Satyendra Nath Bose National Centre for Basic Sciences

Azadi Ka Amrit Mahotsav

Visitor, Associates and Students' Programme (VASP) presents Webinar Series on

Quantum Materials & Devices

22 DEC 2021
10:00 AM (IST)

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TITLE

Rare Earth Magnetic materials: Platforms for Exotic Spin States and Bose Condensation

ABSTRACT

Rare earth materials provide a fertile playground for quantum magnetism. Strong spin-orbit couplings lead to atomic crystal-field doublets, which act as effective spin-half degrees of freedom. Cooperative behavior of these degrees of freedom leads to an array of quantum-magnetic phenomena including spin-ice, order by disorder, quantum spin-liquids and most recently Bose-Einstein Condensation of magnons. Relatively small values of the exchange energy scale means that quantum magnetism can be investigated from the exotic states in lzero magnetic-fields to saturation in high magnetic fields by a variety of experimental techniques. We will discuss our recent modeling of an unusual Bose-Einstein Condensation dome in the material Yb2Si2O7.

SPEAKER

Professor Rajiv R. P. Singh, *University of California, Davis*

Professor Rajiv R. P. Singh is one of the renowned condensed matter theorists at the department of physics and astronomy at UC Davis USA. His research activities involve using statistical mechanics and computational methods to study a variety of problems in theoretical physics. These range from the electronic behavior of solids to protein structure and novel mechanisms in biological Physics. Professor Singh has contributed immensely in understanding various novel phenomena in magnetism and superconductivity and developed and studied various statistical models that exhibit exotic and novel paradigms of cooperative many-body behavior: for example, novel quantum phases and phase transitions, novel excitations, and novel mechanisms of order and disorder. In Biological Physics, Professor Singh contributed significantly in understanding the conductivity of DNA and protein misfolding and aggregation inside the cell leading to various diseases. He is a fellow of many societies, like fellow of the Institute of Physics and fellow of the American Physical Society, etc.

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