



भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद

Physical Research Laboratory, Ahmedabad

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**PRL Ka Amrut Vyakhyaan-08**

**Wednesday, 22 September 2021**

**@ 16:00 hrs. IST**

**“PROSPECTS IN SOLAR PHYSICS  
FOR THE NEXT DECADE:  
A MULTI-MESSENGER ERA”**

**Dr. Valentin Martinez Pilet**

Director, National Solar Observatory (NSO)  
Boulder, USA.



**You Tube** <https://youtu.be/QDHmPDgqgzo>

## PRL ka Amrut Vyakhyaan-08

### Title: “Prospects in Solar Physics for the Next Decade: a Multi-messenger Era”

**Speaker: Dr. Valentin Martinez Pillet**

Director, National Solar Observatory (NSO) Boulder, USA.

**On Wednesday, 22 September 2021**

#### Abstract

The start of operations of the NSF’s Daniel K Inouye Solar Telescope (DKIST) in late 2021 coincides with the science phases of two solar encounter missions, Parker Solar Probe (NASA) and Solar Orbiter (ESA/NASA). The three facilities constitute a multi-messenger suite destined to help us understand how the heliosphere is magnetically connected to the Sun. By getting closer to the Sun, the two spacecrafts can measure in-situ the pristine consequences of the processes observed at the solar surface with unprecedented detail and sensitivity using DKIST. The ability to observe spectropolarimetric signals from the solar corona is a novel and unique capability that DKIST will contribute to this collaboration. This talk will outline some multi-messenger science cases that will benefit from combining the three facilities using different vantage configurations created by their orbits around the Sun. This discussion will be useful to update on the status of DKIST, but also of the NSO operated synoptic network GONG (with a node in Udaipur) and the plans for a future improved network that replaces it.

#### The Speaker

Dr. Valentin Martinez Pillet is a well-known solar physicist, and is currently the director of National Solar Observatory (NSO), Boulder, Colorado. NSO operates the largest solar telescope in the world, the 4m Daniel K Inouye Solar Telescope (DKIST) which became operational in 2019. Dr. Valentin joined NSO as the director in 2013 and oversaw the installation and commissioning of the DKIST. Before he started his career in NSO, he was a senior scientist at the Instituto de Astrofísica (IAC), Tenerife, Spain. In IAC, he was the PI for the Imaging Magnetograph eXperiment (IMaX) for the 1 m Sunrise balloon-borne solar experiment. He is an expert in solar polarimetry and worked with some of the best telescopes in the world such as Vacuum Tower Telescope (VTT) in Tenerife. He is the Co-Principal Investigator for the Polarimetric and Helioseismic Imager instrument that was flown on the European Space Agency’s Solar Orbiter mission in February 2020. He is also a member of the Science Working Team of the ESA/NASA Solar Orbiter mission. Dr. Pillet was the President of the Division II of the IAU “The Sun & the Heliosphere” from 2010-2012 and has also served as a member of the editorial board of Solar Physics Journal.

He has published more than 250 research publications in reputed journals and more than 25 invited review articles. He is also a member of several international scientific bodies and member of the Scientific Advisory Committees of various institutions of international repute.



## 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 astromolecules 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.

