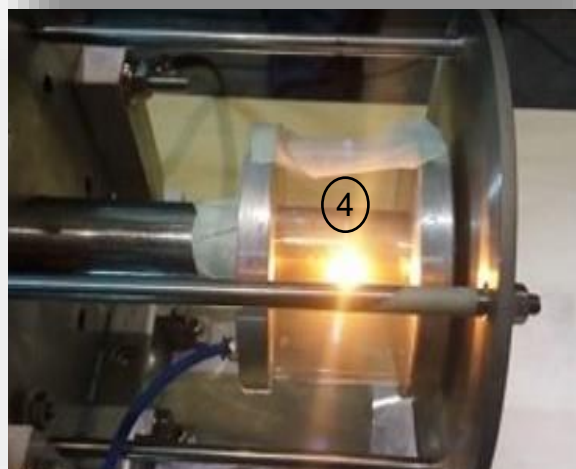
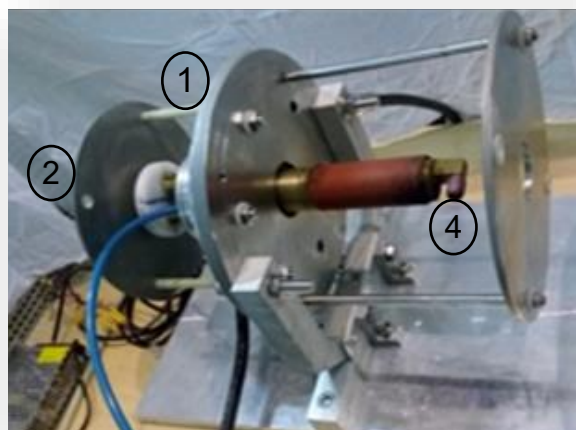
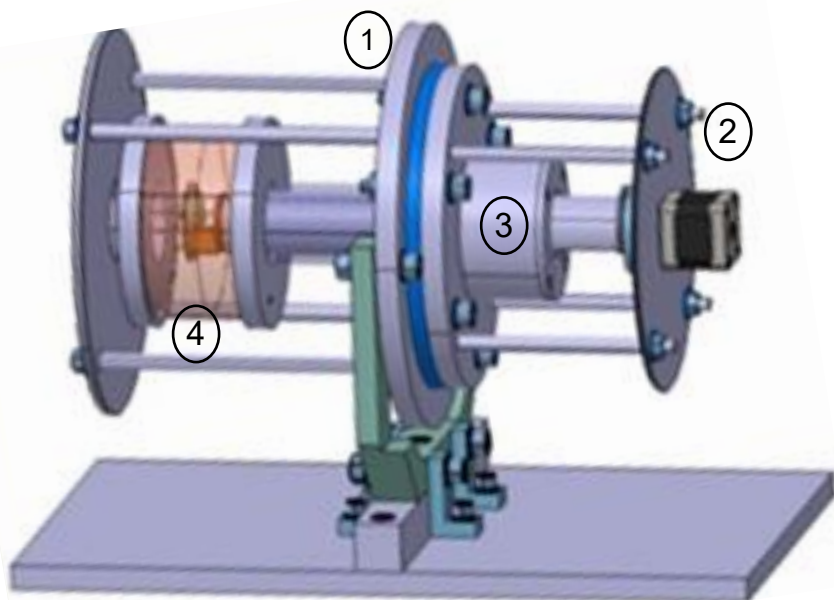


## Design and Development of Internal Bore Welding Test Setup

Welding of pipe joints from the outside are prone to failures due to lack of control of the conditions of the root, majorly, corrosion related failures. Additionally, outside welding becomes impractical for closely spaced pipe arrangements for orbital and manual welding. A definitive approach is to explore the implementation of welding from inside of the pipe. The implementing the weld from inside requires a special tool which has provisions of tool maneuverability, alignment and precision. Keeping the above considerations in view, a special device, named 'Internal Bore Welding Torch' has been developed, put into application and tested for the production quality. Further upgradation of this system is planned to address some of the practical issues faced in operation. This work has aided to the confidence to develop indigenous welding solutions for our practical problems and can be utilized as need arises.



(Clockwise, from top) Schematic of the welding setup (1) Support flange and insulation (2) Stepper motor assembly (3) Roller bearing and flange cap (4) Purging chamber and welding torch. Photographs of the system showing the welding head and during welding.

### Design Features

Rotating arm which can go up to 180mm deep into the pipe and provide an arc.

Rotation control for defining welding speed and no. of rotation to control welding in overlap region.

Customized nozzle-collet-collet body assembly with a passage of shielding gas.

Support bearing for concentric rotation of arm and therefore to maintain the arc gap.

Power carrying rod which also serves as the path for shielding gas up to the nozzle.

Purging chamber for protecting the root of the weld from oxidation, which is transparent to monitor the progression of welding

### Inspection & Qualification

No visual defect observed in Radiography examination, confirming the Integrity of the weld joints.

Mechanical (tensile and bend) test was performed and qualified as per the requirement.

Helium leak test have also been conducted and achieved the leak rate in the range of E-10 mbar.l/s.

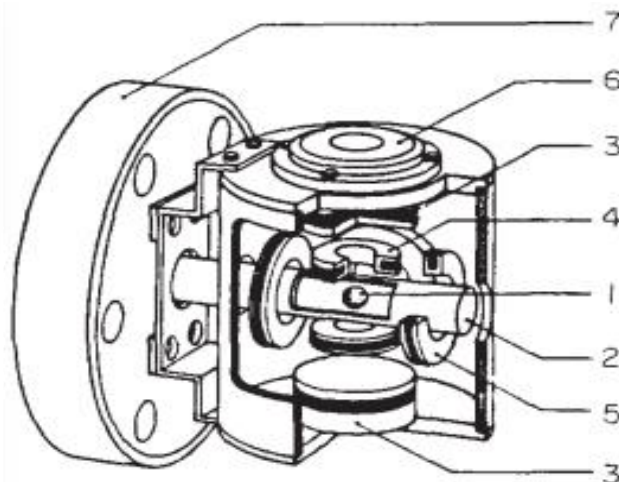
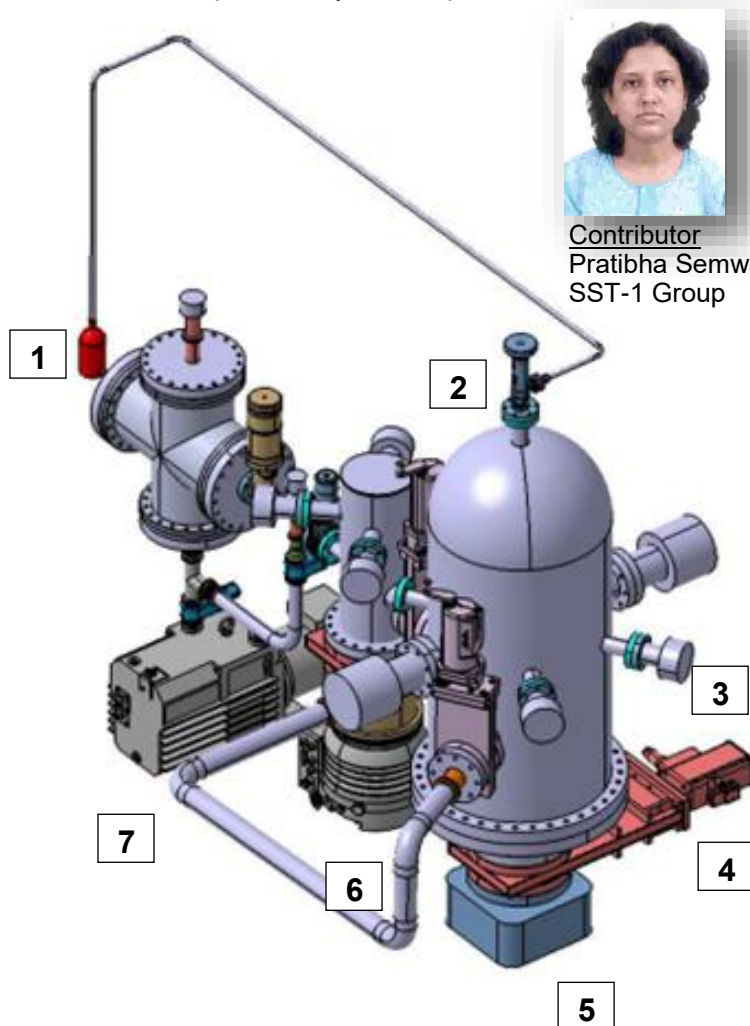


Contributor :  
Ashish Yadav  
ITER-India

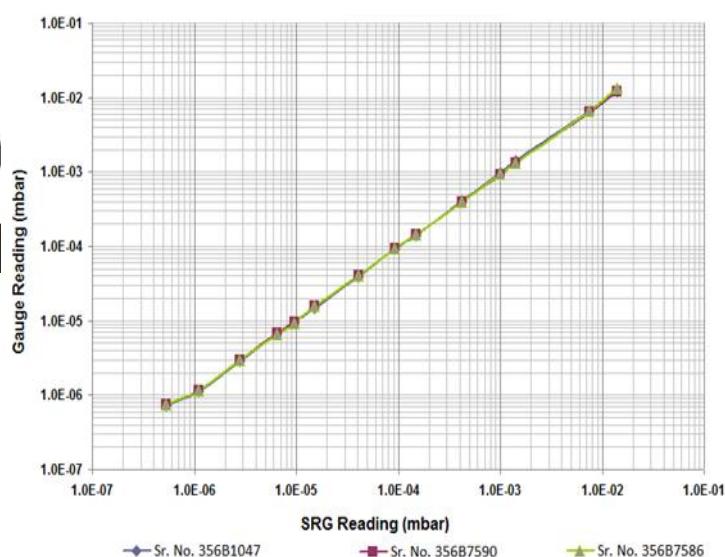
By definition, calibration is a set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument and the corresponding values realized by standards. Calibrated gauges must be used in any experiment where an accurate knowledge of the vacuum level is required whether this is expressed in terms of the molecular density, molecular impact rate or the pressure directly. This is particularly necessary if experiments performed in different laboratories have to be compared. Moreover long duration operation may lead to the changes in the gauge parameters or contamination of the gauge which may result in erroneous readings. Therefore all secondary gauges must be calibrated periodically with respect to a standard reference gauge.



Contributor  
Pratibha Semwal  
SST-1 Group



Schematic of the Spinning rotor Gauge (SRG)  
(1) Steel sphere (2) Evacuated tube (3) Permanent magnets (4) Vertical stabilization coils (5) Driving coils (6) Water level (7) Flange



(Above) The schematic of the gauge calibration system : (1) Gas cylinder (2) Gas feed valve (3) Spinning Rotor Gauge (SRG) (4) Gate valve (5) Ion pump (6) Turbomolecular pump (7) Rotary pump. (Right) Calibration graph obtained from the system

## Welcome to the IPR Family !



Mr. Subhadip Das  
DOJ : 26-5-2017

WELCOME!



Mr. Yogesh Dadheech  
DOJ : 10-7-2017

WELCOME!



Mr. Nimish R. Sachaniya  
DOJ : 26-5-2017

**Mr. Nimish R. Sachaniya** joined as Technical Assistant-B with the FCIPT division on 25-May-2017, **Mr. Subhadip Das** joined as Engineer – SC with the MESD division on 26-May-2017 and **Mr. Yogesh Dadheech** joined on 10-July-2017 as the IPR Stores Officer at IPR. Mr Dadheech was employed with Hindustan Zinc Ltd since last 8 years before joining IPR. We welcome the three new entrants to the IPR family and wish them the very best for their career !



## Summer School Programme - 2017

3

The Summer School Programme (SSP)-2017 at IPR commenced on 29<sup>th</sup> May 2017. This year a total of 39 students have joined the programme, of which 27 were from M.Sc. Physics and 12 were from Engineering streams (Mechanical and Electrical). The tenure of SSP was from 29<sup>th</sup> May to 7<sup>th</sup> July 2017. During the six week long residential program, the participants of SSP-2017 were exposed to lectures on plasma science, scientific project work, visits to various laboratories, in IPR as well as visits to other institutes in Ahmedabad/Gandhinagar. A poster presentation of the projects undertaken by the SSP-2017 participants was arranged on 7<sup>th</sup> July prior to the concluding session of the programme. A one-day picnic was organized for the SSP-2017 participants along with PAVAGARH (Vadodara). IPR Director's Lunch was also organized for the SSP students where the Director interacted with the students. The organizing committee of the SSP-2017 consisted of the following members ; Pintu Bandyopadhyay, Jinto Thomas, Mitul Abhangi, Varsha Siju, Hiral Joshi, Hardik Mistry, Jagabhandhu Kumar, Vinay Menon and Prashant Kumar.



Group photo of the SSP-2017 participants and the organizing team



(Left) Director IPR interacting with the SSP-2017 students. (Right) Students receiving prizes for the poster presentation from Prof. Abhijit Sen - (Top) Ms. Kamini Bharti and (bottom) Mr. Zeeshan



(Left) Poster presentation by the SSP students. SSP students during the concluding session



The construction of the laboratory building, auxiliary building as well as the pump house is progressing. The auxiliary building will be completed by end of July and the chilled water plant pipeline is being assembled in this building now.



(1) The laboratory building roofing work in progress (2) Roofing work in progress, as seen from 2nd floor of the laboratory building (3) View of the auxiliary building from the control room showing the water chiller piping installation being carried out. (4) Fire-retardant painting of the beams in the 1st floor of laboratory building. (5) View of the high-bay area of the laboratory building from the 2nd floor.



Nanotechnology is deemed to be the enabling technology for next generation advanced machines and processes. FCIPT's efforts have been focused on developing industry specific nanotechnologies using plasma technology. One such technology is nano-powder production technology developed at Institute for Plasma Research, FCIPT Division. Based on the interest of an Ahmedabad based company M/s Vishal Engineers & Galvanizers Pvt. Ltd. (VEGPL), a non-exclusive Technology Transfer agreement was signed by and between IPR and VEGPL on 14th June 2017 at IPR. The agreement was signed by Mr. Vikalp Joisar, Director, VEGPL and Shri A. Varadarajulu, Chairman, SPC, IPR in the presence of Director, IPR.



Signing of the technology transfer of nano-power production technology between IPR and M/s VEGPL, Ahmedabad

### IPR @ Meetings

The 34<sup>th</sup> DAE Safety & Occupational Health Professionals Meet-2017 was jointly held by Atomic Energy Regulatory Board (AERB) and Kudankulam Nuclear Power Project (KKNPP), NPCIL at Kudankulam, Tamilnadu from 28 to 30 June, 2017. The themes for this year's meet were "Key Principles of Human, Organizational and Technical Factors in Safety" for Industrial Safety and "Life Style Diseases – a silent Killer of the Millennium" for Occupational Health. This meet was inaugurated by Shri K.N. Vyas, Director-BARC. About 180 delegates from various DAE units and DAE aided institutes participated in this meet.

The meet was attended by Shri Bharat Doshi, Shri Vijay Patel, Shri D.V.Modi and Shri Ravi Ranjan Tiwari. A poster was presented by Shri Tiwari on "Safety Considerations in Remote Handling and Robotic Work-Cells". Mr. S. Shravan Kumar won the consolation prize for Cartoon Competition and Dr. Sandhya Dave won a consolation prize for Hindi Safety Slogan Competition. Her slogan was "विवेकहीन जीवनशैली के धीमे जहर से मुक्ति पाइए।स्वस्थ सफल जीवन हेतु प्राकृतिक दिनचर्या अपनाइए।।



(Clockwise) Mr. D Modi receiving the prize for slogan competition on behalf of IPR. Mr. R. R. Tiwari with his poster; Prize winning cartoon by Mr. Shravan Kumar



As reported earlier, Dr. J Govindarajan retired from service on 30th June 2017. A farewell meeting for him was organized by the Staff Club.

The Staff Club President began the meeting and Dr. Swe-tang Pandya introduced Dr. Govindarajan to the gathering through a lively presentation. During the meeting, several colleagues of Dr. Govindarajan spoke about their experiences and anecdotes of their long association with him.

Shri. P K Atrey, Shri Ujjwal Baruah, Dr. Chenna Reddy, Dr. Ravi Kumar, Ranjana Manchanda etc., also shared their experiences and funny anecdotes of working with Dr. Govindarajan. Director Dr. Shashank Chaturvedi presented a memento on behalf of the Staff Club to Dr. Govindarajan and his wife, Mrs. Shanti Govindarajan. On behalf of IPR, we wish him a happy and healthy retired life.



Right : IPR Director, Dr. Shashank Chaturvedi presenting the memento to Dr. Govindarajan and Mrs. Govindarajan



Left : IPR Director, Dr. Shashank Chaturvedi sharing a few light moments during the farewell Right : Dr. Govindarajan thanking the audience.

## 4th PFRC-BRNS Meeting @ IPR



The 4th meeting of the Plasma & Fusion Research Committee (PFRC) of the Board of Research in Nuclear Sciences (BRNS) was held at IPR during 13-14 July 2017. The following members attended the meeting Prof P I John (Chairman), Prof. Prabal Chattopadhyay, Shri. D. K. Dalal (Project Officer, BRNS), Shri. P K Atrey, Prof Amit Roy and Prof. T Jayakumar, Prof. Sangita (Scientific Secretary, BRNS), Dr. Ravi A V Kumar (Member Secretary, PFRC) and Dr. N Ramasubramanian. During this 2 day meeting, 11 new R&D projects with a budget allocation of ~ Rs.3.0 Crores as well as 30 ongoing projects were reviewed. The Committee also held deliberations on the future course of R&D in Plasma & Fusion.



In continuation of the ongoing theme of "Healthy Employees – Healthy Organization", IPR Staff Club organized a seminar on 6th July, 2017 by Dr. Bharat J. Patel, (M.S. Ortho) on preventive health care to be adopted for Arthritis, Knee and back pain. IPR employee participated to this interactive session and lecture.



(Left) Shri. P. K. Atrey welcoming the speaker, Dr. B.J. Patel. (Right) View of the participants (Inset) Dr. Bharat J Patel delivering the talk.

## When The Monsoon Arrives !

We all look forward to the monsoons, and when it rains, the IPR campus is indeed a very pretty sight. So much so that not only IPR'ites, but also other living beings in IPR too stop what they were doing to watch the rains ! After the long and harsh summer, it is indeed a sight for sore eyes when the foliage in the campus looks genuinely happy and also when one gets to see the real hues and colors which the summer heat seemed to have taken away temporarily from them !





Mr. Rajiv Sharma of the SST-1 Cryogenic Division attended 14th Cryogenics 2017 IIR International Conference at Dresden, Germany on 17 May 2017 and gave a poster presentation entitled "*A hydrostatic pressurization test of high pressure helium gas storage vessels at IPR*". He also paid a technical visit to the Karlsruhe Institute of Technology, Karlsruhe, Germany on 22 May 2017 where he delivered a talk entitled "*SST-1 Cryogenics System and Related Facilities*".



(Left) Mr. Rajiv Sharma with his poster at the conference. (Right) With the members of the Cryogenic Division of KIT, Karlsruhe.

## Validation of Indigenous Developed Electrical Insulation Breaks in SST-1

For the requirement of up gradation of hydraulics for the PF-3 and PF-5 SC magnets of SST-1 machine, the bigger size (of  $\frac{1}{2}$ " NB i.e. 21.3 mm OD) insulation breaks were in-house developed, fabricated, tested as per operational requirement and installed in circuit. The electrical insulation breaks have been validated and sustained the maximum possible cool down temperature of 4.9 K, 6.0 K and 5.6 K in PF 1, 2 & 4, PF-3 and PF-5 at inlet hydraulics respectively. In current cool down and experimental requirement the bigger size (of  $\frac{1}{2}$ "NB) electrical insulation breaks has performed in rigorous environment of many thermal cycling of pressure from 8.0 to 1.2 bar at cryogenic temperature which induces high thermal stress in electrical insulation breaks. An advancement task of bigger size insulation breaks ( $\geq 1/2$ ") and development of indigenous cryogenic resin system is continuing. Contributor : Mr. Rajiv Sharma, SST-1 Cryogenics Division



(L-R) Developed Electrical Insulation breaks ; Breaks Installed in upgraded PF coils hydraulics ; Thermal shock testing at 4.2 K in the Lab

## Congratulations !!

Dr. Arpan Doshi, son of Mr. Bharat Doshi, Engineer-SG of IPR earned his Bachelor of Medicine and Bachelor of Surgery degrees from the University of Sheffield, UK and has become Britain's youngest doctor at the age of 21 years and 334 days. He beat the previous record by 17 days. He is due to start work as a junior doctor in the city of York in UK. He started his medical school at the age of 17 in 2012. The University of Sheffield had also awarded him a £13,000 scholarship for his medical studies.

On behalf of all the staff members of IPR, the newsletter wishes to congratulate Dr. Arpan Doshi on this stupendous achievement and wish him the very best in his medical career.

*Congratulations!*



Dr. Arpan Doshi



- ◆ **Mr. Mangilal Choudhary**, Institute for Plasma Research, Gandhinagar, gave a talk on "Experimental studies on collective phenomena in dusty plasmas" on 23rd June 2017
- ◆ **Dr. Chandra Shekhar Pant**, IIT Mumbai, gave a talk on "Large Eddy Simulation (LES) of Microphysics in Atmospheric Clouds" on 3rd July 2017
- ◆ **Mr. Neeraj Chaubey**, Institute for Plasma Research, Gandhinagar, gave a talk on "Synchronization Dynamics Between Two Coupled Glow Discharge Plasma sources" on 4th July 2017
- ◆ **Prof. Arnab Kumar Ray**, Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar, Gujarat, gave a talk on "Evolution and Instability of Bondi Accretion" on 4th July 2017 (Colloquium # 273)
- ◆ **Mr. Subrata Jana**, Institute for Plasma Research, Gandhinagar, gave a talk on "Study on Plasma Shaping and Control in Steady State Superconducting Tokamak (SST-1)" on 21st July 2017
- ◆ **Dr. J. K. Atul**, Institute for Plasma Research, Gandhinagar, gave a talk on "Magnetic Shear Stabilized Multiple Instabilities In Convective Fluid Plasma Transport Scenario" on 24th July 2017
- ◆ **Prof. B. N. Dev**, Department of Materials Science, Indian Association for the Cultivation of Science, Kolkata, gave a talk on "Quantum tunneling: From solar fusion and life to nanotechnology" on 24th July 2017 (Colloquium # 274)
- ◆ **Mr. Chandrasekhar Shukla**, Institute for Plasma Research, Gandhinagar, gave a talk on "Particle-in-Cell Simulations of Fast Electron Time Scale Phenomena" on 25th July 2017
- ◆ **Prof. G. Ravindra Kumar**, Tata Institute of Fundamental Research, Mumbai and **Prof. Amita Das**, Institute for Plasma Research, Gandhinagar, Gujarat, gave a talk on "Mimicking Astrophysical Turbulence on a Tabletop" on 25th July 2017 (Colloquium # 275)

## Upcoming Events

- ◆ 7th Central European Symposium on Plasma Chemistry, Sveti Martin na Muri, Croatia, 3-7 September 2017 <http://cespc7.org/>
- ◆ 12th International Workshop on Electric Probes in Magnetized Plasmas (IWEP 2017), Naklo, Slovenia, 4-7 September 2017 <http://www.djs.si/iwep2017/>
- ◆ International Conference on Quantum, Atomic, Molecular and Plasma Physics, Glasgow, UK, 4-7 September 2017 <http://quamp2017.iopconfs.org/home>
- ◆ 2nd Conference on Extremely High Intensity Laser Physics (ExHILP), Lisbon, Portugal, 5-8 September 2017 <http://exhilp.wimpzilla.tecnico.ulisboa.pt/>
- ◆ 10th International Conference on Inertial Fusion Sciences and Applications (IFSA2017), Saint Malo, France, 11-15 September 2017 <http://web.luli.polytechnique.fr/ifsa2017/>
- ◆ 25th International Conference on Numerical Simulation of Plasmas (ICNSP 2017), Leuven, Belgium, 18-20 September 2017 <https://kuleuvencongres.be/icnsp2017/>
- ◆ International Conference on Research and Applications of Plasmas (PLASMA 2017), Warsaw, Poland, 18-22 September 2017 <http://plasma2017.ipplm.pl/>

## Know Our Colleagues



**Mr. Manoj Kumar Gupta** joined IPR in 1998 as a mechanical engineer after completion of Technical Trainee programme of the 1997 batch. He started with RF Division on LHCD system and involved from the conceptual designing to the commissioning of the in-vessel, out-vessel and the Hard X-ray diagnostic systems. He completed his M.E. in 2007 with specialization in cryogenics and was deputed to the SST-1 Cryogenics system in the same year. He contributed to refurbishing existing Liquid Nitrogen system for the SST-1 which included 80K thermal shields, transfer lines (multiple inlet and multiple outlet), valve boxes, booster system etc. He also designed many support structures for different systems in various divisions. He became the leading member for the LIGO India Mechanical Systems in 2012 as a part of LIGO Preparatory Group. He completed most of the related drawings, design and analysis part of many sub-systems of the LIGO group. He is presently working as section head for the Engineering Design and Analysis Section (EDAS).

**Mr. Kumar Rajnish** completed his B.E. (Instrumentation Technology) from SJCE Mysore, Mysore University in 1995 and M.Tech in Biomedical engineering from BHU, Varanasi in 1999. He Joined the Institute after TTP 1998-99 as Instrumentation and control Engineer in RF group. He worked for acquisition and control (DAC) for ICRH, ECRH & LHCD systems and involved in the design, development, integration and testing of DAC systems for high power klystron operation, Gyatron operation and tetrode based amplifier systems. He also contributed in the design, development, testing and integration of Signal conditioning modules and development of different electronic cards for successful integration & operation of these sub-systems with ADITYA tokamak as well SST tokamak. Since 2006 he is working with ITER-India project where his prime responsibility is to develop Local control unit for ICRH-Source package and coordinate various CODAC related activities between ITER-India and IO-central team.



## The IPR Newsletter Team

Ritesh Srivastava	Tejas Parekh	Ravi A. V. Kumar	Priyanka Patel	Dharmesh P	Mohandas K.K.
Suryakant Gupta	Ramasubramanian N.	Chhaya Chavda	Shravan Kumar	Supriya Nair	Harsha Machchhar

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