the
abdus salam
international centre for theoretical physics

1964
40th anniversary
2004

NEWS from ICTP

2 WHAT'S NEW
Dot Dash Digital

3 COMMENTARY
Two Anniversaries

4 FEATURES
Step by Step

ICTP in the 1960s

8 DATELINE
In Africa
IAC Report
Goddard to Princeton

10 ACTIVITIES
January-March 2004

12 MONITOR
Science Consortium
God's Cards
In Memoriam

14 PROFILE
Pervez Hoodbhoy

15 WHAT'S NEXT
Conferences, Schools, Workshops

SPRING
2004

#108

ICTP and ITU have forged a partnership to advance the frontiers of the telecommunication revolution in developing countries.

Dot Dash Digital

Fatima, a 30-year-old Nigerian woman, sits beneath a cloth canopy that screens both her and her merchandise from the blistering sun. The stand has been her place of business for more than a decade.

Sales have been good for the past several days and her stock of brightly coloured napkins, scarves and table cloths is running low. So she takes her cell phone from her handbag and places a call to her supplier. Within an hour, he delivers her order. Customers, meanwhile, have continued to come and go.

Just last year, if Fatima needed to restock her merchandise, she would have been forced to close her stall and walk to her supplier, placing her order in person. Two hours of work would be lost. That would mean fewer sales and less money to take home.

When you're living on US$3 dollars a day, every sale counts and, with her cell phone in hand, Fatima has now been able to make more sales and earn more money, more often.

Hamadoun I. Touré, director of the International Telecommunication Union's (ITU) Bureau of Development, likes to tell this story when describing how new information technologies have transformed the lives of everyday people in the world's poorest nations.

And he has the numbers to back him up. In sub-Saharan Africa alone, mobile phone use has increased 300 percent a year for the past five years—a reflection of the broad appeal of this technology. ITU has sought to advance the use of cell phones and other new information technologies by seeking regulatory reform and encouraging investment from the private sector.

This isn't the first time that Touré's organisation has offered to steer new information technologies in the right direction. Indeed the venerable 140-year-old institution was created just 20 years after the discovery of the telegraph. At the dawn of the first telecommunications revolution, ITU's goals were twofold: to develop universal standards that would facilitate the use of the new technology and to promote widespread global access to a breakthrough communication tool.

ITU has continued to pursue these goals throughout its history and never more so than in the past two decades. Indeed bridging 'communication divides' has been at the heart of ITU's mandate ever since its inception. In effect, efforts to narrow the 'dot and dash divide' symptomatic of the telegraph era have been replaced by strategies to reduce the 'digital divide' characteristic of our computer age.

With the help of ICTP, Touré now hopes to lend a helping hand to universities in the developing world in their efforts to become full and equal partners in the use of email and the internet. This February, he visited ICTP to sign a 'cooperation agreement' with ICTP's director K.R. Sreenivasan. The agreement calls for the institutions to "collaborate for the advancement of resources and research and develop capabilities in the field of telecommunication science and technology in developing countries."

Touré hopes that "this new partnership will help meld ITU's 'connectivity' capabilities—through its strong ties to governments, private sector telecommunication companies and financial institutions—to ICTP's 'training and research' capabilities."

"ICTP," notes Sandro Radicella, head of the Centre's Aeronomy and Radiopropagation Laboratory (ARPL), "has been conducting extensive training activities for communication researchers and technicians from the developing world for more than a decade." The Centre has also taken a lead role in the transfer of knowledge and open-source technology to universities and research institutions throughout the South. And, through its e-Journals Delivery Service, launched in 2001, it has sought to bring up-to-date scientific publications to scientists in more than 100 countries, including some of the world's least developed countries (see "Ready Access," *News from ICTP*, Spring 2003, p. 2, and "ICTP's Journal Delivery Service," *News from ICTP*, Autumn 2001, p. 2).

Sandro M. Radicella, Katepalli R. Sreenivasan, Hamadoun I. Touré and Ryszard Struzak

"Our partnership with ICTP," says Touré, "is designed to help ITU achieve one of its major objectives: to cyber-connect all universities by 2015 and, equally important, to use this university-wide web to provide valuable information for improving university curricula and research, especially in the developing world."

In big ways and small, new communication technologies are radically transforming our world. Now ITU and ICTP are joining forces to help universities in the developing world build the infrastructure and skills that they need to reap the benefits that are inherent in these breakthrough technologies.□

For additional information about ITU, see www.itu.int/home/index.html. For additional information about ICTP's Aeronomy and Radiopropagation Laboratory, see arpl.ictp.trieste.it.

Erio Tosatti
Head, Condensed Matter Sector
SISSA

ICTP Acting Director, 2002-2003

COMMENTARY

ICTP's and SISSA's long and fruitful relationship is now a quarter century young.

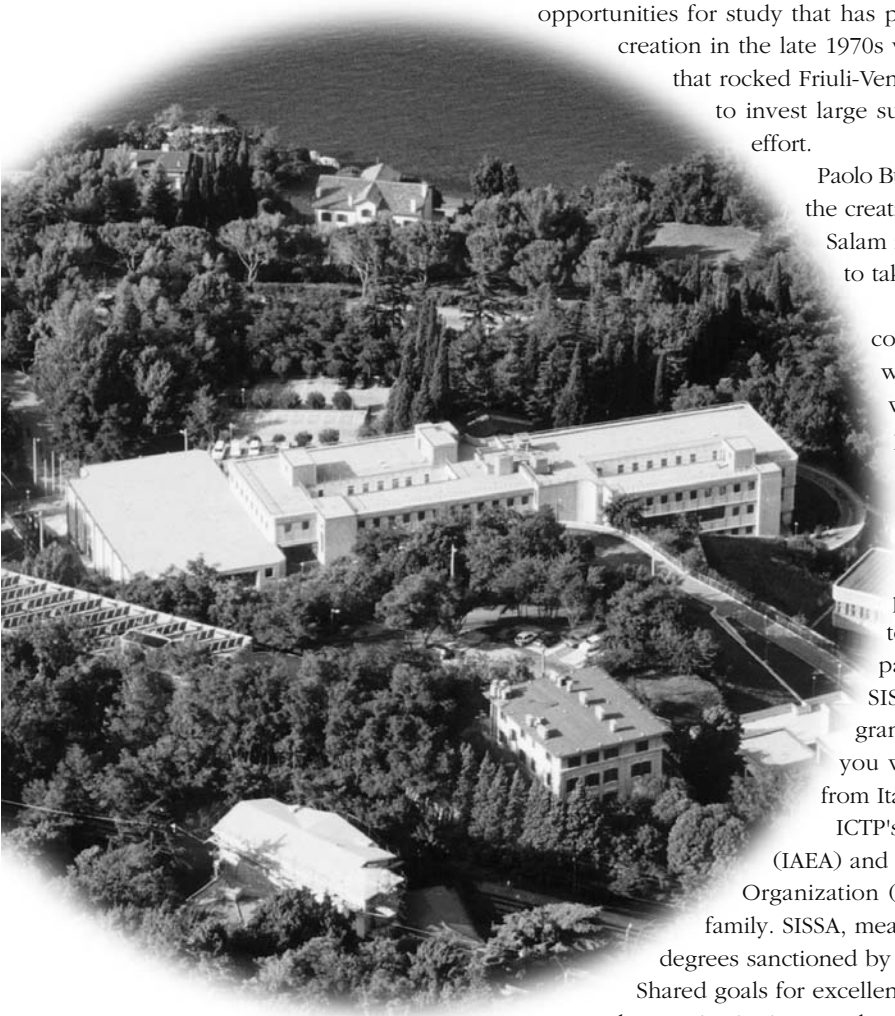
Two Anniversaries

This October, ICTP will be celebrating its 40th anniversary. The Centre will not only be honouring its singular contributions to global science but will also be highlightling the role it has played in spawning a cluster of other institutions in Trieste and the surrounding area—all of which share the Centre's principles and goals.

One of the most significant of these institutions is the International School for Advanced Studies (SISSA), which itself celebrated its 25th anniversary last November.

The neighbouring institutions share more than anniversary dates. The two, in fact, share a common heritage marked by years of scientific cooperation and exchange that has been made possible by the generosity of the Italian government.

The birth of ICTP in the mid 1960s took place against the backdrop of a chronic international problem: the limited opportunities for study that has plagued scientists from the developing world. SISSA's creation in the late 1970s was a byproduct, in part, of a devastating earthquake that rocked Friuli-Venezia-Giulia in 1976, prompting the Italian government to invest large sums of money in the region as part of the rebuilding effort.



International School for Advanced Studies (SISSA)

Paolo Budinich, Trieste's grand statesman for science, championed the creation of both institutions. He worked closely with Abdus Salam in the founding of ICTP, 'retiring' at the age of 60, only to take up SISSA's mantle two years later.

Budinich envisioned that the two institutions would complement one another and indeed he was right. Both would require vigorous training and commitment. Both would emphasise scientific excellence. Both would focus primarily on physics and mathematics. And both would share faculty and classroom space to achieve their goals.

ICTP's short-term research and training—its conferences, schools and workshops—provide a continual source of learning for graduate students and professors, young and old, from around the world. Four to six thousand scientists visit the Centre each year to participate in these classroom 'sprints of knowledge.' SISSA, meanwhile, is a three-to four-year PhD degree-granting programme—a 'long-distance intellectual run,' if you will—that enroles some 200 students each year, both from Italy and abroad.

ICTP's direct ties to the International Atomic Energy Agency (IAEA) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) make it a full-fledged member of the UN family. SISSA, meanwhile, is an Italian institution that bestows advanced degrees sanctioned by the Italian government.

Shared goals for excellence in scientific research and training have encouraged the two institutions to share their resources as well—all for their common cause. Many of SISSA's faculty members—including Stefano Fantoni, Michele Parrinello, Dennis Sciama and myself, to name just a few—have also worked for ICTP, lecturing at the Centre's workshops, tutoring the Centre's Diploma Course students, and even serving as ICTP's acting director, which I did between May 2002 and March 2003. Until 1991, when our building was completed, SISSA's offices were located in ICTP's Main Building along with the University of Trieste's Department of Physics.

As the fields of physics and mathematics continue to expand and the barriers between disciplines are stripped away, no one institution can hope to meet the demands of the entire scientific community. The 'principle of partnership' that SISSA and ICTP established more than two decades ago and that we celebrate on the occasion of our anniversaries does not simply provide an opportunity to honour our past but also offers a valuable signpost for our shared futures.□

The IAEA-ICTP 'STEP' programme hopes to stem the chronic brain drain problem that plagues so many nations in the developing world.

STEP by STEP

They grew up in divergent cultures and live and study in distant countries. Yet they speak a common language: the language of lasers.

Now, thanks to the IAEA (International Atomic Energy Agency)-ICTP Sandwich Training Educational Programme (STEP), they have an opportunity to advance their skills and ultimately earn doctorate degrees without joining their nation's professional Diaspora and becoming yet another 'lost' statistic in the developing world's chronic brain drain problem.

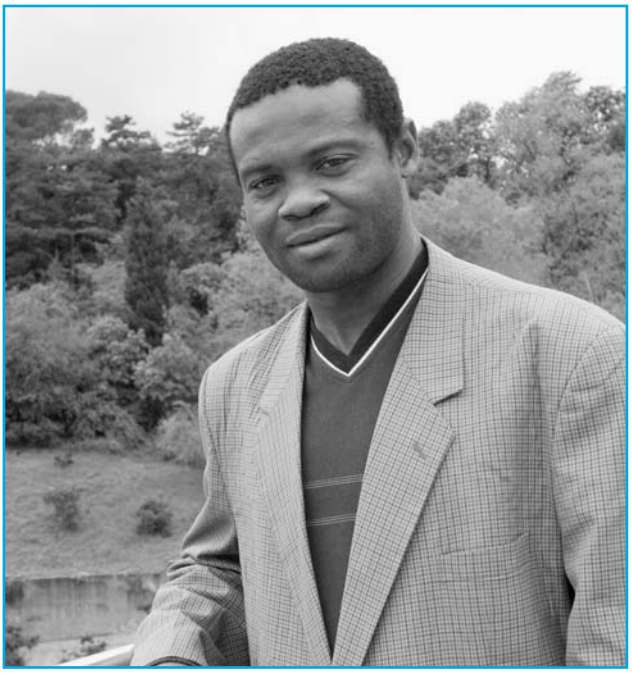
Rosen Kanchev Ivanov hails from Bulgaria, Tetchou Nganso Hugues Merlain from Cameroon and Gamal Elsayed Mahmoud Afifi from Egypt. Their paths have briefly crossed in Trieste but at the conclusion of their three-year educational journeys, each—if all goes according to plan—will be firmly rooted in their home countries poised to pursue long and fruitful careers as teachers and researchers.

"That's the goal of the IAEA-ICTP STEP initiative," says Ana María Cetto, head of the IAEA's Department of Technical Cooperation (TC), which is the Agency's lead department for seeking ways to put nuclear research to work in solving some of the developing world's most pressing health and environmental problems. TC provides the funds for STEP while ICTP shoulders lead responsibility for its day-to-day operations.

"We all know that a scientific divide separates the North from the South and that a major force driving this divide is the lack of skilled scientific and technical personnel in many developing countries," says Gallieno Denardo, a long-time scientist at ICTP, who was instrumental in the development and implementation of STEP. "Compounding this problem is the fact that so many of the developing world's most talented scientists are educated in the North and, once they have an opportunity to live and study here, they often decide to remain here."

"The programme," notes Paulo Baretto, a recently retired staff member of IAEA's TC department, who worked closely with Denardo during the 1990s to put STEP in place, "is based on the notion that a student who stays at home to earn a degree will remain at home to live and work. Yet, while we want to encourage students to stay at home, we do not want to handicap either their education or career prospects for doing so."

That's where STEP comes into play. Under the programme, students from developing countries that are member states of IAEA will be offered fellowships to pursue doctorates in fields of interest to the Agency that also coincide with ICTP's major fields of study. These fields include, for example, atomic, laser, nuclear and plasma physics; mathematical modelling; medical radiation physics; and nuclear, isotope and synchrotron radiation techniques.



Tetchou Nganso Hugues Merlain

"Each student," says Baretto, "has two advisors who work closely together to help guide the course of study. The primary advisory is a professor at the university where the student is enrolled and where he or she will receive a degree. The second advisor—an 'external' advisor, if you will—resides at the facility that the student plans to visit abroad."

"The thesis topic that the student and professors decide on," continues Baretto, "is based on three interrelated criteria: it must pose a research challenge for the student, be of potential value to the student's home country, and explore questions that are within the scope of ICTP's research and training activities."

"This strategy" notes Denardo, "not only provides valuable guidance for the student but also helps to promote collaboration among the mentoring professors who exchange information about the student's research and progress and, in the process, learn more about each other's facilities. We're hoping that the programme helps build both individual and institutional capacity."

All told, the student spends three to six months a year over three years at his 'away' institution. The rest of the time

is spent at his or her 'home' institution pursuing traditional studies in a traditional setting.

The work of Ivanov, Tetchou and Afifi focusses on synchrotron radiation theory and applications. More specifically, their work both analyses the theory of harmonic generation and explores experimental techniques that foster the creation of stable beams from unique crystals.

"The goal," says Afifi, "is to contain the beam's oscillation by stabilising the pulse amplitude and timing. In short, we try to analyse and ultimately reduce the level of 'jitter' in the light source, a problem that makes it an unreliable tool for the tasks we will ask it to do." Stable beams, for example, can be used both to uncover the molecular makeup of materials and to advance fibre-based digital communication.

Ivanov and Afifi's work has brought them to *Elettra* synchrotron radiation facility located near Area Science Park some 15 kilometres from ICTP's Miramare campus. Tetchou's research has taken him both to ICTP and *Université Catholique de Louvain* in Belgium.

"These are not the only facilities that have been made available to STEP students," says Denardo. "In addition, there are the International Centre for Genetic Engineering and Biotechnology (ICGEB) and Laser Laboratory, located in Area Science Park in Trieste, as well as an increasing number of laboratories and research centres within the region."

Denardo adds that "ICTP will not only oversee the daily operation of STEP—in cooperation with IAEA—but will offer its own set of STEP fellowships in fields that do not fall under the Agency-sponsored portion of the programme—for example, in mathematics and condensed matter and elementary particle physics." This will allow an even broader range of students to benefit from the initiative.

In total, about 25 to 30 fellowships will be offered each year. "The number," Denardo says, "is not only related to budget considerations but also due to the fact that we want students to be in direct contact with their advisors both at home and abroad. We have discovered that such personal interaction is one of the most important keys to success." In the programme's first year, some 100 applications from students in 25 countries were received.

"From IAEA's perspective, the overall goal of STEP," says Cetto, "is to strengthen the scientific capability of young researchers from developing member states so that they can contribute to the scientific, technical and economic development of their home countries. Many of the programmes sponsored by IAEA's TC department are project-oriented and have specific, clearly defined objectives. STEP adds an important new dimension to the Agency's efforts because it seeks to nurture the life-long knowledge and skills that young researchers will need to address critical science-based problems throughout their careers."

In a sense, STEP is designed to help address science-related development problems among member states by creating a pool of well-trained scientists and technologists who can address a wide range of challenges and ultimately help to educate and train subsequent generations of researchers at home. "It is based," Denardo notes, "on the enduring concept that you can never take knowledge away from someone."

IAEA would like to extend STEP through cooperative arrangements with institutions other than ICTP, but Cetto acknowledges that it will take some time and careful planning before moving ahead.

Rosen Kanchev Ivanov and Gamal Elsayed Mahmoud Afifi

"ICTP," she says, "is a unique institution that has enjoyed decades of experience in the training of young scientists from the developing world. There are few institutions that can match the Centre's track record of success."

"Our long-standing relationship with ICTP is what drew us to this partnership in the first place and the early indications are that our confidence in the Centre has been well placed. STEP is off to a good start and we expect its impact to grow in the years ahead."□

For additional information about the IAEA/ICTP Sandwich Training Educational Programme (STEP), contact ICTP, Office of External Activities, Enrico Fermi Building, Via Beirut 6, 34014 Trieste, Italy; phone: +39 040 2240 322; fax: +39 040 2240 443; email: calligar@ictp.trieste.it; web: http://www.ictp.trieste.it/www_users/STEP/STEP.html. The deadline for the next round of applications is 15 September 2004.

Paolo Budinich
ICTP Deputy Director, 1964-1978

The 1960s, ICTP's 'startup' decade, was a tumultuous time, marked by uncertainty and success. Paolo Budinich explains.

ICTP in the 1960s: Foundations of Success

On 18 June 1964, Carlo Arnaudi, Italy's Minister of Scientific Research, and Sigvard Eklund, Director General of the International Atomic Energy Agency (IAEA), laid the foundation stone for what would become ICTP's main building. The ceremony symbolised the creation of the Centre, fulfilling the vision first put forth by Abdus Salam four years before.

The Main Building at Miramare, however, would take four years to complete, not opening its doors until 1968. Thanks to the generosity of the local Italian authorities, the Centre was given temporary space in a five-story building on Piazza Oberdan, located in the heart of the Trieste.

The building on Piazza Oberdan was not fully renovated in time for the Centre's first major activity—the International Seminar on Plasma Physics held in October 1964. As a result, the seminar took place in the conference hall of the Jolly Hotel, located less than a kilometre from Piazza Oberdan.

At the time, there was the even more compelling challenge of assembling a capable administrative staff for a fledgling organisation with an uncertain future.

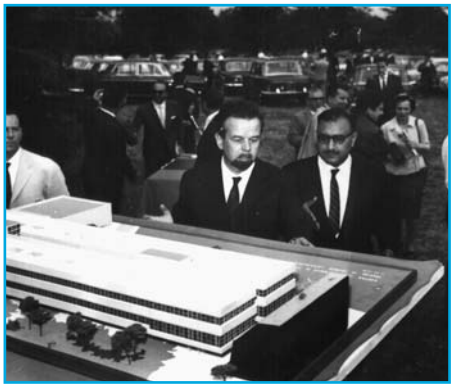
18 June 1964 – Minister Carlo Arnaudi lays cornerstone of Main Building

Many of the administrative posts that remain in place to this day were created during the Centre's first years of operation. Indeed, by late 1964, ICTP's scientific and support staff included a director (Abdus Salam), deputy director, scientific information officer, administrator, librarian, secretaries, clerks, and technical staff.

Two major distinctions, however, highlight the difference between now and then.

Now, the staff totals 120; then, 25.

Now, long-term staff members are all employees of the UN system. Then, staff were locally recruited under the terms of the 'seat agreement' between the IAEA and the Italian government.



Paolo Budinich and Abdus Salam examine model of new building

Even more importantly, because IAEA approved the creation of the Centre on a 'provisional' basis—subject to a comprehensive review after four years—no one was sure if ICTP would continue operating beyond its trial run. Indeed some IAEA member states that had supported the creation of the Centre suggested that ICTP, if successful, should eventually be moved from Italy to a developing country.

During the Centre's early years, ICTP's budget was also in question. The Italian government had authorised more than US$275,000 a year for the first four years of ICTP's operations. Moreover, the land and structures that were part of the Centre complex were valued at more than US$2.5 million.

IAEA, in turn, initially budgeted $55,000 annually for the Centre (rising to US$150,000 in 1967). This represented a generous contribution given the Agency's modest budget yet broad-ranging responsibilities that reached far beyond scientific research and training to include efforts to promote peaceful applications of nuclear energy and the creation of inspection teams to curb nuclear proliferation.

However, those who examined the Centre's mandate—including a Consultative Committee of Experts appointed by IAEA's director general and the Centre's own Scientific Council—all agreed that ICTP would need an annual budget between US$500,000 and US$750,000 to fulfil its mandate.

As a result, the Centre in the 1960s was continually searching for money to bring its resources closer in line with its vision. The Ford Foundation, which awarded ICTP a four-year US$200,000 grant, helped to make up the difference. Nevertheless, the funding was not permanent and there was no guarantee that it would continue.

Partially due to its provisional status and budget uncertainties, the Centre did not have a permanent research staff. Instead

it relied on visiting and guest scientists and professors of the University of Trieste (who acted as consultants) to meet its research and training needs.

Like many working for ICTP's administrative staff, scientists at the Centre actually belonged to other institutions, coming to the Centre during periods when university classes were not in session or at a time when they were on sabbatical leave.

Visiting professors during these early years included A.O. Barut, University of Colorado at Boulder, and Christian Fronsdal, University of California at Los Angeles, USA. During ICTP's first academic year, 1964-1965, each stayed for 10 months to organise and participate in training activities for younger scientists.

Similarly, Marshall N. Rosenbluth, University of California, San Diego, USA, and Roald Z. Sagdeev, head of the Plasma Physics Laboratory, Institute of Nuclear Physics, Novosibirsk, USSR, came to Trieste to help launch the plasma physics group. Rosenbluth's and Sagdeev's partnership—indeed friendship—helped to make ICTP one of the few places in the world where scientists from the East and West could work side-by-side during the Cold War.

In addition, such prominent institutions as Princeton University in the United States, Imperial College in the United Kingdom, CERN (European Organization for Nuclear Research) in Geneva, Switzerland, and the Joint Institute for Nuclear Research, Dubna, USSR, allowed their staff scientists to come to the Centre for several months each year, providing a steady stream of world class scientists.

Seminar on High Energy Physics and Elementary Particles, June 1965

Despite all of the vagaries and unknowns, ICTP flourished during the first decade of its existence thanks to the drive of Abdus Salam and the enthusiastic support of the word scientific community. The efforts laid a foundation for success that quickly earned the Centre international acclaim.

ICTP's first scientific activity was a four-week International Seminar on Plasma Physics, held in October 1964, which attracted such eminent scientists as Boris B. Kadomtsev, USSR Academy of Sciences' Nuclear Energy Institute, and W.B. Thompson, Clarendon Laboratory, UK. The Centre's second scientific activity, a two-month International Seminar in High Energy and Elementary Particle Physics, which took place in May and June 1965, included future Nobel Prize winners Murray Gell-Mann, Sheldon Glashow and Julian Schwinger.

And then there was the star-studded Symposium on Contemporary Physics held from 7 to 29 June 1968—an event that put ICTP on the global scientific map serving as the 'symbolic' foundation stone of its scientific activities.

The symposium, which was attended by nearly 300 scientists from some 40 countries, brought 21 current and future Nobel Prize winners to Trieste. Among the scientific luminaries in attendance were Hans A. Bethe, Francis H.C. Crick, Paul A.M. Dirac, Werner Heisenberg and Eugene P. Wigner. The gathering marked the arrival of ICTP as a world class research centre dedicated to cutting-edge issues in physics and with the capacity to attract the world's most talented scientists. The symposium also indicated the Centre's emergence as a prominent crossroads for scientific exchange.

Werner Heisenberg lectures during the Symposium on Contemporary Physics, June 1968. Paul A.M. Dirac (in background) chairs session

Besides the workshops and seminars, there were three extended courses (two in nuclear physics and one in condensed matter physics), each with some 100 participants and each lasting from 10 to 12 weeks. The courses, which included introductory lectures during the first week and examinations of the most recent advances in the field for the remainder of the time, attracted young physicists from developing countries and developed countries alike. The latter were not financially supported by ICTP but were eager to come nevertheless.

Building on the success of these noteworthy activities, by the end of the 1960s, ICTP had attracted more than 1500 scientists from 55 countries.

At the same time that the Centre was earning a well-deserved reputation for research and training excellence, it was also launching what would become its flagship programme: the Associateship Scheme, which enabled scientists from the developing world to visit the Centre for extended periods three times over a three-year period (later extended to six years).

The ultimate goal was to allow scientists from the South to remain at home yet to be fully engaged in cutting-edge science. Among the Centre's first Associates were Juan José Giambiagi (Argentina), Riazuddin (Pakistan), Igor Saavedra (Chile), and Daniel A. Akyeampong (Ghana), each of whom went on to have distinguished careers in science and science administration in their home countries. Over the years ICTP has selected more than 2000 Associates.

In less than a decade the Centre had indeed laid the foundation stones—both symbolically and concretely—for its success. As a result, ICTP ended the 1960s as an institution proud of its rapid progress and cautiously optimistic about the prospects for growth and maturity in the 1970s.□

DATELINE

Lending a Hand in Africa

"Hardly a PhD physicist in East Africa has not had an association with ICTP." That's the conclusion of **Edmund Zingu** in a *Physics Today* article, "Promoting Physics and Development in Africa," published in January. Zingu is the academic vice principal at Mangosuthu Technikon, Durban, South Africa. Zingu laments the minimal presence of science in general and physics in particular throughout Africa. For example, in east Africa (stretching from Sudan in the north to Swaziland in the south), there is one PhD physicist for every 2 million people; in South Africa, there is one PhD physicist for every 140,000 people; and in the United States, one for every 8000 people. Zingu praises ICTP for providing resources and opportunities for African physicists who work under extremely difficult conditions and often in isolation. Led by reform policies in South Africa, Kenya and several other African nations, Zingu believes that the continent now has a chance to make meaningful progress in developing its capacity in physics and other scientific disciplines in the years ahead. He acknowledges, however, that there is a long, long way to go. For a full text of the article, see www.aip.org/pt.

Nobel Laureate Rudolph Marcus

Rudolph A. Marcus, Nobel Prize in Chemistry 1992 and Arthur Noyes Professor of Chemistry, California Institute of Technology, lectured on "Strange Isotope Effects in Ozone Formation and Implications for the Earliest Solar System" on 26 January, in the Centre's Main Lecture Hall. Marcus won the Nobel Prize in Chemistry 1992 "for his contributions to the theory of electron transfer reactions in chemical systems."

New Staff Member

Bobby Acharya has joined the ICTP High Energy Physics group. Before arriving in Trieste, Acharya, who was born in Uganda and raised in the UK, served as a research associate at Rutgers University in New Jersey, USA. Acharya studied theoretical physics at Imperial College and Queen Mary College, earning a PhD degree in 1997. Following a three-year fellowship with the Particle Physics and Astronomy Research Council of England, he went to the USA in 2000, remaining there until his appointment to ICTP this January.

Panza Honoured

Giuliano F. Panza, head of the Structure and Non-Linear Dynamics of the Earth (SAND) group and professor of earth sciences and physics at the University of Trieste, has been elected to the National Academy of Sciences *"detta dei XL."* Panza is being honoured for his broad-ranging contributions to research and training in the field of seismic hazards. Established in 1782, the academy honours Italy's most prominent scientists. For additional information, see www.accademiaxl.it.

InterAcademy Council Report

The InterAcademy Council (IAC), an Amsterdam-based organisation created by the world's national science academies to provide expert knowledge and advice to international bodies, has issued its first report: *Inventing a Better Future: A Strategy for Building Worldwide Capacities in Science and Technology.* **Jacob Palis**, chairperson of the ICTP Scientific Council and co-chair of the report's study panel, presented the report's findings to UN Secretary General Kofi Annan at UN headquarters in New York City. At the ceremony, Palis spoke about ICTP's and the Third World Academy of Sciences' (TWAS) long-standing contributions to the advancement of science in the South and urged others to draw on the work of these two Trieste-based institutions in future efforts to promote science in the developing world. The full text of the report can be found at www.interacademycouncil.net.

Goddard to Princeton

Peter Goddard, who counts ICTP's Dirac Medal among his most prestigious awards, has been appointed director of the Institute for Advanced Study in Princeton, New Jersey, USA. Goddard previously held the post of master of St. John's College at the University of Cambridge, UK. He is considered one of the world's foremost experts in string theory and conformal field theory. Goddard also played a central role in the establishment of the Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, serving as its first deputy director from 1991-1994. His tenure at the Institute for Advanced Study began this January. He replaces Philip Griffiths who headed the Institute for the past 12 years. For additional information, see www.ias.edu.

Optical Realities

Imrana Ashraf Zahid, Department of Physics at Quaid-e-Azam University, Islamabad, Pakistan, and **Revati N. Kulkarni**, International Institute of Information Technology, Pune, India, are the winners of the 2004 ICO-ICTP Prize. The awards ceremony took place on 10 February during the Winter College on Interferometry and Applications in Modern Physics. Established in 2000 through an agreement between ICTP and the International Commission for Optics, the award is given to scientists, younger than 40 years of age, who are pursuing optics research in developing countries. Winners receive a certificate and a cheque for US$1000. For additional information, see the 'awards' page on the ICTP homepage at www.ictp.trieste.it.

Imrana Ashraf Zahid and Revati N. Kulkarni

Networked Society

How does information disseminate briskly and broadly within a community, especially a community that is well networked? A mathematical model examining how such dynamic interaction takes place is presented in an article, "The Rise and Fall of a Networked Society: A Formal Model," published in a recent issue of the *Proceedings of the National Academy of Sciences*, that is co-authored by ICTP staff scientist **Matteo Marsili**, Fernando Vega-Redondo (*Universidad de Alicante* and *Universitat Pompeu Fabra*, Barcelona, Spain) and Frantisek Slanina (Academy of Sciences of the Czech Republic, Prague). Marsili, who joined the Centre's Condensed Matter Physics group in 2002, focusses his research on applications of statistical physics to economic and social systems. For the full text of the article, see www.pnas.org.

Cosmic Public Lecture

Alvaro de Rújula, a world-famous theoretical physicist on the scientific staff at CERN (European Laboratory for Nuclear Research), Geneva, Switzerland, was the first speaker in the ICTP public lecture series, "Frontiers," that has been organised to celebrate the Centre's 40th anniversary. *Immaginario Scientifico* is assisting ICTP in this effort. De Rújula, who spent five months at ICTP in 1966 when the Centre was still headquartered in downtown Trieste, spoke before a packed audience in the Kastler Lecture Hall at the Adriatico Guesthouse on 25 March. In his lecture, "The Latest News from the Big Bang," de Rújula explored the mysteries of the origins of the universe (see www.immaginarioscientifico.it). For additional information about the lecture series, contact pagan@ictp.trieste.it.

Leading Scientists, Leading Prizes

George Ellis, a leading theoretical cosmologist who is a professor of applied mathematics at the University of Cape Town, South Africa, has been awarded the 2004 Templeton Prize for his contributions to "the dialogue at the boundary of theology and science." Ellis, who served as professor of cosmology at SISSA (International School for Advanced Studies) from 1987 to 1994 (see "Going Home," *News from ICTP*, Winter 2003-2004), will receive the prize in a private ceremony at Buckingham Palace, London. Accompanied by a cash award of US$1.4 million, the Templeton Prize is one of the world's largest annual monetary prizes given to an individual. Another important scientist closely linked to ICTP's activities, Fields Medallist Sir **Michael Atiyah**, University of Edinburgh, UK, is the recipient of the Abel Prize for 2004, given by the Norwegian Academy of Science and Letters. Atiyah will share the prize with Isadore M. Singer, professor of mathematics, Massachusetts Institute of Technology (MIT), Cambridge, USA. The Abel Prize carries a cash award of about US$1 million. Atiyah, who served as president of the Royal Society, UK, is a founding associate fellow of TWAS (Third World Academy of Sciences) and helped to launch the IAP (InterAcademy Panel on International Issues), both located on the ICTP campus (see "Sir Michael Atiyah," *News from ICTP*, Summer 2003).

High Energy Activities

Then and Now

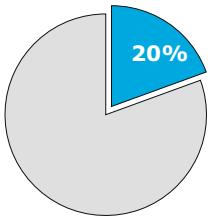
Participants from Developing Countries

Participants from Developed Countries

Seminar on High Energy Physics and Elementary Particles

1965

3 May—30 June 1965

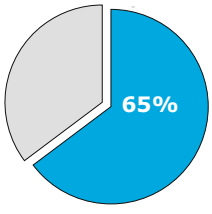


Details	
Participants: Developing Countries	21
Participants: Developed Countries	87
Total	**108**

Introductory School on String Theory

2002

3—14 June 2002



Details	
Participants: Developing Countries	79
Participants: Developed Countries	43
Total	**122**

ACTIVITIES

TEACHING WORKSHOP ON "ACCOUNTING FOR URBAN ENVIRONMENT", Ethiopia

5 - 16 January

Directors: P. Dasgupta (Beijer International Institute of Ecological Economics, Stockholm, Sweden, and Cambridge University, UK), R. Hassan (University of Pretoria, South Africa) and K.-G. Mäler (Beijer Institute).

JOINT DEMOCRITOS-ICTP SCHOOL ON CONTINUUM QUANTUM MONTE CARLO METHODS

12 - 23 January

Co-sponsors: DEMOCRITOS National Simulation Centre (Trieste, Italy), Psi-K Network of the European Science Foundation, and Materials Computation Center of the University of Illinois at Urbana-Champaign (USA).
Directors: S. Baroni (International School for Advanced Studies, SISSA, and DEMOCRITOS), D.M. Ceperley (UIUC) and S. Moroni (Italian National Institute for the Physics of Matter, INFM, Rome, Italy).

EGRID PROJECT: I SEMINAR AND KICK-OFF MEETING

28 - 30 January

Co-sponsor: Italian Ministry for Education, University and Research.
Director: S. Baroni (International School for Advanced Studies, SISSA, and DEMOCRITOS National Simulation Centre, Trieste, Italy).
Local Organisers: A. Nobile (ICTP) and S. Cozzini (SISSA).

WINTER COLLEGE ON INTERFEROMETRY AND APPLICATIONS IN MODERN PHYSICS

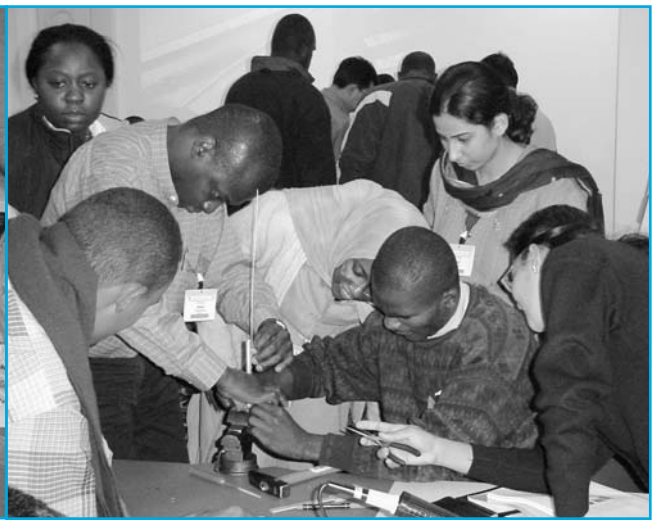
2 - 13 February

Directors: E. Arimondo (University of Pisa, Italy), R. Dändliker (*Université de Neuchâtel*, Switzerland) and R.S. Sirohi (Indian Institute of Technology, Delhi, India).
Local Organiser: G. Denardo (ICTP).

SCHOOL ON DIGITAL RADIO COMMUNICATIONS FOR RESEARCH AND TRAINING IN DEVELOPING COUNTRIES

9 - 27 February

Directors: S.M. Radicella (ICTP) and R.G. Struzak (International Telecommunication Union, ITU, Geneva, Switzerland).



WORKSHOP ON NUCLEAR REACTION DATA AND NUCLEAR REACTORS – PHYSICS, DESIGN AND SAFETY

16 February - 12 March

Co-sponsors: International Atomic Energy Agency (IAEA, Vienna, Austria) and Commission for New Technologies, Energy and the Environment (ENEA, Rome, Italy).
Directors: A.L. Nichols (IAEA), A. Trkov (IAEA), J. Kupitz (IAEA) and A. Gandini (University of Rome *"La Sapienza"* and ENEA, Italy).
Local Organiser: B. Stewart (ICTP).

WORKSHOP ON SAFETY SIGNIFICANCE OF NEAR FIELD EARTHQUAKES

8 - 12 March

Director: P. Labbé (International Atomic Energy Agency, IAEA, Vienna, Austria).
Local Organiser: G.F. Panza (University of Trieste and ICTP).

WORKSHOP ON MODELING IN LIFE AND MATERIAL SCIENCES AND IN TECHNOLOGY

8 March - 2 April

Director: H. Neunzert (*Institut für Techno- und Wirtschafts-mathematik*, Kaiserslautern, Germany).
Local Organiser: T. Goetz (International School for Advanced Studies, SISSA, and ICTP, Trieste, Italy).

SPRING SCHOOL ON SUPERSTRING THEORY AND RELATED TOPICS

15 - 23 March

Directors: E. Gava (Italian National Institute for Nuclear Physics, INFN, Trieste, Italy), K.S. Narain (ICTP), H. Ooguri (California Institute of Technology, Pasadena, USA), S. Randjbar-Daemi (ICTP) and A. Sen (Harish-Chandra Research Institute, Allahabad, India).

FOLLOW-UP OF THE FIRST SCHOOL ON ECOLOGICAL ECONOMICS

22 - 26 March

Directors: P. Dasgupta (Beijer International Institute of Ecological Economics, Stockholm, Sweden, and Cambridge University, UK) and K.-G. Mäler (Beijer Institute).
Local Organisers: M. Marsili (ICTP), and M. Eberle (*Fondazione ENI Enrico Mattei*, FEEM, Italy).

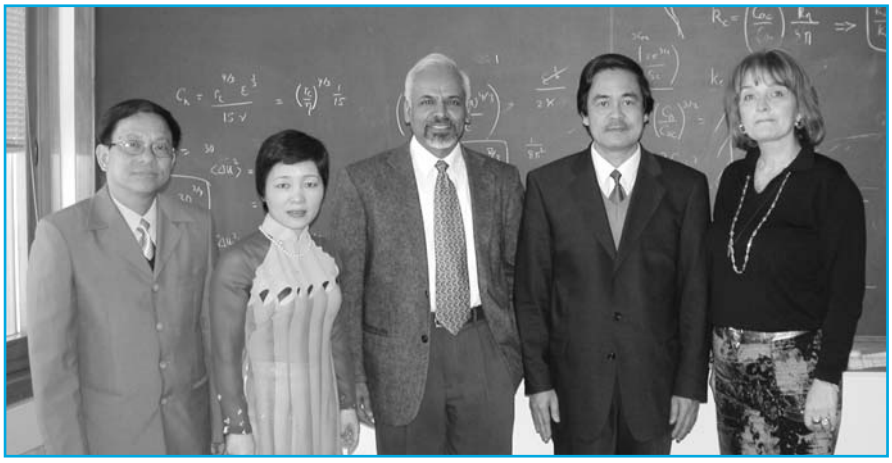
MONITOR

UNESCO DDG Comes to ICTP

Marcio Barbosa, deputy director general of the United Nations Educational, Scientific and Cultural Organization (UNESCO), UNESCO, visited ICTP on 18 March. Barbosa met with the director, Katepalli R. Sreenivasan, and senior administrator, Dag H. Johannessen. He also heard brief presentations from each of the group heads. The meeting focussed on future avenues of potential cooperation between the two institutions. UNESCO serves as ICTP's lead administrative agency under a tripartite agreement signed between UNESCO, the International Atomic Energy Agency (IAEA) and the Italian government.

Delegation from Vietnam

During the week of 15-19 March, a delegation of the University of Communications and Transport, Hanoi, visited the Centre for discussions on how to manage and operate a modern electronic library. Members of the delegation included **Le Von Hoc** (rector), Vu Duc Minh (head, External Relations Department), **Nguyen Minh Hau** (director, Information Library Centre) and **Hoang Thi Minh Phuc** (vice director, Information Library Centre).



God's Cards in English

Princeton University Press has published *Sneaking a Look at God's Cards: Unraveling the Mysteries of Quantum Mechanics* by **GianCarlo Ghirardi**, professor of theoretical physics at the University of Trieste and head of ICTP's Associates Programme. The book was originally published in Italy in 1997 by *Il Saggiatore* in Milan under the title *Un'occhiata alle carte di Dio*. The monograph explains quantum mechanics to lay readers, presenting the first general discussion of such topics as quantum cryptography and quantum computation. It has received warm praise from both scientists and literary critics. For additional information, see www.pup.princeton.edu.

Italian Ministry

A delegation from the Italian Foreign Ministry, led by under-secretaries **Roberto Antonione**, **Mario Baccini** and **Margherita Boniver**, visited ICTP on 5 March to learn more about its scientific activities and to discuss Trieste's candidacy for Expo 2008. Presentations were made by Katepalli R. Sreenivasan, director of ICTP; Edoardo Boncinelli, director, International School for Advanced Studies (SISSA); Graziano Bertogli, deputy managing director, International Centre for Science and High Technology (ICS); Walter Gerbino, deputy rector, University of Trieste; Carlo Rizzuto, president, *Sincrotrone Trieste*; Renzo Rosei, president of the Scientific Advisory Council, *Sincrotrone Trieste*; and Maria Cristina Pedicchio, president, Area Science Park.

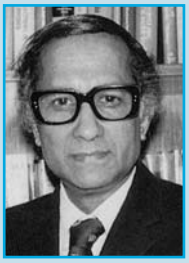
Science Consortium in Trieste

Thirty-four science institutions located in Trieste and the surrounding region, including ICTP, formally signed an accord calling for "greater coordination among national and international research centres in Trieste and Friuli-Venezia Giulia." The signing ceremony took place in the main auditorium of Area Science Park on 27 January. Roberto Antonione, Italy's deputy foreign minister; Guido Possa, Italy's deputy minister of education, and Riccardo Illy, governor of Friuli-Venezia Giulia, were in attendance. The consortium—which has been spearheaded by Maria Cristina Pedicchio, president of Area Science Park—hopes to improve cooperation among the region's scientific institutions and, ultimately, to develop joint projects of mutual interest. For additional information, see www.area.trieste.it.

Janet Varnier Retires

ICTP staff member **Janet Varnier** retired at the end of January. Born in Sydney, Australia, Varnier joined ICTP in 1966 as typist/secretary in the editorial section. During her first tenure at ICTP, which lasted a decade, she also worked for the fellowship and associateship programmes, administration and finance. She left the Centre for the first time in 1976 to care for her children. In 1981, she rejoined the Centre, employed initially in the director's office and then with the high energy physics group, where she was responsible for organising training courses. Scientists and staff congratulate Janet for her years of dedicated service to the Centre and wish her well in her retirement.

IN MEMORIAM



Sivaramakrishna Chandrasekhar, a world renowned condensed matter physicist and founder of the Centre for Liquid Crystal Research, Bangalore, India, died on 9 March. He was 73. Chandrasekhar came to ICTP on numerous occasions during his illustrious career. His last visit took place during a meeting on discotic liquid crystals in November 2002. The meeting was held in conjunction with the 25th anniversary of the publication of Chandrasekhar's seminal article in the Indian physics journal *Pramana*, reporting the first synthesis of discotic liquid crystals, which have found a wide variety of applications, including in computer displays. Chandrasekhar, who received numerous honours for his accomplishments, was a fellow of the Royal Society and a founding fellow of the Third World Academy of Sciences (TWAS).

Pervez Amirali Hoodbhoy, recent winner of the UNESCO Kalinga Prize, is a researcher and scholar with deep convictions that extend beyond science to social and political issues.

Science and Society

Pakistani-born physicist Pervez Amirali Hoodbhoy, who was awarded UNESCO's prestigious Kalinga Prize for the popularisation of science in 2003, is one of a rare breed of scientists, equally at home in both the world of science and the world of social and political affairs.

Hoodbhoy, professor of physics at Quaid-e-Azam University in Islamabad, was born in Karachi in 1950. He received his bachelor's, master's and PhD degrees all from the Massachusetts Institute of Technology, USA, studying electrical engineering, mathematics, solid state physics and nuclear physics along the way. Not wanting to be another statistic in the brain-drain phenomenon, he returned to Pakistan in the early 1970s and has been a faculty member at Quaid-e-Azam University ever since. His main research interests are quantum mechanics, quantum chromodynamics and supersymmetry.

Pervez Amirali Hoodbhoy

An ICTP Associate from 1986 to 1992, Hoodbhoy has visited Trieste on many occasions. In November 1997, he lectured at the Abdus Salam Memorial Meeting, organised one year after the death of the Centre's founder. Hoodbhoy used the occasion to speak "not about Salam's unparalleled success but, instead, his most spectacular failure: Salam's unfulfilled quest to bring science to Pakistan and other Muslim countries."

"It's a sad paradox," Hoodbhoy recalled then," that such a profoundly religious individual as Salam, who was member of the Muslim Ahmadiya minority, ultimately became a non-Muslim in a state where non-Muslims are by law second-class citizens."

Even worse, "Salam was the target of bitter attacks and vilification. Magazines concocted wild conspiracies of nuclear espionage, claiming that Salam had sold nuclear secrets to India. Fundamentalist student groups made it virtually impossible for Salam to visit any university campus. I am ashamed to say that Salam could never set foot in my university in Islamabad, whose physics department had been inspired in considerable part by him, and which was the only department in the country where his lectures could be understood."

The result, Hoodbhoy bitterly comments today, is that "Salam's name remains unknown to school children in Pakistan."

Apart from his scientific work, Hoodbhoy chairs Mashal Books, a non-profit organisation that publishes monographs in Urdu on women's rights, education and the environment. He has written and spoken extensively on topics ranging from science in Islam to education in Pakistan. More recently, Hoodbhoy has produced three documentary series in Urdu, broadcast weekly by Pakistani television, focusing on education, the power of scientific thinking and the mysteries in the universe.

Hoodbhoy is deeply critical of Pakistan's educational system. "It is based upon rote learning," he notes, "and it actively seeks to destroy the inquisitiveness of early childhood by rewarding obedience and punishing originality. Fortunately it is not 100 percent efficient. Thousands of viewers of the Urdu science television serials that I produced wrote letters seeking answers to questions ranging from black holes and supernovae to the ozone hole and human cloning."

"Science in Islam," continues Hoodbhoy, "has been stuck solidly in the mud for seven centuries, and is likely to remain there until Muslim societies open themselves to the realisation that with science comes the scientific method which, at its core, requires free thought and open enquiry. Without such a change in philosophical attitudes, no amount of resources poured into scientific development is likely to do much good."

Many of Hoodbhoy's articles and essays have been devoted to the problem of nuclear proliferation set against the backdrop of Pakistan-India border tensions. Nuclear disarmament remains a passion for him, and he is a member of the Pugwash Council.

During the past few months, relationships between the two countries have dramatically improved. Hoodbhoy hopes that "the recent thaw in Pakistan-India relations could lead to academic exchanges between the two countries. Pakistan could gain enormously from employing Indian professors and researchers on short-term contracts, as well as sending its students to Indian universities for graduate work in the sciences and arts. Indian faculty members, on the other hand, could enjoy higher salaries than at home. It would be a win-win situation."□

WHAT'S NEXT

1 - 2 April
Workshop on Integrated Assessment of Sustainable Development

14 - 23 April
Workshop on Web Enabling Technologies and Strategies for Scientific e-Learning

15 - 21 April
2nd Workshop on Spatial Dynamic Models of Economics and Eco-Systems

followed by

Workshop on Spatial Aspects of Reserve Design Optimization under Economic Constraints

19 - 30 April
Workshop on Climate Variability in the 20th Century (C20C)

19 April - 21 May
ICTP School on Synchrotron Radiation and Applications — In memory of J.C. Fuggle and L. Fonda

12 - 15 May
Research Conference on Advancing Frontiers of Optical and Quantum Effects in Condensed Matter

17 - 21 May
ITU/ICTP Workshop on New Radiocommunication Technologies for ICT in Developing Countries (African Region)

24 May - 11 June
School on Commutative Algebra and Interactions with Algebraic Geometry and Combinatorics

24 May - 11 June
Spring College on Science at the Nanoscale

31 May - 9 June
Second Workshop on the Theory and Use of Regional Climate Models

14 - 25 June
Introductory School on Recent Developments in Supersymmetric Gauge Theories

14 - 25 June
Workshop on Quantum Systems out of Equilibrium

28 June - 2 July
Conference and School on Unifying Concepts in Glass Physics (Bangalore, India)

28 June - 2 July
Workshop on Random Matrix Theory: Condensed Matter, Statistical Physics and Combinatorics

28 June - 2 July
Workshop on Natural Circulation in Water-Cooled Nuclear Power Plants

28 June - 10 July
Summer School in Cosmology and Astroparticle Physics

Throughout the year, the most up-to-date information on ICTP activities may be found on the World Wide Web and via e-mail. Here's how to find out what's going on.

ON THE WORLD WIDE WEB (WWW)
Our address is `http://www.ictp.trieste.it/`
The site includes detailed information on our research groups and activities, and a listing of our preprints, awards and job opportunities.

ON E-MAIL
(1) For Yearly Calendar of Scientific Activities
Create a new e-mail message and type
To: `smr@ictp.trieste.it`
Subject: `get calendar 2004`
Leave the body of the message blank. Send it.
Your e-mail will generate an automatic reply from the ICTP server containing the most updated version of the yearly Calendar.

(2) For Information on a Specific ICTP Activity
Each activity in the Calendar has its own 'smr' code number, which is located on the last line of each activity description. The 'smr' number will enable you to obtain more information—if available—on those activities you are interested in. To receive this more detailed information, create a new e-mail message and type the smr code number that you found on the calendar:
To: `smr####@ictp.trieste.it`
Under the e-mail's subject, type
Subject: `get index`
Leave the body of the message blank and send it.
You will receive automatic reply messages containing all documentation available on that particular activity.

(3) For Information on All ICTP Activities
A free online service for the dissemination of information on all ICTP activities, programmes and related announcements is available via e-mail. To subscribe, create a new e-mail message and type:
To: `courier-request@ictp.trieste.it`
Leave the subject line empty.
In the body of the message type
`subscribe`
and your e-mail address. Send the message.
Any comments or suggestions on this service are most welcome. Please address them to `pub_off@ictp.trieste.it`.

NEWS from ICTP

The Abdus Salam International Centre for Theoretical Physics (ICTP) is administered by two United Nations Agencies—the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Atomic Energy Agency (IAEA)—under an agreement with the Government of Italy. Katepalli R. Sreenivasan serves as the Centre's director.

News from ICTP is a quarterly publication designed to keep scientists and staff informed on past and future activities at ICTP and initiatives in their home countries. The text may be reproduced freely with due credit to the source.

Editor-in-Chief
Daniel Schaffer

Staff Writer*/Direttore responsabile*
Fabio Pagan

Managing Editor
Anna Triolo

Copy Editor
Katrina Danforth

Statistician
Giuliana Gamboz

Photos
ICTP Photo Archives,
Massimo Silvano

Layout
Associazione Progettisti Grafici

Printed by
Arti Grafiche Friulane

ictp 40th anniversary 1964 2004

public information office

the
abdus salam
international centre for theoretical physics

strada costiera, 11
34014 trieste
italy
sci_info@ictp.trieste.it
fax: (+39) 0402240565
www.ictp.trieste.it

Spediz. in A.P. Art.2 C. 20/C L. 662/96 - DCI "TS" - Iscritto al n. 1044 del Reg. Stampa del Trib. di Trieste