

ICTS Seminar

- Title : Novel phases of matter in frustrated magnets: the fascinating pyrochlore architecture
- Speaker : Yasir Iqbal, Indian Institute of Technology Madras, Chennai
- Date : Tuesday, August, 14, 2018
- Time : 11:30 AM
- Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Magnets featuring competing interactions which cannot be simultaneously satisfied, dubbed “frustrated” magnets, open a window offering a glimpse into the vast and intriguing world beyond Landau’s symmetry breaking and Fermi liquid theories. Quantum and classical spin systems on frustrated geometries such as the pyrochlore lattice display a plethora of fascinating phenomenon such as the absence of symmetry breaking down to zero-temperature, thus realizing an exotic phase of matter dubbed a spin liquid. After reviewing the history of spin models on this lattice, I will describe the mysteries that still surround us, and finally, present our latest results [1] for Heisenberg and related models. The work [1] is a first systematic investigation (beyond perturbative regimes) of the effects of quantum fluctuations at low-temperatures and employs the newly developed (pseudo-fermion) functional renormalization group method. Most importantly, we reveal the presence of the exotic quantum spin liquid phase for low spin values, and address the question of its stability.

[1] arXiv:1802.09546 (2018), Quantum and classical phases of the pyrochlore Heisenberg model with competing interactions, Y. Iqbal *et al.*