



# भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद Physical Research Laboratory, Ahmedabad

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**67\_PRL Ka Amrut Vyakhyaan**

**Wednesday, 09 November 2022**

**@ 04:00 PM (IST)**

**“Fusion and Plasma Research in  
India:  
Where are we, where are we going?”**

**Dr. Shashank Chaturvedi**

Director, Institute for Plasma Research,  
Gandhinagar.



[https://youtu.be/mU5\\_RwkK51E](https://youtu.be/mU5_RwkK51E)



## ***67\_PRL ka Amrut Vyakhyaan***

**Title: “Fusion and Plasma Research in India: Where are we, where are we going?”**

**Speaker: Dr. Shashank Chaturvedi**

Director, Institute for Plasma Research, Gandhinagar.

**On Wednesday, 09 November 2022**

### **Abstract**

Research at IPR can be divided into a few broad areas. The first is the development and operation of nuclear fusion-related devices called tokamaks. The second is R&D targeted at the indigenous development of Fusion Reactor Technologies, which are essential for an indigenous programme aiming at power from Nuclear Fusion. The third is basic research in plasmas and related fields, including exploration of the physics of alternative fusion concepts. The fourth is the development of plasma technologies for Societal/Industrial benefit. This talk will provide a brief overview of the above activities along with the Roadmap for the future.

### **The Speaker**

Dr. Shashank Chaturvedi got his B.Tech. in Chemical Engineering from IIT Delhi, where he was awarded the Silver Medal for standing first in the Dept. He then got his Ph.D. in Chemical Engineering from Princeton University, USA. His PhD work involved the computational study of a novel Nuclear Fusion Reactor concept.

He was awarded the Homi Bhabha Science & Technology Award of DAE in 2005. He is a Fellow of the Indian National Academy of Engineering and Senior Professor in the Homi Bhabha National Institute (HBNI).

He has earlier served as Head, Computational Analysis Division in the Bhabha Atomic Research Centre (BARC), Visakhapatnam. He is presently serving as Director of the Institute for Plasma Research, Gandhinagar, Gujarat.

His research interests include numerical modelling of pulsed-power & plasma systems, including Magneto-hydrodynamics, radiation-hydrodynamics, high-speed impact & shock waves, pulsed electromagnetics, High Performance Computing (HPC), Theoretical and experimental determination of materials properties (opacity, equation-of-state) under extreme conditions and automated processing of signals, voice, image & video data.



## About PRL

The Physical Research Laboratory (PRL), known as the “cradle of space science” in India, is one



of the premier research institutes founded in 1947 by Prof. Vikram Sarabhai, a renowned Cosmic Ray Scientist, a great visionary and institution builder. PRL played a seminal role in producing a highly motivated cadre of space scientists and the technologists of highest international repute. The first scientific rocket launched from Thumba on 21st November-1963 and many other rockets launched thereafter contained payloads developed at PRL. Dr. Sarabhai initiated many of these scientific and technical activities at PRL which eventually led to the formation of the Indian Space Research Organization (ISRO). Therefore, PRL is known as the “cradle of space science” in India. Further, the research in the area

of Plasma Physics expanded to the formation of the Institute of Plasma Research (IPR).

As an institution PRL is unique in that it conducts fundamental research in a wide range of research areas from the Earth to the cosmos, and comprising Astronomy and Astrophysics; Solar Physics; Space and Atmospheric Sciences; Theoretical Physics; Geosciences; Atomic, Molecular and Optical Physics, Astrochemistry; and Planetary Sciences and Space Exploration. PRL is one of the rare research institutes of international repute wherein research in such diverse fields of sciences is carried out using several state-of-the-art experimental facilities that exist under one umbrella.

Along with the ongoing research, several new initiatives have been taken up during the last few years. The Multi-Application Solar Telescope (MAST) at Udaipur Solar Observatory has been operationalized. PRL initiated scientific programmes in frontier areas of research, which include a search for exo-planets, laboratory studies of interstellar grains, laboratory synthesis of cold astro-molecules and experimental studies in the field of quantum optics. PRL is also developing several scientific payloads as a part of ISRO’s larger vision and contributing to roadmap for competitive scientific exploration of the solar system and beyond. In particular, PRL has been contributing significantly not only in building instruments for space missions, such as Chandrayaan-1, Chandrayaan-2, AstroSat and upcoming Aditya-L1, Chandrayaan-3 and planetary and space missions, but also by bringing out new and insightful science results.

PRL contributes to several national and international research programmes and to human resource development through its Doctoral and Post-Doctoral Programmes, capacity building programmes, such as UN Course on Space Science, and science and engineering internship programmes. PRL contributes significantly to society through its Outreach Programmes by periodically organizing science exhibitions and Open Houses, planned visits of students of various school and college to PRL, and popular talks at various institutions to not only share the excitements of the advancements of contemporary scientific findings but also to encourage students to take up sciences as their research career.

