VIGYAN
SAMAGAM

PUSHING THE FRONTIERS OF SCIENCE

Vigyan Samagam
"Scientre Stage"

In order to highlight the value and impact of fundamental research to a broad cross-section of audience including students, academicians and industry, and to further strengthen India's participation in mega-science projects, Department of Atomic Energy (DAE), Department of Science and Technology (DST) and National Council of Science Museums (NCSM) are jointly organising a multi-venue mega-science exhibition, Vigyan Samagam.

The following eight mega-science collaborations will be showcased in Vigyan Samagam:

- European Organisation for Nuclear Research (CERN)
- Facility for Antiproton and Ion Research (FAIR)
- India-based Neutrino Observatory (INO)
- International Thermonuclear Experimental Reactor (ITER)
- Laser Interferometer Gravitational-Wave Observatory (LIGO)
- Major Atmospheric Cerenkov Experiment (MACE)
- Square Kilometer Array (SKA)
- Thirty Meter Telescope (TMT)

A first-of-its-kind, Vigyan Samagam shall be hosted in a caravan mode at four major Indian cities as per the following schedule:

- Mumbai: 8th May to 7th July, 2019
- Bengaluru: 29th July to 28th September, 2019
- Kolkata: 4th November to 31st December, 2019
- Delhi: 21st January to 20th March, 2020

"Scientre Stage" is the inaugural, 2-day science event at each of the four cities, including the formal inauguration ceremony itself.

Inauguration

Welcome address
Mr. Ranajit Kumar, Head, NCPW, DAE, Mumbai

About the Speaker:

- Ranajit Kumar is an Outstanding Scientist & Head of Nuclear Controls & Planning Wing in the Department of Atomic Energy (DAE). He is a leading specialist with outstanding contribution in the area of international nuclear safeguards, nuclear security and nuclear safety. He is leading DAE in the area of international civil nuclear cooperation, international cooperation on nuclear science & technology including cooperation on mega sciences projects, negotiation and implementation of international safeguards in all obligated facilities of DAE, nuclear security policy formulation and implementation etc. He is also leading the cooperation on cutting edge mega science projects with various international organizations like International Thermonuclear Experimental Reactor (ITER), The European Organization for Nuclear Research (CERN), world's third Laser Interferometer Gravitational Wave Observatory (LIGO) in India, Square Kilometre Array (SKA), Thirty Meter Telescope (TMT), India based Neutrino Observatory (INO) and Facility for Anti-proton Research (FAIR). He is leading a team responsible for technical evaluation and grant of export / import and handling license of prescribed substances, equipment and technologies as well as nuclear related dual use goods, equipment and technology as covered under SCOMET list. He is also leading the activities of the Global Centre for Nuclear Energy Partnership (GCNEP), an institute established for promoting R&D, training and human resource development with a vision to promote safe, secure and sustainable nuclear energy, in partnership with countries like USA, France, UK and international organization like IAEA.
- He serves as a member in the Council of Management of Tata Institute of Fundamental Research (TIFR), in the International Thermonuclear Experimental Reactor (ITER) Council, in the BRIT (Board of Radiation & Isotope Technology) Board, DAE and in the "Standing Advisory Group of Safeguards Implementation (SAGSI)" of the Director General (DG) of International Atomic Energy Agency (IAEA). He served as a member from India to the Nuclear Security Guidance Committee (NSGC) of IAEA during 2012 – 2017.
- Ranajit Kumar obtained his Bachelor of Engineering (Electronics & Tele-Communication Engineering) from Bengal Engineering College, Calcutta University (presently known as IIEST - Indian Institute of Engineering, Science and Technology, Shibpur) in the year 1984. After completion of 1 year Orientation Course in Nuclear Engineering in Bhabha Atomic Research Centre (BARC) Training School (September, 1984 – August, 1985), he joined Reactor Control Division in BARC as R&D electronics engineer. In BARC, he has spent more than 31 years' in designing computer and microprocessor based system for application in Nuclear Safety and Nuclear Security. He was responsible for design, development, planning and implementation of nuclear security systems for different types of nuclear fuel cycle facilities including nuclear power plant, reprocessing and waste management plant, research laboratory etc.
- Shri Ranajit Kumar was awarded Technical Excellence Award of DAE in the year 2011. He was also awarded several group achievement awards of DAE.

Address by Guest of Honour
Mr. Arijit Dutta Choudhury, Director General, NCSM, Kolkata

About the Speaker:

- Mr. Arijit Dutta Choudhury is a science museum/centre professional and has been serving presently as the Director General of the National Council of Science Museums, under the Ministry of Culture, Government of India.
- He has more than 30 years of work experience in developing and operation of Science Centres under NCSM comprising development of exhibits, complete projects on turnkey basis etc. He joined the National Council of Science Museums (NCSM) in 1987 and worked in various capacities including Director of Science City, Kolkata. During his career spanning over 31 years in science education and communication, he has contributed immensely to the development of number of science museums/centres and other museums in the country, various exhibitions and activities and non-formal science education programmes for students, teachers and general public.
- He is a member of many Science Communication organizations and science museum/centre boards.

Address by the Guest of Honour
Mr. K.N.Vyas, Chairperson, AEC and Secretary, DAE, Mumbai

About the Speaker:

- Mr. K.N. Vyas is a Mechanical Engineering Graduate of MS University, Vadodara and a graduate of the 22nd Batch of BARC Training School. Joining the Department in 1979, he commenced his career with forays into nuclear reactor fuel designs. He developed programmes to carry out fuel performance analysis of nuclear fuels, which modeled fuel design aspects like irradiation swelling, fission gas generation and release, pellet-clad interaction, etc.. The insights gained by these studies led to the design of the 7×7 cluster for BWR fuel having superior performance characteristics. As a fuel design engineer, he provided key inputs to fuel manufacturing units like Atomic Fuels Division and Nuclear Fuels Complex.
- Mr. has played an important role in indigenisation of special materials as well as several fabrication & test equipment used in fuel fabrication. His expertise was useful in evolving the design of Test Blanket Module and associated systems, planned to be installed at the ITER project.
- Mr. K.N. Vyas is a recipient of Indian Nuclear Society Outstanding Service Award, Homi Bhabha Science and Technology Award and the Dr. N. Kondal Rao Memorial Award. He and his team have won Group Achievement Awards in the years 2007, 2008, 2012 and 2013 in the field of design and development of critical reactor system equipment, as well as successful erection and commissioning of various reactor systems. He is a Fellow of Indian National Academy of Engineering, 2015.

Address by the Guest of Honour
Prof. Ashutosh Sharma, Secretary, DST, New Delhi

About the Speaker:

- Ashutosh Sharma is the Secretary to the Government of India since January 2015, heading the Department of Science and Technology (DST), where he helped initiate several new programs.
- Ashutosh received his PhD from the State University of New York at Buffalo (SUNYAB; 1988), his MS from the Pennsylvania State University (1984) and B.Tech. from IIT Kanpur (1982). He has been a professor (1997-), an Institute Chair Professor (2007-) and the Head (2003-05) of Chemical Engineering, and the founding Coordinator of Nanosciences Center and Advanced Imaging Center at the Indian Institute of Technology at Kanpur.
- He has published over 340 peer reviewed papers, filed over 15 patents, given over 150 invited or key note conference presentations and mentored a successful nanotechnology startup.
- Ashutosh is a recipient of numerous honors and awards including the inaugural Infosys Prize in Engineering and Computer Science, TWAS Science Prize of the World Academy of Sciences, Bessel Research Award of the Humboldt Foundation, J. C. Bose Fellowship, Bhatnagar Prize, Homi J. Bhabha Award of UGC, The Syed Husain Zaheer Medal and the Meghnad Saha Medal of INSA, Distinguished Alumni Awards of IIT Kanpur and SUNY Buffalo, Firodia Award and the Life-time Achievement Award of the Indian Science Congress.
- Ashutosh is an elected Fellow of The Indian National Science Academy, The Indian Academy of Sciences, The National Academy of Sciences, India and Indian National Academy of Engineering, The World Academy of Sciences (TWAS) and the Asia-Pacific Academy of Materials. He has also served on the Councils of the first two. He has been an associate editor of ACS Applied Materials and Interfaces, Proceedings of Indian National Science Academy and ASME Journal of Micro- and Nano-Manufacturing and has been on the editorial boards of several journals: Carbon; ACS Industrial and Engineering Chemistry Research; Current Science; Nanomaterials and Energy; Chemical Engineering Science; Journal of Colloid and Interface Science; Canadian Journal of Chemical Engineering and Indian Chemical Engineer.

Vote of Thanks

Dr. Praveer Asthana, Head, Mega Science Division, DST, New Delhi

About the Speaker:

- Dr. Praveer Asthana, an Adviser/Scientist-G in DST, is currently the Head of INSPIRE and Mega Science Divisions of DST. He did his Ph.D. in Theoretical Particle Physics from the University of Alberta, Canada and he joined DST in April 1989. Some of the major responsibilities handled by him in DST are – adoption of Science and Technology Policy 2003 by the Government, Nano Mission, establishment of SERB, KVPY, INSPIRE, the Women Scientists Scheme, scientific, administrative and budgetary affairs of 25 DST autonomous institutions and mega science projects like collaborations with CERN, Fermilab, KEK, Elettra, FAIR, DESY, TMT, INO and so on.

Keynote address

VIGYAN SAMAGAM
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Keynote Address

Prof. Paolo Giubellino, Scientific Managing Director, GSI & FAIR

India and International science projects: a history of successes, with a bright future.

Abstract:

- India is a full member since many years of major international science projects, such as FAIR and ITER, and participates in several more. Indian scientists and industry have played and play a leading role in many areas. Their know how has been instrumental to the success of these projects. Conversely, know how and knowledge and technological advances have been brought back to India. India, as a direct owner of parts of these international frontier laboratories plays as a protagonist In the world scientific and technological arena Mega science projects in general and India's participation in particular will be discussed.

About the Speaker:

- Paolo Giubellino is an experimental Physicist working on High-Energy Nuclear Collisions. After six years leading the CERN ALICE experiment, he is since 2017 Scientific Managing Director of the GSI Helmholtz Center and of the FAIR international Laboratory, Germany and full Professor at TU Darmstadt. Author of over 300 scientific papers, he received several recognitions, among which two Doctor honoris causa, the title of Commendatore for scientific merits, the Medal of the Mexican Physical Society, the Fermi Prize, highest recognition of the Italian Physical Society and the Meitner Prize, highest recognition for Nuclear Physics of the European Physical Society.

India and Mega Science

Project: Facility for Antiproton and Ion Research (FAIR)

Prof. Bikash Sinha, Former Director, VECC & SINP, Kolkata

Genesis of ALICE-CERN and FAIR collaboration with India

Abstract:

- Indian researchers have been playing a major role in the ALICE experiment at CERN for the search of the deconfined state of strongly interacting matter called Quark Gluon Plasma. India is also playing a major role in building accelerator components and detectors for the upcoming FAIR facility at Darmstadt, Germany. Both these collaborations were initiated keeping India's future role in megascience projects. The genesis of these participations will be discussed

About the Speaker:

- Prof. Bikash Sinha, former Director of VECC and SINP, a fellow of several academies including 3rd World Academy of Sciences, Italy and recipient of numerous awards is an eminent physicist and contributed immensely in the field of Quark Gluon Plasma. He led the team from India to participate in the experiments at CERN, Geneva, RHIC at BNL, USA and more recently FAIR in Germany. Dr. Sinha is the recipient of S.N. Bose Birth Centenary Award of the Indian Science Congress Association in 1994. Dr. Sinha has been conferred Padma Shri and Padma Bhushan Awards by the Government of India in 2001 and 2010 respectively for his significant contribution in Science & Technology. Dr. Bikash Sinha was the Vice-chancellor of West Bengal University of Technology. Apart from scientific contributions, he is a regular writer on popular science in Bengali.

Project: Thirty Meter Telescope (TMT)

Dr. Shashi Bhushan Pandey, ARIES, Nainital

TMT project and role of India

Abstract:

- The Thirty Meter Telescope (TMT) is one of the extremely large telescopes (https://www.tmt.org/) that will allow us to see deeper into space and observe cosmic objects with unprecedented sensitivity. The TMT will have three times bigger aperture than currently existing largest visible-light telescopes in the world. The new cutting-edge technology and adaptive optics technique enable TMT to provide unparalleled spatial resolution with images more than 12 times sharper than those from the Hubble Space Telescope. It will provide new observational opportunities in the field of astronomy and astrophysics with various instruments from ultraviolet to mid-infrared. This unique facility will allow astronomers to address fundamental questions in astronomy ranging from understanding planets and star formation to unraveling history of galaxies and large-scale structure in the Universe. India-TMT has initiated many work-packages towards manufacturing of the primary mirror of the telescope, software and back-end instruments.

About the Speaker:

- Shashi Bhushan Pandey is an optical astronomer at Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital. Dr. Pandey was awarded his PhD degree in 2006 for working towards energetic stellar explosions like Gamma-ray bursts and Supernovae. Apart from his core scientific activities, Dr. Pandey is actively involved towards developments of the 1.3m optical telescope, the 3.6m Devasthal Optical Telescope and back-end instruments like 4Kx4K CCD Imager. On behalf of ARIES, one of the PI institutes of India-TMT, Dr. Pandey is involved towards various aspects of the TMT project since very beginning including prototypes of Segment Support Assemblies within India and other work-packages. Dr. Pandey has also represented member of Scientific Advisory Committee on behalf of India-TMT and many other committees to get the project evolved within the country to its present form.

Project: Major Atmospheric Cherenkov Experiment (MACE)

Dr. V.K.Dhar, BARC, Mumbai (for HiGRO collaboration)

MACE gamma-ray telescope

Abstract:

- MACE (Major Atmospheric Cherenkov Experiment) is a 21-m diameter imaging atmospheric Cherenkov telescope being set up by the HiGRO (Himalayan Gamma-Ray Observatory) collaboration comprising BARC, TIFR and IIA at Hanle in Ladakh region of North India. The telescope is designed to study very high energy cosmic gamma-ray sources in the unexplored energy region of ~20 GeV and beyond with high sensitivity. The light collector of MACE comprises 356 mirror panels of size ~1m x 1m where each panel consists of 4 indigenously developed diamond turned aluminium mirror facets. The imaging camera of the telescope consists of 1088 photomultiplier tubes with a resolution of ~0.125^{o} and a field of view of ~4.0^{o} x 4.0^{o}. Expected to operate at a trigger threshold energy ~20 GeV, the telescope will play an important role in understanding the nature of cosmic accelerators and the radiation emission processes in extreme environments. Scientific objectives of the MACE, its key design features and current status of the telescope will be presented in the talk.

About the Speaker:

- Dr V K Dhar joined the Very High Energy gamma-ray astronomy programme of BARC in 1990 and has participated in the development of India's first imaging gamma-ray telescope TACTIC which is operational at Mt Abu. He obtained his Ph.D degree from Homi Bhabha National institute, Mumbai in 2014. Currently he is involved with various developmental aspects of the 21m-diameter MACE (Major Atmospheric Cherenkov Experiment) telescope which is being installed at high altitude (~4200 m) astronomical site Hanle in North India.

Project: International Thermonuclear Experimental Reactor (ITER)

Dr. Shishir Deshpande, Dean-Admin, IPR & former Project Director, ITER-India

ITER Project Overview and India's Contribution

Abstract:

- The worldwide research on controlled thermonuclear fusion has culminated in the dream project called International Thermonuclear Experimental Reactor (ITER) where the ultimate test of burning plasmas will be carried out in a fusion reactor. ITER is being built in France with 'in-kind' commitments from its seven partners (China, EU, India, Japan, S. Korea, Russia and the US). A unique and challenging feature of the ITER project is its splitting into various procurement packages being executed all over the world and with the requirement that all these systems integrate well with each other. The system-level challenges add another key feature, in the sense that many systems are significantly large or high capacity in some sense and hence require extensive R&D to mitigate risks.
- ITER-India is a special project within the Institute for Plasma Research, Gandhinagar delegated to deliver 9 packages each of which is a mix of precision, heavy, R&D intensive and interface intensive system under built-to-print and functional systems category.
- The overview covers some historical highlights, current status and how ITER-India is meeting the challenges of this unique project.

About the Speaker:

- Dr. Shishir Deshpande did Masters in Physics at Nagpur, India (1984) and his doctoral research at the Institute for Plasma Research (IPR) at Ahmedabad, India (1992). Later, as a group leader for Tokamak Modeling (1995- 2007) has worked mainly in the area of tokamak plasma physics which include modeling of the experiments, theory and simulations of plasma edge physics, plasma-surface interactions and multi-scale modeling. He was involved in the conceptualization of the tritium-breeding blanket activity (2006-08). From 2007-2019 he was the Project Director for ITER-India, a special project within IPR (for execution of in-kind deliveries from India for ITER).

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)

Prof. Somak Raychaudhury, Director, IUCAA, Pune

LIGO-India: Ripples at the cutting edge of Science and Technology

Abstract:

- Within the last four years, epoch-making discoveries have been made by the Laser Interferometric Gravitational-Wave Observatories (LIGO) in the USA, with the discovery of gravitational waves, which have confirmed Einstein's formulation of the nature of gravitation, and has opened up a completely new way of studying the Universe. In collaboration with the USA, we are about the build the third such observatory in India (LIGO-India), which will become a crucial node of the worldwide network of these detectors. Building LIGO-India represents challenges not just to the scientific community, but poses unique challenges and opportunities for engineers and Indian industry, and promises a cutting-edge international facility on Indian soil for coming generations. I will introduce LIGO-India, and review its current status and the challenges ahead.

About the Speaker:

- Somak Raychaudhury is the Director of the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, and is the Chair of the TMT-India Project Management Board and the LIGO-India Science Management Board. He graduated from Presidency College, University of Calcutta, and University of Oxford, UK. After his PhD from the University of Cambridge, UK, he worked at the Harvard-Smithsonian Center for Astrophysics, USA, where he was part of the team that built the Chandra X-Ray Observatory for NASA. After faculty positions at IUCAA, Pune and at the University of Birmingham, UK, he was Dean of Sciences at Presidency University, Kolkata, before his current position. His research involves a wide range of topics in observational Cosmology and Astrophysics.

European Organisation for Nuclear Research (CERN)

Dr. Sukalyan Chattopadhyay, SINP, Kolkata

An overview of LHC physics

Abstract:

- An introduction to the physics scope of the large Hadron Collider will be given. The four major experiments at LHC and the highlights of the Indian contribution will be discussed.

About the Speaker:

- Prof. Sukalyan Chattopadhyay is the Head of the Nuclear and High Energy Group of Saha Institute of Nuclear Physics. He did his PhD from Tata Institute of Fundamental Research and joined SINP in 1996. He has been associated with the ALICE collaboration at CERN since 1997. He is the Team Leader of Indian Collaboration to the Muon Spectrometer of ALICE.

Project: India-based Neutrino Observatory (INO)

Prof. Amitava Raychaudhuri, University of Calcutta, Kolkata

Neutrino mass: An evolving mystery

Abstract:

- Neutrinos, uncharged weakly-interacting fundamental particles, are of three types and were thought to be massless till recently. They have been found to exhibit the unusual feature of oscillating from one type to another as they travel. The way this was observed in the last few decades in a few clever experiments around the world will be highlighted. We discuss how this is a signal for a non-zero mass of the neutrinos. Finally we briefly touch upon a major experiment – the India-based Neutrino Observatory -- that is being set up in India to address some of the open issues.

About the Speaker:

- Amitava Raychaudhuri, educated at Presidency College, Kolkata and Delhi University, obtained his Ph.D. in particle physics from the University of Maryland, USA. Currently Professor Emeritus at the University of Calcutta, he was the Sir Tarak Nath Palit Professor of Physics there since 1996. From 2005-2011 he was the Director of the Harish-Chandra Research Institute, Allahabad. He is a recipient of the Shanti Swarup Bhatnagar Award and the International Alumnus of the year 2005 of the University of Maryland. He is a Fellow of the three National Science Academies and has been awarded D.Sc.(h.c) by the University of Gour Banga and the University of North Bengal.

Project: Square Kilometre Array (SKA)

Dr. Debades Bandhopadhyay, SINP, Kolkata

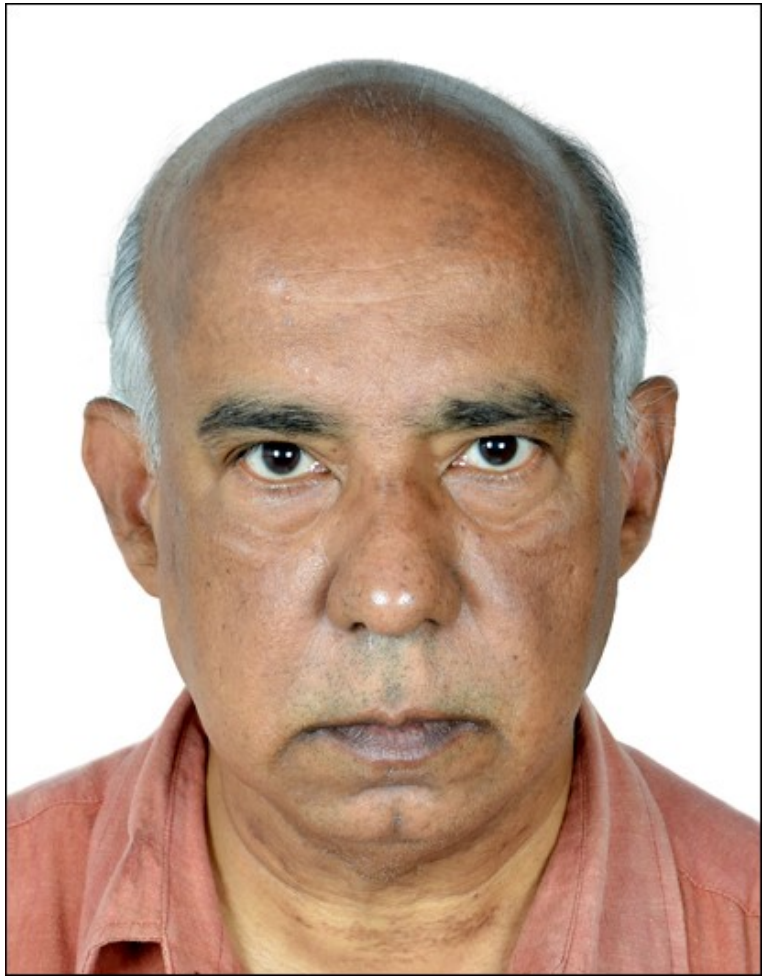
The Square Kilometre Array: A New Observatory to Explore the Universe

Abstract:

- The Square Kilometre Array (SKA), a next generation telescope, will be the most powerful radio telescope in the next decade. It will be co-located in South Africa and Australia. Many key questions in astrophysics can answered using this telescope. India's role in the SKA along with science programs will be highlighted in this presentation.

About the Speaker:

- Debades Bandyopadhyay obtained his PhD degree from the University of Kolkata. Currently he is a senior professor in the Astroparticle Physics and Cosmology Division, Saha Institute of Nuclear Physics, Kolkata. He was the recipient of the Alexander von Humboldt Fellowship. His research interest focuses on supernovae and neutron stars.



Mega Science and Industry

Project: Facility for Antiproton and Ion Research (FAIR)

Dr. Mangesh Borage, Raja Ramanna Centre for Advanced Technology, Indore

Power converters for electromagnets in FAIR: Indian in-kind contribution

Abstract:

- India is one of the partner countries in the Facility for Antiproton and Ion Research (FAIR), Darmstadt, Germany, holding 3.5 per cent of the FAIR GmbH shares and contributing actively in building the facility. Power converters for electromagnets is one of the major accelerator components identified so far as Indian in-kind contribution to the project in terms of the scale and complexities. It is proposed to contribute nearly 700 power converters of various types and ratings to energize normal and superconducting electromagnets with precise and very stable current to guide the beam of high-energy particles in various parts of FAIR accelerator complex. The talk attempts to highlight the requirements, challenges, work-flow, progress, opportunities and the path ahead in the development of power converters for electromagnets in FAIR.

About the Speaker:

- **Mangesh Borage** received B. E. degree (1993), M. Tech. degree (1996) and Ph. D. (2012) in electrical engineering. He joined BARC, Mumbai in 1994. Since 1995, he is with RRCAT, Indore, where he has developed a large number of power converters for electromagnets in Indus accelerators, Infra-Red Free Electron Laser and other facilities, and, many other specialized applications such as laser diode drivers, super capacitor chargers, high-power inverters etc.. He has been closely associated with the FAIR power converter project. He has been involved in the design, prototype development and series production/qualification of the first power converter type recently dispatched to FAIR. He leads a Committee which monitors and facilitates the progress of manufacturing and qualification of power converters at ECIL and acts as an interface between FAIR and ECIL. He has authored nearly 80 papers in peer reviewed national and international journals and conferences. Dr. Borage is recipient of University Merit Certificate from Shivaji University, Kolhapur, India in 1993, Dr. Homi Bhabha Award at BARC, Mumbai, India in 1995 as well as DAE Excellence in Science, Engineering and Technology Awards, namely, Scientific and Technical Excellence Award in 2012 and Group Achievement Awards in 2008 and 2016.

Project: Thirty Meter Telescope (TMT)

Mr. Viswanatha Narasimhaiah, India TMT Coordination Centre, IIA, Bengaluru

Indian Contribution to TMT Project and the Challenges

Abstract:

- Thirty Meter Telescope (TMT) International Observatory (TIO) is a joint venture of scientific institutions in Canada, China, India, Japan and the US to build advanced 30m diameter optical–infra-red telescope. India is 10% partner to this mega project and is contributing 70% of its share as in-kind hardware.
- Majority of the “Primary Mirror Systems” which form heart of the telescope are to be delivered by India as part of India's contribution to TMT. India-TMT Coordination Centre (ITCC) at Indian Institute of Astrophysics, Bangalore is the nodal group responsible for these developments and deliveries. A brief of systems that are to be delivered from India and the associated challenges are discussed.

About the Speaker:

- Viswanatha N, a mechanical engineer is working as “Consultant-Principal Engineer” for India TMT Project, ITCC at Indian Institute of Astrophysics, Bangalore from past three years. Previously he was Group Director, Spacecraft Mechanisms Group, UR Rao satellite Centre. He retired from ISRO in 2015.
- He has 39 years of experience; he is the designer of Solar array deployment mechanisms for our first Indian communication satellites INSAT-2A. He has designed many first-of-its-kind novel and innovative mechanisms for our satellites. He was the Design Team Leader of “Large Unfurlable Antenna” of GSAT-6 satellite. Is recipient of NRDC Technology day award 2002, bagged many ISRO awards including “Performance Excellence” Award. He has three International patents, published more than 40 papers.

Project: International Thermonuclear Experimental Reactor (ITER)

Ms. Aparajita Mukherjee, Senior Project Manager, ITER-India

Developing Technologies for India's deliverables to ITER

Abstract:

- As a part of the agreement related to procurement arrangements with ITER France, ITER India is responsible towards delivering the machine core components viz the cryostat and the in-wall shields and packages related to cooling water systems, cryogenics, IC and EC RF heating systems, Diagnostic neutral beam and diagnostics. Each of this package has special requirements related to materials, precision machining, jointing technologies for similar and dissimilar materials and RF technologies. Enormous experience has been gained during the course of ensuring these deliverables to ITER with the Indian industry and to bring the industry to the state of industrial readiness for future needs. The present status of the deliverables and the technologies developed shall be presented and discussed.

About the Speaker:

- Aparajita Mukherjee, presently works as Senior Project Manager, ITER-India, for Ion Cyclotron and Electron Cyclotron Resonance Heating & Current Drive Source system for international fusion project, ITER. Her major involvement is in the field of engineering design/analysis and technology development of Radio Frequency components/sub-systems/systems, especially for ITER requirement. Previously she worked extensively for Indian Tokamaks ADITYA & SST-1 for Ion Cyclotron Resonance Heating system. Her field of interest are studies of Radio Frequency wave propagation in the plasma medium, development of launcher structure, low & high power Radio Frequency sources, various Radio Frequency components, matching networks and amplifier cavities.

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)

Dr. Amit Kumar Srivastava, Institute for Plasma Research, Gandhinagar

LIGO India: Opportunities for the industry

Abstract:

- LIGO-India observatory, developed by the four R&D institutes (DCSEM, IPR, IUCAA, RRCAT) has the following major work elements; civil facilities, vacuum systems, contamination control, instrumentation & controls, laser & optics, data storage and making scientific data available for research. A major task would be to ensure quality control. The presentation would give a glimpse of the opportunities for the industry to actively participate in the development phase of the project.

About the Speaker:

- Amit Kumar Srivastava is a Scientific Officer 'G' at the Institute for Plasma Research, Gandhinagar working on the LIGO-India project. With work experience of around 24 years, his main expertise is in data acquisition & control systems engineering. He has earlier worked for development of hardware and software in the field of electronics & instrumentation for large distributed data acquisition & control systems.

European Organisation for Nuclear Research (CERN)

Mr. Debashis Das, Director, RRCAT, Indore

Indian Collaborations in CERN and Industry Partnership

Abstract:

- Under the Indian-CERN collaboration, a large number of high-end technology components like superconducting corrector magnets, QHPS supplies, and protection units for LHC; 100kV solid state modulator and couplers for Linac 4 (LHC upgrade) were developed and supplied by India largely involving Indian industries. India also played an important role in the construction and operation of two huge detectors viz. ALICE and CMS. The overall participation has important and significant role in the discovery of the Higgs boson at the LHC in 2012 in participation by Indian scientists. The present talk brings out the glimpses of India CERN Collaboration and emphasizes on participation of Indian Industries in these contributions as well as further opportunities for the Indian Industries to engage in manufacturing and supply of components and subsystems for CERN projects.

About the Speaker:

- Mr. Debashis Das is B.Tech in Electronics Engineering from Mysore university and joined Bhabha Atomic Research Centre (BARC) from 26th batch of BARC Training School in 1983. He is Homi Bhabha awardee of BARC training school in Electronics branch. Mr. Das has held responsible positions in BARC and other DAE unit. He headed Electronics Division, BARC during the period from January 2015 to October 2016 and subsequently as Distinguished Scientist assumed the office of the Associate Director (E), Electronics & Instrumentation (E&I) Group, BARC from November 01, 2016. Mr. Das has held the additional responsibility of Chairman & Managing Director (C&MD) of Electronics Corporation of India Limited (ECIL), Hyderabad from November 2016 to June 2018. Mr. Das has been conferred with many DAE excellence Group Achievement Awards and has been the recipient of the DAE special Contribution Award.

Project: India-based Neutrino Observatory (INO)

Prof. Naba K Mondal, DAE Raja Ramanna Fellow, SINP, Kolkata

India-based Neutrino Observatory (INO) Project

Abstract:

- India-based Neutrino Observatory (INO) is a mega science project approved by the Govt. of India for carrying out front ranking experiments in the field of neutrino physics and dark matter in an underground laboratory. The proposed detector is a 50 kiloton magnetised tracking Calorimeter (ICAL) with Resistive Plate Chambers (RPCs) as the active particle trackers. Indian industry is expected to be involved in fabricating various components like RPCs, Electronic Data Acquisition Systems, High Voltage Systems, Monitoring and Control Systems etc.. for this project. In this talk, I propose to give a brief description of various detector components of ICAL and then discuss its physics potential, opportunities for Indian Industry and various spin offs.

About the Speaker:

- Prof. Naba K Mondal, an internationally known particle physicist, is currently DAE Raja Ramanna Fellow at Saha Institute of Nuclear Physics, Kolkata. He has made key contributions in the Kolar Gold Fields (KGF) Proton Decay Experiment. He was a member of DZERO experiment at Fermilab and CMS experiment at CERN and was involved in the discovery top quark and the Higgs boson. He led the India-based Neutrino Observatory Project (INO) from its inception till 2016. He is a fellow of all three science academies of India and was a J.C. Bose National Fellow. He is also a fellow of the World Academy of Sciences for the Advancement of Science in Developing Countries (TWAS) and recipient of Esther Hoffman Beller Endowment Lecture Award from American Physical Society. He has been awarded D.Sc. (h.c.) by University of Burdwan.

Project: Square Kilometre Array (SKA)

Dr. N. Uday Shankar, Emeritus Scientist, RRI, Bengaluru

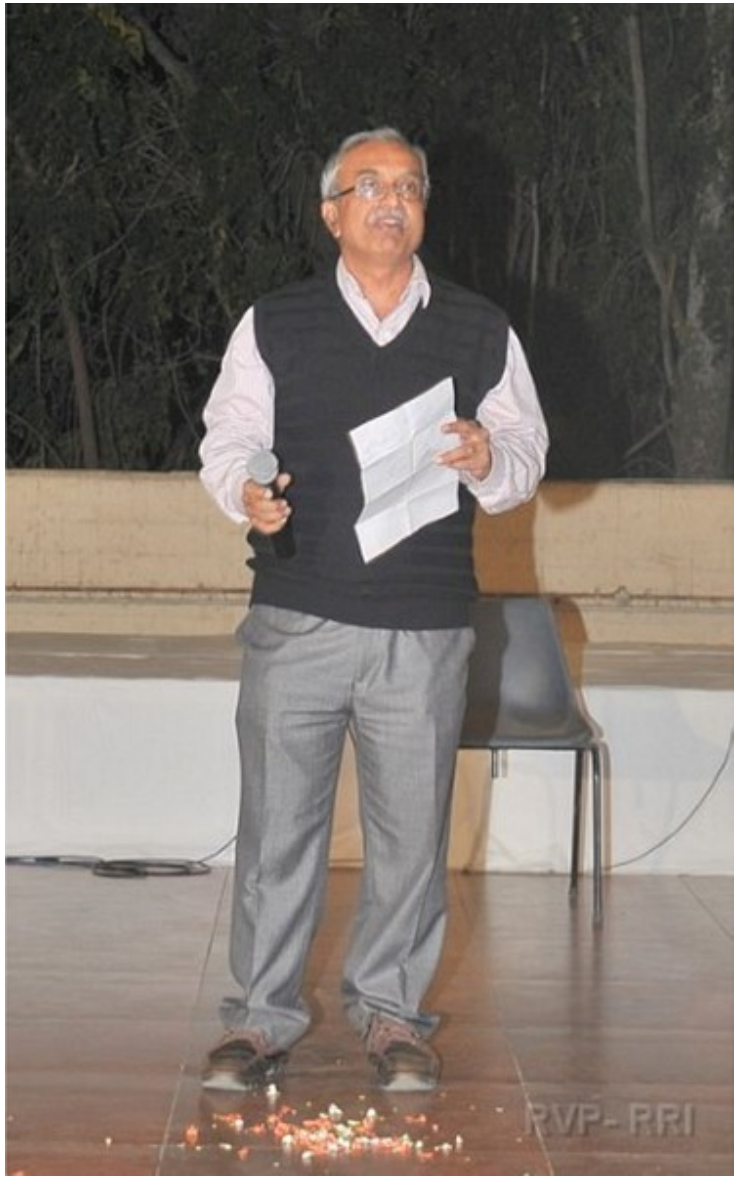
Are Our Research Institutions and Industries Ready to Face the Engineering Challenges of SKA?

Abstract:

- The talk will introduce the engineering challenges of SKA and discuss areas of technology it is all set to push to its next level in the global scenario such as: antenna design, radio frequency electronics, optical fibre technologies, signal processing and complex system management involved in Assembly, Integration and Testing. Many of these challenges are not new to us. The same will be illustrated by describing the activities and achievements of collaboration between our research institutions and industries in the design phase of SKA and constructing SKA pathfinders and precursors such as GMRT and MWA. The talk will conclude describing the challenges ahead and our preparedness to face them.

About the Speaker:

- Prof. N. Udaya Shankar is a low frequency radio astronomer who has contributed to its development in India in various capacities. He is presently a member of a team called DISTORTION lab at RRI working on the detection of signals from epochs of recombination to reionisation. He was a member of the MWA team involved in developing & improving algorithms on imaging with MWA to optimally reconstruct EoR power spectrum from the observations. He was in-charge of the design and development of a new technology 12m radio telescope (Preloaded Parabolic Dish (PPD) concept) for centimeter-wave observations. He has lead teams designing, constructing Gauribidanur and Mauritus Radio Telescopes and carrying out all-sky surveys of the sky at 34.5 MHz and 150 MHz. Presently he is a member of the Science and Engineering advisory committee of SKA.



Industry Session

Industry Session

Mr. Arun Srivastava, Secretary, AEC & Head, ICPD, DAE, Mumbai

About the Panel Moderator:

- Mr. Arun Srivastava, Secretary, Atomic Energy Commission and Head, Institutional Collaborations & Programs Division, is a 1983 batch Chemical Engineering graduate from Laxminarayan Institute of Technology (LIT), Nagpur. He has also completed postgraduate Diploma in Management Studies from Mumbai University in 1992 and Chartered Financial Analyst (CFA) course from Institute of Chartered Financial Analyst of India, Hyderabad in 1996.
- He is from the 27th batch of BARC training school (1983-84). He has worked in Heavy Water for the design, fabrication / construction and commissioning of Heavy Water Plant, Manuguru. In July 1999, Mr. Srivastava joined Department of Atomic Energy (DAE). He has been involved in the strategic planning and analysis related activities for the DAE. In DAE, he is presently heading the Institutional Collaborations and Programs Division of NCPW. He is responsible for all Mega Science Projects in which DAE along with DST are participating and is holding various positions in the Boards/Executive Councils of these projects.
- Since July 2010, Mr. Srivastava is holding the position of Secretary, Atomic Energy Commission, the highest policy making body for the Atomic Energy. Mr. Srivastava is currently the Chairman of the ITER Council, which is the Governing body of the ITER Project.
- Chairman, Atomic Energy Commission has conferred ‘Special Contributions Award 2006’ in recognition of his valuable contributions in the field of Nuclear Science & Technology and to the program of the Department of Atomic Energy under the Excellence in Science, Engineering and Technology Award Scheme of DAE. LIT, from where Mr. Srivastava has completed his graduation, has recently conferred him ‘Jewel of LIT’ Award, as an illustrious Alumni. He is the youngest recipient of this award, since the establishment of LIT.

Industry Session
Projects: CERN and FAIR
Ms. A. Manjula, Senior DGM, CAD/ECIL, Hyderabad

About the Panel Member:

- Ms. A. Manjula is Master of Science in Software Systems from BITS. She joined Electronics Corporation of India Limited (ECIL) in 1983. She worked as a core designer in R&D teams and handled many projects related to Power Electronics. In recognition of this core strength, ECIL has been selected as a partner in prestigious international mega science projects such as the Large Hadron Collider (LHC), Facility for Anti-proton and Ion Research (FAIR) and International Thermo-nuclear Experimental Reactor (ITER). For FAIR, the power converters, being manufactured, comply to European Standards. They range in power rating up to 150 KW. These will power the normal and super conducting magnets that accelerate and bend the high energy particle beams. ECIL is supplying high voltage power supplies (HVPS) to ITER.
- At present Ms. Manjula is the in-charge of Control Systems Division of ECIL and under her supervision 28 varieties of 600 nos. Ultra-stable Power Converters are being supplied for FAIR project.

Industry Session
Project: Thirty Meter Telescope (TMT)
Mr. Anand Dayal, Indo-Danish Tool Room, Jamshedpur

About the Panel Member:

- B.E.(Mechanical) from BIT Mesra in 1993. M. Tech (Mechanical) from NIT Jamshedpur & MBA from XLRI Jamshedpur with 25+ years experience in leadership roles in the Tata Group, Jindal Group & Govt of India. Led National & International projects & been instrumental in disseminating the best practices of Project Management & Business Excellence. Currently works as the CEO of MSME Technology Centre Jamshedpur (Indo Danish Tool Room) under the Ministry of MSME, Govt. of India. Mentor for establishments of two new Technology Centers(TC) under World Bank funder TCSP program at Kanpur & Bihta (Patna) in 10 to 15 acres land & capital outlay of Rs 130 Cr per TC. Mentor for establishments of two new Technology Centers under Hub & Spoke Scheme of the GoI at Varanasi & Bilaspur in 20 acres land & capital outlay of Rs 200 Cr per TC. Third TC proposed at Bokaro in feasibility study stage. Passionate to outreach the scale & scope of interventions for the MSMEs with focus on entrepreneurship, skill development, Technology, Access to Finance, Marketing Support etc. for all inclusive, sustainable growth of the MSMEs in rural, traditional & agri enterprises. Plays an active role in collaboration, convergence & co-operation with stakeholders. Special Invitee / member of several CII Panels like Skill, Start Ups, CSR & Affirmative Action etc. CII Jharkhand State Council & Eastern Region Council.

Industry Session
Project: Major Atmospheric Cerenkov Experiment (MACE)
Mr. Rahul Gupta, Regional Manager Engineering Services, DesignTech Systems Ltd.

About the Panel Member:

- Mr Rahul Gupta has over 15 years of rich work experience in engineering service industry. He has acquired his Bachelor of Engineering with specialisation in Mechanical Engineering from Ajay Kumar Garg Engineering College, Ghaziabad and MBA in International Marketing from Institute of Management Technology.
- Over the last decade bearing the responsibility of driving business strategy as Regional manager in DesignTech Systems Ltd for North & East India, Mr. Rahul has gained tremendous experience working with OEM's in various industrial vertical like Aerospace and Defence, Automotive, Electromechanical and Consumer Goods, Heavy Engineering, Industrial Machinery, Power and Energy.

Industry Session
Project: International Thermonuclear Experimental Reactor (ITER)
Mr. Narayan Mirji, Vice President Marketing, Paharpur Cooling Towers Ltd.

- About the Panel Member:

Mr. Mirji has over 26 years of experience in Industrial Marketing and is currently overseeing the marketing of industrial cooling towers for Paharpur Cooling Towers. Previously engaged with Kirloskar Brothers Ltd; he was heading the operations of North and Central Africa and was instrumental in executing several turnkey projects in water, irrigation, power and industrial sectors. He holds a Mechanical Engineering degree from Karnataka University and a MDBA in International Marketing from Symbiosis, Pune.

Industry Session

Project: Square Kilometre Array (SKA)

Mr. Vivek Mohile, Consultant, Persistent Systems Limited, Pune

About the Panel Member:

- Vivek Mohile professional background of over 20 years is primarily in Controls and Embedded Systems and IoT. He holds a B. Tech and M. Tech from IIT Bombay.
- Vivek has been a part of Persistent's Embedded Systems and Controls and Mobility practices and has been working on Astronomy related projects for more than 10 years. Apart from that he has worked with TCS, Infosys and Persistent with several multinational clients in the areas of automotive, power generation and utilities and pharma and chemicals.
- Currently he represents the Indian team on the Square Kilometer Array Organisation as Product Manager responsible for defining the roadmap and monitoring the feature development of the SKA Observatory Management and Controls.