S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES
Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Condensed Matter and Materials Physics

08th August,2023 **12.00 Noon** **ONLINE/ FERMION**

SPEAKER
Prof. Jay Deep Sau,
Professor, Department of Physics and
Condensed Matter Theory Center,
Co-director, Joint quantum institute,
University of Maryland,
College Park, MD USA

TITLE OF THE TALK

SEARCH FOR NON-ABELIAN MAJORANA MODES AS A ROUTE TO TOPOLOGICAL QUANTUM COMPUTATION

ABSTRACT

Majorana zero modes are fermion-like excitations that were originally proposed in particle physics by Ettore Majorana and are characterized as being their own anti-particle. In condensed matter systems Majorana zero modes occur as fractionalized excitations with topologically protected degeneracy associated with such excitations. For over a decade the only candidate system for observing Majorana zero modes were the non-Abelian fractional quantum Hall state and chiral p-wave superconductors. In this colloquium, I will start by explaining the basic ideas of topological quantum computation using Majorana zero modes and the potential advantages over existing systems. I will then discuss the current experimental progress, challenges in the field and our theoretical analysis of current devices. I will then provide a more detailed explanation of braiding, Majorana operators and the associated topological degeneracy.

HOST FACULTY

Prof. Manoranjan Kumar, Professor

****