

Colloquium Notice

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Non-integer-spin bosonic excitations in untextured magnets

Recent experimental advances in generation and detection of pure spin currents have opened up new avenues for exploiting magnets for technology as well as for exciting fundamental physics. Exotic quasiparticles have been observed in complex spin systems exhibiting spin ice rules, skyrmions etc. In this talk, I will discuss emergence of novel quasiparticles, mediated by magnetic dipolar interactions, that have been hiding in simpler spin systems with uniformly ordered ground states.

Amongst other properties, these quasiparticles exhibit spin ranging from zero to above 1. These exotic excitations can be interpreted as quantum coherent conglomerates of magnons, the eigen-excitations when the dipolar interactions are disregarded. Of particular interest is our finding that the eigenmodes in an easy-axis antiferromagnet are spin-zero quasiparticles instead of the widely believed spin 1 magnons. The latter re-emerge when the symmetry is broken by a sufficiently large applied magnetic field. The spin greater than 1 is accompanied by vacuum fluctuations and may be considered a weak, non-geometrical form of frustration.

Monday

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Starts at 12:15 PM

Physics Conference Room, SB B326