



भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद

Physical Research Laboratory, Ahmedabad

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PRL Ka Amrut Vyakhyaan-19

Wednesday, 08 December 2021

@ 16:00 hrs. (IST)

**“Shedding light on the Dark
Matter in the Universe”**

Prof. Rohini Godbole, D.Litt.

Padma Shri, FNA, FASc, FNASc, FTWAS, J.C. Bose Fellow

Centre for High Energy Physics,

Indian Institute of Science, Bangalore.



<https://youtu.be/9qEvbR3TXRU>

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Title: “Shedding light on the Dark Matter in the Universe”

Speaker: Prof. Rohini Godbole

Padma Shri, FNA, FASc, FNASc, FTWAS, J.C. Bose Fellow

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Abstract

This talk will discuss one of the next frontiers to be crossed in the everlasting march towards unravelling the mysteries of nature, viz. the issue of Dark Matter (DM) in the Universe. In this context this talk will discuss about the observations that compel the scientists to believe that it exists and also explore its connection with accepted theories of particle physics. It will then discuss about the various ways to probe its nature and properties at the Large Hadron Collider (LHC), the future electron positron colliders like the ILC as well as other experiments happening deep underground. In the last part of the talk some research work will be touched upon that the speaker has been engaged in over the last few years in the context of the Supersymmetric Dark Matter, the lightest supersymmetric particle, LSP.

The Speaker

Prof. Rohini M. Godbole is currently an honorary professor at the Indian Institute of Science, Bangalore, is a theoretical particle physicist who has spent time at various Universities in India, Europe and the USA including CERN, Geneva. She has worked extensively over the past four decades on exploring the Standard Model of Particle Physics (SM) and the physics beyond it (BSM) at the colliders, authoring more than 300 publications in refereed journals and arXived preprints, including a graduate level text book. Her pioneering work on probing hadronic interactions of photons at colliders, provided important insights for the designs of electron-positron colliders. Her suggestions to probe the SM and BSM physics at colliders have been used in experiments at different colliders. She is an elected fellow of all the three science academies of India as well as The World Academy of Science (TWAS), having been the council members of all the three as well as Vice President of the National Academy of Sciences (India). She has been the chief editor of *Pramana*, journal of Physics brought out by the Indian Academy of Sciences and member of various editorial boards of National and International journals and also of a number of International scientific advisory bodies such as the High Energy Physics Advisory Panel in the US, the International Detector Advisory Group for the International Linear Collider or the Advisory Board: Oxford Research Encyclopedia for Physics. She is the recipient of the fourth highest civilian honour of the Government of India, the Padma Shri, first woman to receive it for work in physics. Recently, the honour “*Ordre National du Merite*” was conferred upon her by the French Government. Degrees of D.Litt. (Honoris Causa) have been conferred upon her by old Universities like the S.N.D.T Women's University, Tilak Maharashtra Vidyapeeth and D.Sc. (Honoris Causa) is to be conferred by I.I.T. (Kanpur) soon.

An avid supporter of women in science, she has worked in a number of for a to facilitate more numerous and effective participation of women in science. This includes bringing out a book ‘Lilavati’s Daughters’, containing autobiographical sketches of Indian women scientists as well as leading surveys to determine why women drop out of science after doing a Ph.D. These have provided some interesting insights on the issue of women in science. She also chaired the committee which drafted discussions on Equity and Inclusion in India’s Science, Technology and Innovation policy of 2020.



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.

