Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

New class of magnetism: Altermagnets and beyond

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The recent discovery of 'Altermagnetism'— spin-split even-parity compensated magnets —highlights how spin symmetries can reveal purely exchange-driven phenomena that has previously been overlooked. Despite having no net magnetisation, altermagnets exhibit spin-polarised itinerant electrons and large non-relativistic, even-parity spin splitting—a unique blend of features combining the advantages of both conventional ferromagnets and antiferromagnets. In this talk, I will discuss the recent progress on theoretical predictions and characterisation of this new magnetic class, and how it can be detected experimentally. These findings not only reshape and reformulate our understanding of existing magnetic systems but also open pathways toward novel spintronic applications that exploit purely non-relativistic mechanisms. Furthermore building on this insight, I introduce non-relativistic spin-split magnetic analogue of unconventional p-wave ordering, namely 'Anti-altermagnets', where spontaneous parity breaking leads to exchange driven large out-of-plane anisotropic responses fundamentally distinct from conventional Rashba systems. Strikingly these materials also display properties such as spontaneous resistive anisotropy and highly efficient charge-to-spin conversion, positioning them as promising platforms for next-generation spintronic technologies.

Thursday, Nov 6th 2025

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFRH