Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Magnetic properties of Ni_3Al and Ni_3Ga: Emergent states and the importance of a tri-critical point? ROBERT P. SMITH, GILBERT G. LONZARICH, SIDDHARTH S. SAXENA, Cavendish Laboratory, University of Cambridge, MARK ELLERBY, University College London — Ni_3Al and Ni_3Ga are itinerant d electron systems which lie close to a ferromagnetic quantum critical point. Ni_3Al is a ferromagnet with a transition temperature at ambient pressure of 41K and a critical pressure of 80kbar while Ni_3Ga is a paramagnet all the way to zero temperature. These materials are ideal systems in which to test spin fluctuation theory. We present magnetisation data of these two materials and test the results against spin fluctuation theory with no adjustable parameters. While Ni_3Al (at ambient pressure) is found to fit well with the theory, Ni_3Ga can be understood by assuming that this system lies close to a quantum tri-critical point. We suggest that such a quantum tri-critical point may be a key feature in the understanding of quantum critical systems more generally.

Robert P. Smith
Institute of Physics

Date submitted: 07 Dec 2004 Electronic form version 1.4