

Dear Colleagues and Students,

It is our great pleasure to invite you all to a Colloquium Lecture organized on the occasion of the School of Materials Science Day, to be delivered by Prof. Arindam Ghosh, Department of Physics, Indian Institute of Science, Bangalore.

The details of the lecture and a brief biography of Prof. Ghosh are provided below.

Title: **Designing emergent phenomena with metallic interfaces**

Date: January 30, 2026 (Friday)

Time: 02:30 PM

Venue: C.V. Raman Hall

Abstract of the Talk:

Atomically precise engineering of interfaces between two dissimilar solids has led to numerous fundamental discoveries in condensed matter physics and disruptive devices functionalities. Interfaces formed with insulators, such as oxides, and/or epitaxial semiconducting layers, have been of particular interest over decades, resulting in discoveries of field effect devices with oxide-semiconductor interfaces, or high-mobility electrons in semiconductor heterostructure, to topological phenomena or even superconductivity at oxide interfaces. Intriguingly, interfaces between archetypal metals have largely been ignored. In this talk, I shall highlight our recent work in engineering emergent properties with some unique forms of interfaces. I shall describe a new strategy of creating three-dimensional network of interfaces in bi-metallic hybrids, by embedding ultra small silver nanoparticles (AgNPs) of radius $\sim 1 - 2$ nm inside single crystalline gold. I shall show that such simple structures can exhibit unprecedented enhancement in an effective electron-lattice coupling, Rashba spin-orbit effects, and even unconventional thermoelectric properties. I shall discuss possible impact of such a material engineering strategy on different physical properties and phenomena.

Brief Biography of Prof. Ghosh:

Arindam Ghosh is JRD Tata Chair Professor of Physics at the Indian Institute of Science in Bangalore, India. He is an alumnus of the University of Cambridge, has been a Visiting Research Fellow in Nanotechnology at the T J Watson Research Centre of IBM, and serves as a member on the Research Councils and adjunct professorships in numerous institutions in India. His research involves both fundamental physics and applied aspects of emerging quantum materials and devices. He has graduated over 25 PhD students, written over 200 research papers, and is a member of all three National Science Academies in India. He coordinated the material and devices vision document for India's National Quantum Mission, chaired the committee that designed the undergraduate quantum education in India for over 9000 technical colleges and universities, and is currently serving as the Convenor of the IISC Quantum Technology Initiative. He has received numerous prizes, including the Swarnajayanti Fellowship (2009), Oxford Instruments Young NanoScientist Award (2015), Shanti Swarup Bhatnagar Prize in 2012, J. C. Bose Fellowship in 2018, and the Infosys Science Prize for Physical Sciences in 2020 for his work on the atomically thin solids, among many others. He is also the co-founder and

CEO of Quan2D Tech. Pvt Ltd – a deeptech startup developing commercializable devices for quantum sensing.

Yours sincerely,
Urmimala Maitra
Assistant Professor
School of Materials Sciences
Indian Association for the Cultivation of Science
2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata, India