Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Quantum phase transitions of magnetic rotons JOERG SCHMALIAN, Iowa State University, Ames Laboratory, MISHA TURLAKOV, Cavendish Laboratory, Univ. of Cambridge, UK — Due to weak spin-orbit coupling, the magnetic excitations of an itinerant ferromagnet become magnetic rotons, excitations with degenerate minima on a hypersphere at finite wavevector. Using self-consistent Hartree and renormalization group calculations, we study weak fluctuation-driven first-order quantum phase transitions, a quantum tricritical point controlled by anisotropy and the non-Fermi liquid behavior associated with the large phase volume of magnetic rotons. We propose that magnetic rotons are essential for the description of the anomalous high-pressure behavior of the itinerant helical ferromagnet MnSi.

Joerg Schmalian
Iowa State University, Ames Laboratory

Date submitted: 30 Nov 2004 Electronic form version 1.4