 4-9 Fourth International Conference on Inertial Fusion Sciences and Applications. Biarritz, France. http://www.celila.u-bordeaux1.fr/ifsa05/

Sep 5-8 Euromat2005: Materials Processing, Properties and Applications. Biarritz, France. http://www.celia.u-bordeaux1.fr/ifsa05/

Sep 5-16 Carolus Magnus Summer School on Plasma and Fusion Physics. Mechelen, The Netherlands. http://www.carolusmagnus.net

Sep 5-30 Autumn College on Plasma Physics: Collective Processes. Trieste, Italy. http://www.ictp.it

Sep 19-24 3rd International Conference on Superstrong Fields in Plasmas. Varenna, Italy. http://www.ispp.it

Sep 26-29 21st IEEE/NPSS Symposium on Fusion Engineering (SOFE2005). Knoxville, Tennessee. http://www.ornl.gov/fed/sofe05

Sep 26-28 11th European Fusion Theory Conference. Aiz-en-Provence. France. http://www/fusion.magnetique.cea.fr/eftc11/index.html

Sep 26-29 12th International Symposium on Laser-aided Plasma Diagnostics. Snowbird Resort, Utah. http://tempest.das.ucdavis.edu/conf/Snowbird/LAPD12/LAPD2005index.html

Sep 26-30 5th International Symposium on Applied Science. Hilo Hawaiian Hotel, Hawaii. Contact: kobayasi@jwri.osaka-u.ac.jp

Sep 28-30 10th IAEA Technical Meeteing on H-Mode Physics and Transport Barriers. St. Petersburg, Russia. http://www.ioffe.ru/H-mode_WS-2005/

October 3-11 15th International Stellarator Workshop and IAEA Technical Workshop on Innovative Concepts and Theory of Stellarators. http://www-fusion.ciemat.es/sw2005

October 10-11 International Workshop on Experimental Performance of KTM Tokamak and Research Program. Astan, Kazakhstan. Contact: tanya@ntsc.kz

October 11-12 Fusion Power Associates Annual Meeting and Symposium: Fusion and Energy Policy. Washington, DC. http://fusionpower.org

Oct 16-19 10th International Workshop on Plasma Edge Theory in Fusion Devices. Julich, Germany. http://www.fz-jeulich.de/pet

Oct 24-28 47th APS Division of Plasma Physics Meeting. Denver, Colorado. http://www.aps.org/meet/DPP05

Nov 3-7 Workshop on Cheap Plasma Technology in Industry, Environment and Medicine. Cairo, Egypt. Contact: abdougaramoon@hotmail.com

Nov 8-14 Course on Global and Local Control of Tokamak Plasma. Erice, Italy. Contact; sansovini@frascati.enea.it

Nov 30 – Dec 2 !6th Meeting on Research Using Small Fusion Devices. Mexico City, Mexico. http://www-naweb.iaes.org/napc/physics/PS/rsfd.htm