



ICTS Ph.D Thesis Defense Seminar

Title : Fractionalisation in spin-orbit coupled magnetic insulators

Speaker : Arnab Seth (ICTS – TIFR, Bengaluru)

Date : Wednesday, 26th October 2022

Time : 02:00 PM (IST)

Abstract : Long-range entanglement in quantum-spin-liquids (QSLs) leads to novel gauge structures and excitations with fractionalised quantum numbers. However, experimental signatures of such fractionalisation are rare and require more theoretical frameworks to interpret the experimental outcomes. Here we present a theoretical study of possible spectroscopic signatures of fractionalisation via the coupling of spins to Raman-active phonons in candidate QSLs. In the QSL phase, such magnetoelastic interaction leads to coupling between the lattice and the emergent excitations, resulting into renormalisation of the frequency and linewidth of phonons with characteristic frequency and temperature dependence.

Furthermore, I will present a new kind of cooperative paramagnet, $S=3/2$ classical-spin-ice (CSI), hosted by the pyrochlore magnets with low-lying crystal field excitations. This model has a richer phase diagram and new kinds of excitations compared to the usual $S=1/2$ CSI. Interestingly, these models are more prone to fall out-of-equilibrium at low temperatures, even in absence of long-range interaction or disorder.

References :

1. Phys. Rev. B 104, 184420, 2021
2. Phys. Rev. B 106, 054507, 2022

Venue : Online Seminar

Please click on the below link to join the meeting

<https://icts-res-in.zoom.us/j/87415946183?pwd=NWNyQmhOeDVPdVMwZkM3cFF3V2dZQT09>

Meeting ID: 874 1594 6183

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