Spontaneous Quantum Hall Effect in Frustrated Magnets

By

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Venue: Hilbert Space (PAP 02-02)
Host: Asst. Prof. Pinaki Sengupta

Abstract
I will present results on the Kondo Lattice models on a triangular lattice for band filling factors n=3/4 and n=1/4. We will see that a simple non-coplanar chiral spin ordering with uniform scalar spin chirality is naturally realized for different coupling regimes of each of the two filling factors under consideration. The n=3/4 case corresponds to a weak-coupling instability driven by perfect nesting of the Fermi surface. The n=1/4 instability takes place in the intermediate coupling regime. The resulting triple-\textbf{Q} magnetic ordering is a natural counterpart of the collinear Neel ordering of the half-filled square lattice Hubbard model. We will also see that the obtained chiral phase exhibits a spontaneous quantum Hall-effect with $\sigma_{xy} = e^2/h$.

*Work done in collaboration with Ivar Martin.

Short Biography
Dr. Cristian Batista got his Ph.D. in Theoretical Condensed matter Physics from the Instituto Balseiro in Bariloche, Argentina. From there he moved to the Los Alamos National Laboratory (LANL) as a Robert Oppenheimer Fellow. Currently he is a staff scientist at the Theoretical Division in LANL. Dr. Batista's research interests lies primarily in the theoretical study of quantum magnetism and strongly correlated electron systems and his works in these areas have received widespread recognition within the Condensed Matter Physics community.

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