INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE
2A&B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032, India

Seminar Notice

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Theoretical Physics Department

Title:	**Interface Driven Novel Electronic and Spin States Revealed by Spin-polarized Scanning Tunneling Spectroscopy**
Speaker:	**Sujit Manna, Department of Physics, Massachusetts Institute of Technology, Cambridge, USA**
Date:	**January 10, 2018 (Wednesday)**
Time:	**4:00 p.m.**
Venue:	**Theoretical Physics Seminar Room (C406),3rd Floor, Centenary Building, IACS**
Abstract:	Iron-chalcogenide based superconductor have set a new paradigm in exploring microscopic mechanism of superconductivity and a race to discover high-Tc interfacial superconductor. It also offer a new platform to realize pristine topological superconductivity and Majorana bound state at relatively high temperature [1, 2]. In this talk, I will discuss our recent findings of atomic scale spin structure and superconductivity in single layer Fe-chalcogenide (FeSexTe1-x) films grown on Bi-based 3D topological insulator, using state of art MBE-STM. At first, we show the existence of noncollinear antiferromagnetic state in a monolayer FeTe under 2D limit, as revealed by spin-polarized scanning tunnelling spectroscopy. A detailed investigation of the temperature, magnetic field and spatial evolution of the electronic structure across the magnetic domains indicates that the unit-cell

	of FeTe is in very close proximity to a superconducting phase transition that coexisting with the anti-ferromagnetism [3, 4]. This will followed by discussion in spatial distribution of superconductivity in single layer FeSe0.5Te0.5 with higher critical temperature, which provides an ideal platform to study novel emergent phase in close proximity to a topological insulator [5]. Finally, I will discuss our unique experimental approach towards unveiling elusive Majorana fermion in epitaxial topological superconductor consist of Rashba nanowires coupled to an swavesuperconductor. **References:** 1. G. Xu et al., Phys. Rev. Lett. 117, 047001 (2016). 2. D. Wang et al., Arxiv: 1706.06074. 3. S. Manna et al., Nature Comm. 8, 14074 (2017). 4. T. Hänke et al., Nature Comm. 8, 13939 (2017). 5. A. Kamlapure et al., Phys. Rev. B 95, 104509 (2017).

All are cordially invited to attend the seminar