भौतिक अनुसंधान प्रयोगशाला, अहमदाबाद

Physical Research Laboratory, Ahmedabad

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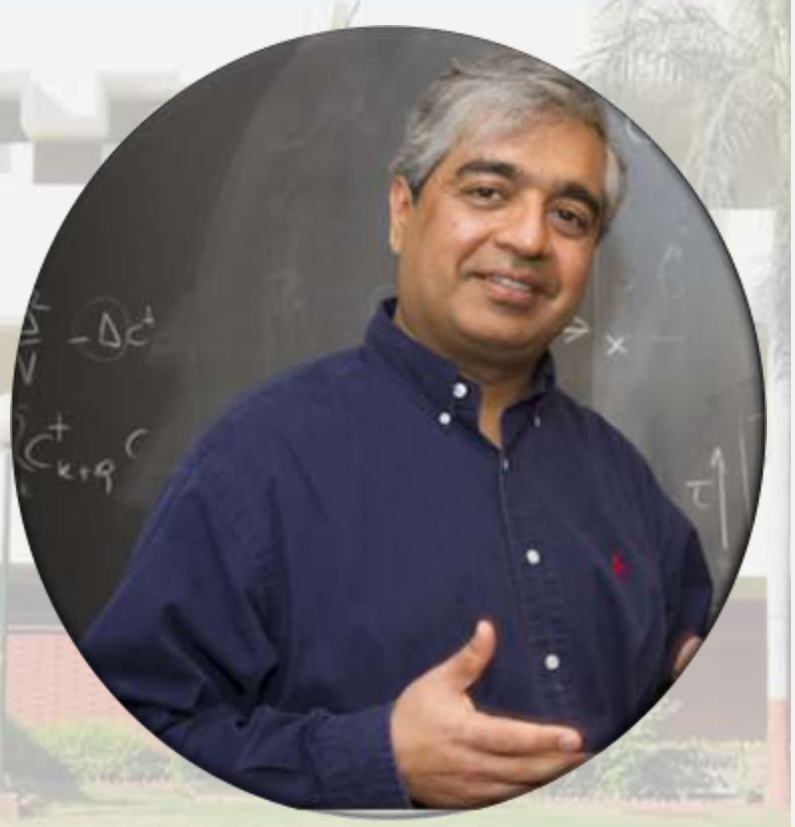
PRL Ka Amrut Vyakhyaan-35

Wednesday, 30 March 2022

@ 04:00 PM (IST)

"Quantum entanglement at all distances"



Prof. Subir Sachdev

Herchel Smith Professor of Physics
Harvard University, Cambridge

https://youtu.be/lvEcANz1G_8

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Title: "Quantum entanglement at all distances"

Speaker: Prof. Subir Sachdev

Herchel Smith Professor of Physics, Harvard University, Cambridge

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Abstract

Entanglement is the strangest feature of quantum theory, often dubbed ''spooky action at a distance''. Quantum entanglement can occur on a macroscopic scale with trillions of electrons, leading to novel superconductors which can conduct electricity without resistance even at relatively high temperatures. These superconductors also display a 'strange metal' regime in which individual electrons lose their identity. Related entanglement structures arise across the horizon of a black hole, and give rise to Hawking's quantum paradox. "I will introduce and describe these long-standing problems in two very different fields of physics, and review progress in resolving them using insights from the Sachdev-Ye-Kitaev model."

The Speaker

Prof. Subir Sachdev was educated at the Indian Institute of Technology, Delhi, the Massachusetts Institute of Technology, and Harvard University. He has held professional positions at Bell Labs, Yale University, and Harvard where he is now the Herchel Smith Professor of Physics. During 2021-22 he is also the Maureen and John Hendricks Distinguished Visiting Professor at The Institute for Advanced Study, Princeton. He has been elected to national academies of science in India and the U.S. and is a recipient of a number of awards and honors which include the Dirac Medal from the International Center for Theoretical Physics, and the Lars Onsager Prize from the American Physical Society.

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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.

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