



## INTERNATIONAL NATHIAGALI SUMMER COLLEGE (INSC) ON PHYSICS AND CONTEMPORARY NEEDS

### THIRTY YEARS OF MEANINGFUL DISSEMINATION OF SCIENTIFIC KNOWLEDGE

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International Nathiagali Summer College (INSC) on Physics and Contemporary Needs has been held every year since 1976, without any break, mostly at the scenic hill resorts near Islamabad, Pakistan. The idea of organizing a College at Nathiagali on regular basis came from the distinguished Nobel Laureate, Late Professor Abdus Salam. These colleges are organized regularly by Pakistan Atomic Energy Commission, and since 2001, in collaboration with National Centre for Physics, Islamabad. The primary purpose of these Colleges is to break the isolation of the scientists in the developing countries by enabling them to interact with an international faculty and their colleagues from the Third World. The scientific activities of INSC aim at the broad coverage of the topics at the frontiers of knowledge in Physics and allied sciences. During the last thirty years more than 520 eminent scientists including six Nobel Laureates shared their knowledge and experience with nearly 5550 scientists from Pakistan and about 880 scientists from as many as 72 developing countries.

**Keywords:** Nathiagali Summer College, Physics, Contemporary needs, Pakistan Atomic Energy Commission, National Centre for Physics

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### 1. Introduction

International Nathiagali Summer College (INSC) on Physics and Contemporary Needs, an annual event of the international scientific community, organized by the Pakistan Atomic Energy Commission (PAEC), was started in 1976 at the suggestion of Professor Abdus Salam. The main purpose of the College is to provide isolated colleagues of the scientific community of the third world countries with an opportunity to meet, review and establish contacts with world-renowned scholars and leading scientists. It also provides a forum to younger active scientists of both the advanced and the developing countries, leading to South-South cooperation and North-South interaction. The International Nathiagali Summer College is unique in the sense that it represents an initiative by a Third World country, relying largely on its own resources, in organizing a meeting of scientists from both advanced and developing countries to:

- promote a scientific dialogue, provide opportunities, and opening avenues for cooperation and joint research programmes;
- broaden the outlook of the participants, and to re-orient their scientific activities; and
- highlight areas where research could be carried out with limited facilities of developing countries.

The institution of the International Nathiagali Summer Colleges, thus, emerged out of this vital need for communication and for breaking the intellectual isolation of scientists in developing countries. This College, covering a wide range of current topics of science, and emphasizing their applications to meet contemporary needs of the society, is the only one of its kind to be organized in a developing country. Over the years, the College has served as a window to the latest developments in science and technology and thereby proved particularly useful for universities

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and other centres of higher learning in the region.

The College has the privilege of providing a forum for the exchange of ideas between experience and youth, between wisdom and enthusiasm and between proven success and budding aspirations. It has been highly successful in catalysing lively interaction among young research workers- mostly from the developing countries- and lectures/ faculty members, primarily from advanced countries. In many cases this interaction continues beyond the period of the College, resulting in collaborative research, opportunities for post-doctoral research, and for admission of young students for graduate studies abroad in the institutions of the faculty addressing the Summer College.

The College has been purposely designed to cover, in a synoptic manner, the modern trends in physics and their application in current technological developments-with special reference to the needs of the developing world. It, therefore, encourages an interdisciplinary cross-flow of ideas and applications; and such interactions help the scientists from the less-developed countries to cultivate direct contacts with those working in well-equipped laboratories and research centres in the advanced countries - the mainstream of modern scientific activities.

INSC is perhaps the only international scientific activity which is being continuously held every year in Pakistan during the last 30 years without any disruption, irrespective of the political or social changes in the country. This is mainly due to the continued support of Pakistan Atomic Energy Commission (PAEC) and its successive Chairmen, Mr. Munir Ahmed Khan, Dr. Ishfaq Ahmad and Mr. Parvez Butt, and the dedication and hard work of Professor Riazuddin, who has been the Director of this College since its inception in 1976, and who has turned the dream of Professor Abdus Salam into reality.

The success of the college is also due to its official patronage at the topmost level. The inaugural sessions of the INSC have mostly been presided over by the Head of the State or the Head of the Government. This has been a source of encouragement, both for the organizers and the participants.

## 2. The Pioneers

As mentioned above, the idea of organizing a summer college at one of the Himalayan hill resorts near Islamabad, Pakistan, came from the distinguished Nobel laureate, Professor Abdus Salam, who suggested in 1974 that an international forum for scientists from developing countries be organized to encourage greater communication and flow of ideas among them. He expressed the view that spending some time in an intellectual environment would help scientists from the developing countries to regain the inspiration for doing creative work at the forefronts of science. He also offered the assistance and co-sponsorship of the International Centre for Theoretical Physics, ICTP (now renamed as The Abdus Salam ICTP), Trieste, Italy.

When Professor Abdus Salam made his proposal to the Pakistan Atomic Energy Commission to organize a Summer College where experts from the industrialized nations and younger scientists from the developing countries could get together for a couple of weeks, once a year, to exchange views on current interests in physics and allied sciences, Munir Ahmed Khan, the then Chairman of PAEC, not only accepted this suggestion, but put his heart into it. He took personal interest to make the first College in 1976 a great success, which set a good tradition for the subsequent Colleges.

Professor Riazuddin, who was at that time Member (Technical) of the PAEC, was overall incharge of organizing the college administratively and academically, and was co-director of the College with Professor Abdus Salam. He has been the director of the International Nathiagali Summer College (INSC) since then. It is due to his efforts that INSC has been getting a top-rate faculty and keeping the traditions and policies first instituted in 1976.

## 3. Scientific Activities of INSC

The scientific activities of INSC aim at a broad coverage of topics both at the frontiers of knowledge in Physics and allied sciences and the forefront of the applicability to contemporary needs. Two or three subjects of current interest and their applications for technological development, with special reference to needs of the developing world, are highlighted every year, providing a synoptic review of the latest advances and trends in these fields and related areas of interest.

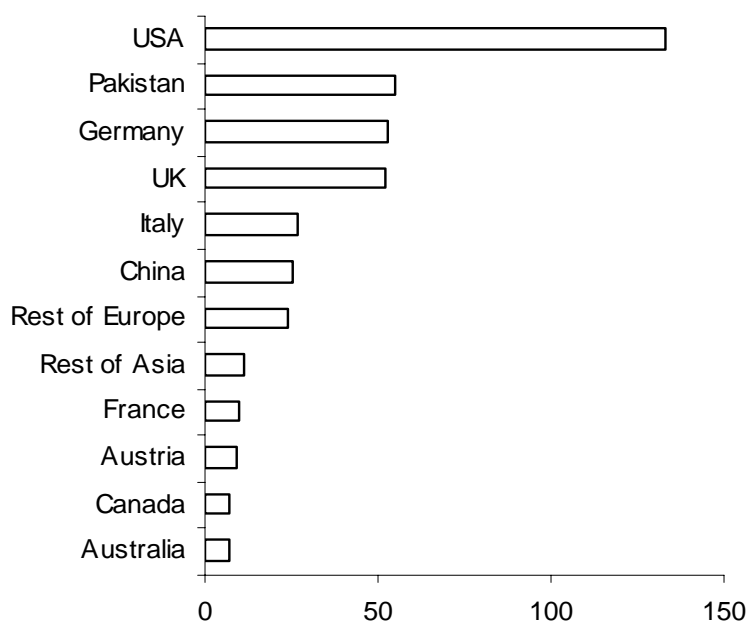


Figure 1. Faculty members' affiliation

Some of the main scientific topics covered in the last thirty Colleges are: Physics and Frontiers of Knowledge: Particle Physics, General Relativity, Astrophysics and Cosmology; Physics and Technology: Atomic, Molecular and Laser Physics, Condensed Matter Physics including Superconductivity, Semi-conductors, Physics at the Nanoscale and Nanotechnology, Polymer Physics, Solid State Nuclear Track Detection and its applications; Materials Science, Synchrotron Radiation Sources and applications, Computational Physics and Software Development; Physics, Energy and Environment: Satellite Imaging and Natural Resources, Geophysics and Seismology, Accelerator Driven Fission, Nuclear Safety and Waste Disposal, Plasma Physics and Nuclear Fusion, Energy Analysis and unconventional sources of Energy such as Solar and Wind Energy; Physics and the Living Matter: Bio- and Medical Physics, Structural Biology and Molecular Biology.

#### 4. Faculty

Effective dissemination of scientific information has been ensured at INSC with the selection of faculty members consisting of renowned scientists, distinguished for their achievements in the fields selected for discussion annually. The most important factor in the success of the College is its speakers. The INSC has been fortunate enough to attract persons who were not only leaders in their

respective fields but were also very good communicators. Over 520 foremost scientists drawn from leading universities, research centres and industries of advanced countries have lectured at INSC over the years. The faculty has many leading lights in their fields of specialization, including six Nobel laureates, in addition to other renowned scientists and outstanding speakers from the USA, UK, Germany, France, Italy, Japan and China. The Nobel laureates who lectured at INSC (see Fig. 1) include: Leo Esaki (USA), Pierre-Gilles de Gennes (France), Robert Hofstadter (USA), Abdus Salam (Pakistan), Samuel C. Ting (Germany) and Chen Ning Yang (USA).

#### 5. Participants

The truly international character of scientific activity has been underscored by the multinational participation in these Colleges. During the last 30 years of INSC, nearly 880 foreign scientists from as many as 72 countries have participated in the proceedings of the College and benefited from a stimulating atmosphere to learn about the latest developments from the leading scientists in their fields of specialty.

Over 5500 participants drawn from R&D institutes, universities and colleges from Pakistan have also benefited from this scientific discourse. Apart from teachers and researchers, postgraduate

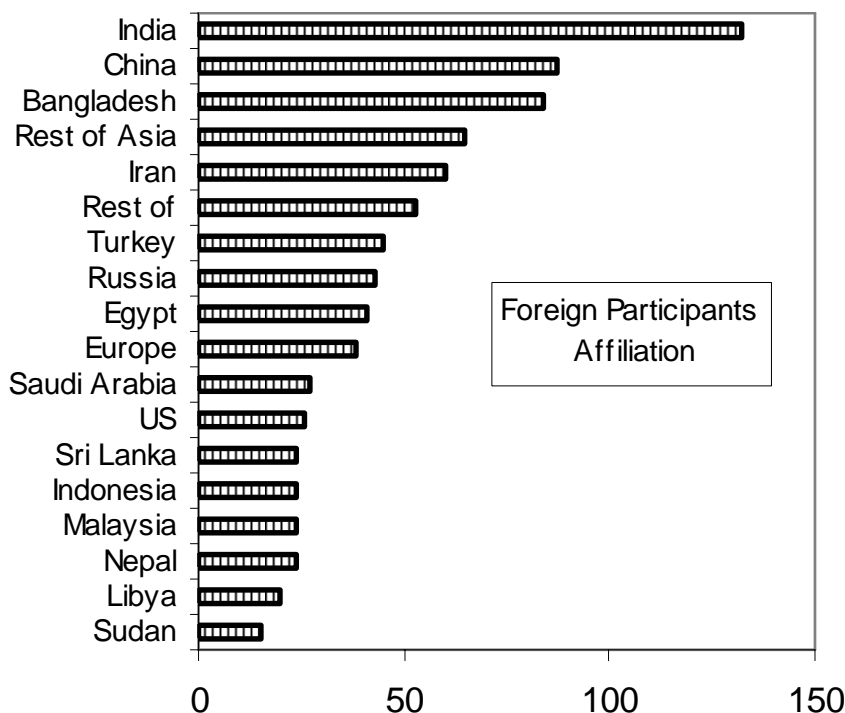


Figure 2. Foreign participants affiliation

students are also encouraged to participate in these discourses at a high level (See Fig.2).

INSC has served as a forum for people of many different nationalities. The general atmosphere of the College reflects a true picture of international scientific fraternity. Personal contacts are established, ideas exchanged and new developments communicated in a more leisurely and relaxed environment. Discussions range from specialized technical topics to an exchange of intellectual and cultural ideas. Asian participants have been drawn from Afghanistan, Bangladesh, Burma, China, India, Indonesia, Iran, Iraq, Jordan, Korea, Malaysia, Nepal, Philippines, Saudi Arabia, Singapore, Sri Lanka, Syria, Thailand, and Yemen. A large number of participants from African countries belong to Algeria, Egypt, Morocco, Nigeria, Tunisia, and Senegal. In addition, there has been participation from Brazil, Poland, Spain, Sweden, and Turkey.

### 6. Salam Memorial Lectures

The great scientist and pioneer of INSC Professor Abdus Salam passed into history on 21 November, 1996. After his demise, the annual Salam Memorial Lecture has become a special feature of the INSC. The first lecture in this series was delivered by Professor Robert Peccei from the

University of California at Los Angeles, USA, who spoke on "Mystery of Flavours" at a special session of the 22<sup>nd</sup> College (1997). Since then the series has continued. The latest lecture in 2005 was by Professor Roberto Battiston from the University of Perugia, Italy, on "Astroparticle Physics in Space".

### 7. INSC Site

Since its inception in 1976, the College has traditionally held in the Himalaya foothills at Nathiagali and occasionally at Bhurban or Islamabad. Nathiagli, about 100 km from Islamabad, is a scenic hill resort lodged on the sylvan slopes of the lower Himalayan range. Perched at a height of about 2600 metres in the forest-studded hills, it is two to three hour, drive towards the north-East of Islamabad, the capital city of Pakistan. A small village known previously only to those seeking escape from the heat and enjoying natural beauty, it became the venue of yearly activity of intellectual discourse at the highest level in this part of the world.

### 8. Organizing and Funding

During the last thirty years, the International Summer College at Nathiagali has been organized by the Pakistan Atomic Energy Commission. Since

the 26<sup>th</sup> College (2001), the scientific programme of the College is being looked after by the National Centre for Physics, Quaid-i-Azam University, Islamabad, while the administrative and financial support is still being provided by the Pakistan Atomic Energy Commission.

The principal co-sponsor has been the Abdus Salam ICTP, Trieste, Italy. For several years, generous grant has also been received from the US National Science Foundation. The college has been co-sponsored, too, by several local and international agencies, e.g. the Chinese Academy of Sciences, Beijing China, US National Science Foundation (NSF), Washington, DC, USA, and European Centre for Nuclear Physics (CERN), Geneva, Switzerland.

### **9. Thirty First INSC**

The next INSC, i.e. the 31<sup>st</sup> in the series, is to be held in Nathiagali from 26<sup>th</sup> June to 8<sup>th</sup> July, 2006. The topics to be covered will be Quantum Devices & Quantum Information, Synchrotron Radiation, and Free-Electron Lasers. The applications for participation in this College will be invited in March, 2006.

### **10. Conclusion**

An important contribution of INSC is the stimulation of interest in science, and creation of a

wider awareness of its relevance to society. These Colleges have served as a window to the latest developments in science and technology and thereby proved particularly useful for young scientists at universities and other centres of learning. An opportunity, unique in the Third World, has been provided for establishing and renewing contacts with the world-renowned authorities; also younger active scientists from both the advanced and the developing countries have been brought closer together leading to South-South cooperation and North-South understanding and interaction.

Exchange of experience amongst participants has been mutually beneficial, providing opportunities to several of them to establish fruitful working contacts with their counterparts. The College is thus instrumental in promoting intellectual exchange. The contacts established at INSC have often resulted in the formulation of collaborative research programmes. Here the PAEC has earned the gratitude of the scientific community of Pakistan at large.

The fact that international meetings of this scope can be held at all in a developing country must be viewed as a major event for the advancement of science as well as of collaboration among scientists in the Third World.