

**N.4: Participation of RRCAT in National level Industrial Exhibition cum Vendor Development Programme**

RRCAT was invited in 16th INDEXPO - National level Industrial Exhibition cum Vendor Development Programme as a guest participant to showcase its requirements and purchase procedures so that vendors from Micro, Small & Medium Enterprises (MSME) sector get wider opportunity to understand its requirements for goods and services and get associated with its supply chain. The 16th INDEXPO was jointly organized by MSME-Development Institute, M/o MSME - Govt. of India, and Directorate of Industries - Govt. of MP in association with MPLUN Bhopal, KVIC Bhopal, NSIC and industries associations of the state at MSME-Development Institute, Indore during 6 to 8 February, 2016. The exhibition was inaugurated by Shri V. L. Kantha Rao, IAS and Industries Commissioner, Directorate of Industries, Government of MP, Bhopal on 6th February, 2016. A total of 120 stalls were put on display, exhibiting products and services from various industries. Besides Madhya Pradesh, representatives of MSE sectors from Delhi, Uttar Pradesh, Maharashtra, Haryana, Rajasthan and Gujarat also took part in this industrial exhibition. Various PSUs and Government Departments like BHEL, NTPC, GAIL India, DRDE Gwalior, Western Railways Ratlam, Indian Navy Bhopal, Port Trust of India Mumbai, Ordinance Factory Jabalpur, etc. have participated in the event.



*RRCAT pavilion in the 16th INDEXPO - National level Industrial Exhibition cum Vendor Development Programme at Indore*

RRCAT pavilion was a place of special attraction for visitor. Hundreds of visitors including students from professional institutions have visited the RRCAT pavilion

during the exhibition and shared information on their technical capabilities and our R&D requirements in light of scientific activities at RRCAT. Information about RRCAT were also publicised through various exhibits like posters, pamphlets and samples of various mechanical and electronic subsystems. A working model of Indus-II machine, kept in RRCAT pavilion was the major source of curiosity and attraction to visiting public specially the students. DAE related information were shown through a movie run over a 40 inch LED screen. Presentations related to our technical requirements and purchase procedures were made by Shiv M. Prasad, Shri S. D. Sharma and Shri Mangesh Borge on Sunday, 7th February, 2016. A dedicated team of 15 volunteers from different Divisions/Sections of RRCAT worked very hard for the grand appearance of RRCAT in this mega event.

*Reported by:  
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On behalf of the team of volunteers from RRCAT*

**N.5: Honours and Awards**

**H.1: RRCAT Scientist elected as OSA Fellow:**

**Dr. Pradeep Kumar Gupta**, Distinguished Scientist and Associate Director, RRCAT has been elected a Fellow of OSA, the leading professional society in optics and photonics in recognition of his pioneering contributions to the development and utilization of optical techniques for biomedical imaging and diagnostic applications, and for leadership contributing to significant growth of these activities in India. Dr. Gupta is also a Fellow of the Indian Academy of Sciences, Bangalore and National Academy of Sciences, Allahabad.



**H.2: DAE Excellence in Science, Engineering & Technology Awards 2014:**

The Department of Atomic Energy has instituted the Excellence in Science, Engineering & Technology Awards Scheme from the year 2006 to recognize outstanding accomplishments and exceptional achievements of the DAE

staff, who are engaged in scientific research, technology development, engineering/project implementation, teaching, health care, and supporting services. There are ten categories of awards under the scheme and one Meritorious Service Award for Auxiliary, Administration, Accounts services etc. These awards are given annually. The awards for the year 2014 were given on the eve of Founder's Day on October 30, 2015 in BARC. The following scientists/engineers bagged the DAE awards for the year 2014.

**H.2.1: Homi Bhabha Scientific and Technology Award:**

**Dr. V. K. Dixit**, SO/F, Semiconductor Physics & Devices Laboratory, Solid State Laser Division has been conferred the "Homi Bhabha Science and Technology Award for the year 2014" for "Physics of semiconductor hetero- and nanostructures and in-house development of semiconductor laser diodes, laser diode arrays and radiation resistant photodetector devices".



He has made significant contributions to the basic physics and applied studies of semiconductor hetero- & nanostructure. He has grown several novel hetero- and nanostructures and has investigated their unique properties by a number of experimental and analytical techniques providing new physics insights about the electronic interactions in these structures. He has developed theoretical model that reproduces the "S-shaped" temperature dependence of the PL peak energy, accurate values exciton localization energy and material parameters in bulk and quantum structures. Studies in dot-in-well structures opening the possibility for engineering the detection peak wavelength by adjusting the quantum well width and/or composition and allow normal incidence with a bias-tunable spectrally adaptive response by him are also noteworthy. He has developed a novel growth technique for growing high quality III-V semiconductor on group IV substrates using MOVPE by nucleating and thick layers concept. His significant contributions are development of semiconductor laser diodes and laser diode arrays of 23 W pulsed and development of radiation hard semiconductor detectors and quadrant detectors to operate up to 100 kGy radiation field & research on source, drain and gate materials for advanced thin film transistors and nano-devices. The award carried a Cash award of Rs. 5 Lakh, a Citation and a Medal.

**H.2.2: Scientific and Technical Excellence Award:**

**Shri Prashant Khare**, SO/G and Head, Cryo-module Engineering Laboratory, Cryo-engineering and Cryo-module Development Division has been conferred the "Scientific and Technical Excellence Award for the year 2014" for his contributions in the field of development of Cryo-module technology with internationally acclaimed



Innovations. These cryo-modules are required for DAE's future projects like ISNS and ADSS. These are also required for international projects for linear accelerators being set up in other parts of world. Cost of such large systems is a concern and hence need of its value engineering is felt everywhere. It is in this context that Shri Khare's innovations are acclaimed by international experts also. The most important innovation that has been made by Shri Prashant Khare is the development of laser welding technology for fabrication of SCRF cavities. An international patent (JP5632924) has been granted on this path-breaking work. This very first SCRF cavity fabricated by this technology gave a performance on par with SCRF cavities fabricated by conventional technology using electron beam welding. This technology is going to be a game changer in the field of SCRF technology based accelerators. This technology is the latest addition to DAE's pool of indigenous technologies. The award carried a cash prize of Rs. 1 Lakh a Citation and a Medal.

**H.2.3: Young Engineer Award:**

**Shri Pritam Singh Bagduwal**, SO/E, Radio Frequency Systems Division has been conferred the "Young Engineer Award" for the year 2014 for his excellent contributions in the field of "Design, development and deployment of precision RF field control system in Accelerator at RRCAT". He has contributed to the smooth replacement of all four old analogue LLRF system of Indus-2



with new precision control system. This work involves study and understanding of field stability requirements for various accelerators and conception & design of high precision RF control system. Shri Bagduwal has developed precision RF field control system for Sub Harmonic Pre Buncher of IR-FEL meeting stringent stability requirement. This indigenous

technology development involving use of digital signal processing for RF system to realize state of art digital LLRF system is a laudable effort. The award carried a cash award of Rs. 50,000/-, a Citation and a Medal.

**H.2.4: Meritorious Technical Support Award:**

The award carries a cash award of Rs. 20,000/-, a Citation and a Medal. There are four award winners from RRCAT:

**1. Shri Ram Pratap Kushwaha,**

SA/F Laser Plasma Division RRCAT has been awarded the "Meritorious Technical Support Award for the year 2014" in recognition of his excellent contribution to indigenous development of optical x-ray streak camera housing, Nd: glass table top terawatt laser, Capillary discharge x-ray laser system, Plasma x-ray and particle diagnostics, designing of several different size vacuum chambers for 150 Terawatt laser beam diagnostics, laser pulse compression and ultra-high intensity laser plasma interaction experiments. He has also vacuum-tested all these chambers after fabrication. His efforts have played a key role in achieving major milestone for the laser programme.



**2. Shri Ashok Kumar Sagar,**

SA/F, Cryo- engineering and Cryo-module Development Division, RRCAT has been conferred "Meritorious Technical Support Award for the year 2014" for his contributions in the field of "Cryogenics Engineering". He has contributed immensely in the indigenous development of 10K and 30K cryocoolers, modification of compressors for helium gas, operation and in-house maintenance of liquid helium and liquid nitrogen plants. He has also contributed in the 2K set-up for cryogenic temperature sensor calibration and indigenous development of helium liquefier. Shri Sagar played a leading role in the installation and commissioning of three numbers of 10K Cryocooler at Indus-2 beam line, the Academy of Sciences, Bangaluru, and School of Instrumentation, Devi Ahilya Vishwa Vidyalaya, Indore. He has also installed and commissioned six numbers of 30K cryocoolers in different user labs.



**3. Shri Joseph Tharayil,**

Foreman/B, Radio Frequency Systems Division, RRCAT has been awarded the "Meritorious Technical Support Award for the year 2014" in recognition of his outstanding contributions in the field of "RF Subsystem fabrication, assembly, control and testing of indigenously developed high power 505.8 MHz Solid-State RF amplifier System for Indus-2 ". He has contributed significantly in development, fabrication and assembly of RF Sub systems including assembly of RF PCBs with transmission line and RF Components, wiring of RF sub systems, RF power calibration of forward and reflected power measurement detectors, installation of RF systems for Accelerators and in preventive maintenance of Solid State amplifiers installed in RF area of Indus-2.



**4. Shri Dev Singh Rajpoot,**

SA/D, Proton Linac & Superconducting Cavities Division, RRCAT has been awarded with "Meritorious Technical Support Award for the year 2014" in recognition of his outstanding contribution in the field of development and active participation in setting up of various facilities required for development of superconducting cavities. He has provided significant technical support in the development of facilities for centrifugal barrel polishing, electropolishing, high pressure rinsing, cavity tuning, optical inspection bench, RF measurement setup etc. He has participated in testing and installation of liquid helium cryostat for vertical test stand (VTS) facility. He has technically supported in the forming of half-cells for 1.3 GHz and 650 MHz cavities, RF measurement of dumb-bells, inspection, barrel polishing, electropolishing, rinsing, clean room assembly of cavities and vertical testing of the cavities at 2 K.



**H.2.5: Meritorious Service Award:**

The award carries a cash award of Rs. 20,000/-, a Citation and a Medal. There is one award winner from RRCAT:

**Shri Nirbhay Singh Balram,** Work. Assistant A, Director's Office, RRCAT has been awarded the "Meritorious Service Award for the year 2014" in recognition of his



excellent contribution in the area of "Administration". He has made significant contributions in the Administration of Office of Director, RRCAT. His worked involved delivering internal dak in RRCAT premises and also at General Post Office with registered dak, ordinary dak and speed post dak regularly. He has developed excellent IT skills and operates the infrastructure at the office efficiently. He is always willing to work well beyond office hours and on holidays whenever required. Shri Balram is a very sincere, hard-working and cooperative person. His interaction with users is very cordial, positive and courteous.



**H.2.6: Group Achievement Awards:**

The award carries a Medal, a Citation and suitable cash awards for each group commensurate with the group size and its overall achievement. The following four groups of RRCAT received the "Group Achievement Award" for the year 2014:

1. A group comprising of 23 members from RRCAT and 9 members from BARC has been conferred the "Group Achievement Award" for the year 2014 for its contribution on "Development and deployment of laser cutting of triangular blocks of yoke assembly for RAPS-3 and water-jet assisted underwater laser cutting of damaged fuel assemblies of Dhruva reactor". The award was received by the group leader, **Dr. Brahma Nand Upadhyay**, SO/G, SSLD on behalf of the group.



2. A group comprising of 45 members from RRCAT has been awarded the "Group Achievement Award" for the year 2014 for its contribution on the "Up-gradation of Indus-2 with two planar undulators". On behalf of the group, the award was received by **Shri T. A. Puntambekar**, Head, IOBDDD due to superannuation of the group leader, **Shri P. R. Hannurkar**, OS, and former Head, IOAPDD & RFSD.



3. A group, consisting of 25 members from RRCAT and 3 members from BARC has been awarded the "Group Achievement Award" for the year 2014 for "Development" of X-ray Refractive Lenses at the X-ray Lithography beamline BL-7, Indus-2". The award was received by the group leader, **Shri Vishal Prabhakar Dhamgaye**, SO/E, ISUD on behalf of the group.



4. A group, consisting of 77 members from RRCAT has been awarded the "Group Achievement Award" for the year 2014 for "Setting up of infrastructure facilities and development of five-cell 1.3 GHz and first 650 MHz superconducting RF Cavities". The award was received by the group leader, **Shri S. C. Joshi**, OS & Head, PLSCD on behalf of the group.



5. A group, consisting of **Dr. G. Haridas** from RRCAT and 75 members from BARC has been awarded the "Group Achievement Award" for the year 2014 for "Design and Development of Detection Monitoring and Assessment Systems for ensuring Radiological Safety".

**H.3: Swargiya Dadasaheb Kalmegh Smruti Award for Innovative Research -2015:**

**Dr. Shovan K. Majumder**, Head, Optical Spectroscopy and Diagnostic Laboratory, Laser Biomedical Applications and Instrumentation Division was awarded with "Swargiya Dadasaheb Kalmegh Smruti Award for Innovative Research -2015" of Fandent Excellence in Dentistry Awards for his outstanding contribution in research on oral cancer diagnosis. The award carried a cash prize of Rs. 10,000/- along with a Trophy and a Certificate.



**H.4: Best Thesis Award:**

**1. Dr. Shankar Lal**, SO/F, Free Electron Laser Lab., Materials & Advanced Accelerator Sciences Division, has been conferred the ISPA Best Thesis Award at 7th Indian Particle Accelerator Conference (InPAC-2015) held at TIFR, Mumbai during December 21-24, 2015. The title of the thesis is "Design, Construction and Experimental Studies with an S-band Photoinjector". The award consisted of a Certificate from Indian Society for Particle Accelerators (ISPA) and a prize of Rs. 5000/-.



2. Title: Characterization of laser synthesized TiO<sub>2</sub> nanostructures by synchrotron X-ray standing wave technique  
 Authors: Gangadhar Das, Manoj Kumar, A.K. Biswas, Ajay Khooha, Puspender Mondal, M.K. Tiwari  
**Shri Gangadhar Das**, HBNI, RRCAT who presented the poster paper, received the award.



**H.5: Thesis Presentation Award:**

**1. Dr. Akilesh Jain**, SO/H, Head, Solid State RF Amplifiers Lab., RF Systems Division, has been conferred the ISPA Thesis Presentation Award at 7th Indian Particle Accelerator Conference (InPAC-2015) held at TIFR, Mumbai during December 21-24, 2015. The title of the thesis is "Investigations on High Power Solid State RF and Microwave Amplifiers for Superconducting Structures". The award consisted of a Certificate from Indian Society for Particle Accelerators (ISPA) and a prize of Rs. 3000/-.



3. Title: Experimental studies on time multiplexed chirped laser amplification  
 Authors: J. Sharma, D. Daiya, A.K. Sharma, R.K. Patidar, P.A. Naik, P.D. Gupta  
**Ms. Jyoti Sharma**, SO/C, Laser Plasma Division, who presented the poster paper, received the award.



**H.6: Best Poster Awards:**

**H.6.1:** Five papers of RRCAT were selected for the Best Poster Awards of Indian Laser Association (ILA) during the DAE-BRNS National Laser Symposium-24 (NLS-24), held at Raja Ramanna Centre for Advanced Technology (RRCAT), Indore during 02-05 Dec. 2015. The award carries a cash prize of Rs. 2500/- and a Citation. The details of the poster papers are given below:

1. Title: A reliable triggering scheme for arc lamps based on burst of pulses  
 Authors: Ashutosh Sharma, C.B. Panwar, R. Arya, and S.M. Oak  
**Shri Ashutosh Sharma**, SO/F, Solid State Laser Electronics Lab., Solid State Laser Division, who presented the poster paper, received the award.



4. Title: Free carrier and excitonic recombination in Al<sub>0.7</sub>Ga<sub>0.3</sub>As-GaAs heterostructure at low temperature and its effect on ultrafast dynamics of two-dimensional electron gas  
 Authors: Salahuddin Khan, J. Jayabalan, Asha Singh, Rama Chari  
**Shri Salahuddin Khan**, SO/E, Laser Physics Applications Section, who presented the poster paper, received the award.



5. Title: Single shot measurement of electric field profile of intense terahertz radiation pulse  
 Authors: Sonal Saxena, B.S. Rao, J.A. Chakera, P.A. Naik  
**Ms. Sonal Saxena**, HBNI, RRCAT who presented the poster paper, received the award.



**H.6.2:** RRCAT has won first three prizes out of five in Best Poster category in the 7th Indian Particle Accelerator Conference (InPAC-2015), held at Homi Bhabha Auditorium, TIFR Premises, Colaba, Mumbai, during December 21-24, 2015. The details of the poster papers and the awards are given below:



1. First Prize: Paper Title: "Measurement, Analysis and Optimization of higher order modes of RF cavities to achieve 200mA/2.5GeV beam in Indus-2"

Authors: Rajiv Kumar Arora, M. Prasad, Mahendra Lad.

**Shri Rajiv Kumar Arora**, SO/F, RF Systems Division, who presented the poster paper, received the award. The award consisted of a Certificate from ISPA and a prize of Rs. 4000/-.



2. Second Prize: Paper Title: "Successful Development of Worlds First Laser Welded SCRF Cavity at RRCAT: Technique and Advantages"

Authors: Prashant Khare, Brahmanand Upadhyay, Rupul Ghosh, Rajesh Arya, Jishnu Dwivedi, Abhishek Jain, Shailesh Gilankar, Chintan Gupta, Laxman Singh, Diwakar Sharma, A. Lakshminarayanan, Pushkar Mishra, P. K. Kush, P. Shrivastava, S.M. Oak, P. D. Gupta

**Shri Prashant Khare**, SO/G, Cryo-engineering and Cryo-module Development Division, who presented the poster paper, received the award. The award consisted of a Certificate from ISPA and a prize of 3000/-.



3. Third Prize: Paper Title: "Manufacturing of Indigenous RF Cavity for Indus-2"

Authors: G. Mundra, S. D. Sharma, Ramesh Kumar, Vivek Bhatnagar, V. G. Sathe, Rakesh Gupta, T. Veerbhadraiah, Sanjay Sharma, Kamlesh Yedle, Brahmanand Sisodia, P. Ram Sankar, Ashish Tiwari, M. Prasad and Mahendra Lad.

**Shri Sanjay Sharma**, SO/E, Accelerator Components Design and Fabrication Section, who presented the poster paper, received the award. The award consisted of a Certificate from ISPA and a prize of Rs, 2000/-.



**H.6.3:** The 2nd International Conference on Agriculture, Horticulture & Plant Sciences held at Shimla (H.P.), India during December 26-27, 2015, selected the following paper of RRCAT for the Best Paper Presentation Award.

Paper Title: "Effect of Electron Beam Irradiation on Microbial Decontamination and Phytochemical Contents of Spices"

Authors: V. P. Verma, V. C. Petwal, P. Gothwal, M. Seema, K.

K. Malviya and Jishnu Dwivedi

**Shri Vijay Pal Verma**, TO/C, Industrial Accelerators Section, Power Supplies & Industrial Accelerator Division (PSIAD) received the Best Paper Presentation Award.



**H.6.4: Shri Amol Singh**, HBNI Ph.D. scholar (external) working in Indus Synchrotrons Utilization Division, won "Best poster award" in the Asia-Pacific edition of "Higher European Research Course for Users of Large Experimental Systems (HERCULES-2015)", held at National Synchrotron Radiation Research Center, Hsinchu, Taiwan, during 5-24 July 2015. The award was given on his presentation related to his thesis work "Study of Compound Materials for X-ray Optical Applications" carried under the supervision of Prof. M.H. Modi, SO/G, ISUD. The award carries a citation and a cash prize of NT\$ 1200.



**H.7:** VIFRA-Outstanding Scientist Award-2015: **Dr. Shovan K. Majumder**, Head, Optical Spectroscopy and Diagnostic Laboratory, Laser Biomedical Applications and Instrumentation Division has been awarded the VIFRA-2015 Outstanding Scientist Award of Venus International Foundation Centre for Advanced Research and Design for his contribution and achievement in the field of optical spectroscopy for oral cancer diagnosis. The award carries a Trophy and a Certificate.



**H.8: Award of Doctor of Philosophy (Ph.D.) Degrees:**

The Homi Bhabha National Institute (HBNI), a Deemed University has awarded Ph. D. Degrees to following employees of RRCAT for research work carried out in RRCAT:

**1. Dr. Mohammed Salahuddin Ansari** of Laser Electronics Support Division (LES D) has been awarded Doctor of Philosophy in Engineering Sciences on the dissertation, titled



"Signal Integrity and Shielding Issues in Mixed Signal Circuits under Transient Electromagnetic Field Generated by High Power Pulsed Nd:Glass Lasers", which was supervised by Dr. S. V. G. Ravindranath.

**2. Dr. Pradeep Kumar** of Indus Operations, Beam Dynamics & Diagnostics Division (IOBDDD) has been awarded Doctor of Philosophy in Physical Sciences on the dissertation, titled "Studies of Beam Lifetime in Synchrotron Radiation Source INDUS-2", which was supervised by Dr. Pitamber Singh.



**N.6: Superannuations**

The family of RRCAT wishes happy and healthy post retirement life to its following colleagues.

**S.1: Shri C.P. Navathe**, Outstanding Scientist & Head, Laser Electronics Support Division (LESDD) and Accelerator Control and Beam Diagnostic Division (ACBDD) superannuated on 31st August 2015 at the age of 60. He was born in Pune, India in 1955. He received his B.E. from University of Pune in 1978 and M.E. from Devi Ahilya Vishwa Vidyalyaya in 1997. He graduated from 22nd batch of BARC Training school. In 1979, he joined Laser Section, Bhabha Atomic Research Centre, Mumbai where he worked on development of electronics for high power lasers and instrumentation for laser produced plasma. He shifted to Laser Program, Raja Ramanna Centre for Advanced Technology, Indore in 1990. He has significantly contributed in design and development of high voltage capacitor bank power supplies and control systems for various high power lasers developed in house. He was instrumental in indigenous development of streak camera. He has many international publications and conference papers in the field of electronics and instrumentation for high power laser. He was a recipient of three DAE Group Achievement awards for excellence in Science and Technology as a Team-leader. We all remember Shri Navathe for his significant contributions and wish him & his family a happy and healthy post retirement life.



**S.2: Dr. Lalit M. Kukreja**, Outstanding Scientist&Head, Laser Materials Processing Division, RRCAT and Senior Professor, Homi Bhabha National Institute laid down his office on August 31, 2015 on superannuation. Dr. Kukreja joined Department of Atomic Energy in 1976 through 20th batch of Training School at Bhabha Atomic Research Centre after completing M.Sc. in Physics from University of Rajasthan with gold medal. He completed Ph.D. on laser processing of polymers from BARC - Bombay University in 1987 under the guidance of Dr. D. D. Bhawalkar, former Director of RRCAT. Since 1993, he was at RRCAT pursuing his research interests in the field of photonic nanomaterials and laser materials processing. He initiated the biennial DAE - BRNS meetings on pulsed laser deposition of thin films and nano-structured materials and served on numerous academic and extra-mural committees of DAE, RRCAT and other organizations. He was awarded with the prestigious Materials Research Society of India (MRSI) medal 2011 in recognition of his significant contributions to the field of Materials Science and Engineering. RRCAT family wishes Dr. Kukreja and his family a happy, healthy and fulfilling retired life.



**S.3: Dr. Lala Abhinandan**, Scientific Officer (H) and Head, Mechanical and Optical Support Section laid down his office on October 31, 2015 on superannuation. Dr. Lala graduated in Chemical Engineering from Institute of Technology at BHU, Varanasi in 1977. Thereafter, he joined 21st batch of BARC Training School. He worked in BARC, Mumbai from 1978 to 1986 with a multi disciplinary research team on a laser based project. He came to RRCAT along with the first group of R&D personnel in 1986 and worked till his superannuation in Oct. 2015. He was awarded Ph. D. in 1999 by IIT, Bombay for his work on Laser Curing of Powder Coatings. Dr. Lala worked on a wide spectrum of R&D problems including development of various lasers and their application, growth of material by Chemical Vapour Deposition, development of mechanical and glass to metal sealed components etc. In 2001, he worked in Fraunhofer Institute for Applied Polymer Science at Potsdam, Germany on a research and study visit under a program run by DAAD. He has been a faculty and M.Tech guide at Homi Bhabha

