Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Emergent spin superstructures and degeneracy in models of itinerant magnets SANJEEV KUMAR, Indian Institute of Science Education and Research (IISER) Mohali, Knowledge City, Sector 81, Mohali 140306 India, JOERN VENDERBOS, MARIA DAGHOFER, JEROEN VAN DEN BRINK, Institute for Theoretical Solid State Physics, IFW Dresden, 01171 Dresden, Germany — In recent years, there has been immense research interest in frustrated magnets with metallic character, such as the pyrochlores $R_2Mo_2O_7$, where R denotes a rare-earth element (Science **291**, 2573 (2001)). The frustration in magnetic sector in such systems can have interesting consequences for the electronic properties. More interestingly, the electronic degree of freedom can aid the system in selecting unconventional magnetic states. Motivated by these possibilities we investigate the double-exchange model with competing super-exchange interactions on various lattices. On a triangular lattice we find a novel chiral spin state to be the ground state at half filling (PRL **105**, 216405 (2010)). On checkerboard and Kagome lattices, the itinerant electrons play a crucial role in lifting the degeneracy of the magnetic sector and select specific ground states with intriguing superstructures. A very interesting effect takes place on a honeycomb lattice, where a Yafet-Kittel type magnetic structure emerges from the interplay between the super-exchange and double-exchange interactions (PRL **107**, 076405 (2011)). Some of these emergent spin states have a macroscopic degeneracy related to a symmetry which is intermediate between local and global.

Sanjeev Kumar
Indian Institute of Science Education and Research (IISER) Mohali,
Knowledge City, Sector 81, Mohali 140306 India

Date submitted: 26 Nov 2011 Electronic form version 1.4