INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A&B, Raja S.C. Mullick Road, Jadavpur, Kolkata700032, India

Seminar Notice

Speaker: Dr. Sreemanta Mitra

Title : Emergent Phenomena in Quantum Materials

Venue: S. N. Bose Hall

Time: 12th March, at 4.00 PM

Abstract: Quantum materials are on the ascent. In this talk, I will discuss about quantum materials and some of the emergent properties in them. Broadly, the talk will be divided into few sections based on my present and past research experience on electronic transport, magnetotransport and magnetism experiments on some quantum materials. In the beginning I will discuss my present post doctoral research initiative on the strongly correlated electronic system, single crystals of rare-earth tetraboride, namely, TmB4, whose lattice structure is topologically equivalent to Shastry Sutherland lattice. We will discuss how we obtain novel quantum linear magnetoresistance, tunable to classical quadratic in this system. Followed by this, I will discuss my results of my previous post-doctoral study. I will describe magnetotransport phenomena in disordered superconductor, namely amorphous InOx , in low dimension, measured at mK temperature and the observance of superconductor to insulator transition, a quantum phase transition in this material. In the following segment, I will discuss parts of my graduate research work on magnetic properties in functionalized graphene and the eect of interface on the transport and dielectric behavior of graphene based nanocomposites. We will show how interesting phenomena can be developed in these type of systems. Finally, I will discuss briey about my future research plan to elucidate novel phenomena in quantum materials for basic and applied perspective.

Selected References

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5. S. Mitra, A. Singha and D. Chakravorty: Non-linear temperature variation of resistivity in graphene/silicate glass nanocomposite. J. Phys. D: Appl. Phys.; 46, 375306, (2013).
6. S. Mitra, S. Banerjee and D. Chakravorty: Tunneling conduction in graphene/(poly)vinyl alcohol composites. J. Appl. Phys.; 113, 154314, (2013).
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.All are cordially invited to attend the seminar.