Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Electronic specific heat enhancement in the half-metallic ferromagnet Cro_2 explained by Fermi Liquid Theory[1] RAUL CHURA, Boston College-Unsaac, KEVIN BEDELL, Boston College — Available data on the electronic specific heat of the half-metallic ferromagnet (HMF) CrO_2, show that the obtained experimental values are systematically greater than the corresponding theoretical ones calculated through various band theory methods. This discrepancy is due to the presence of many-electron correlation effects (spin fluctuations, strong electron-magnon scattering) which are not taken into account in the band theory calculations. A renormalization of the band theory results is therefore needed to account for the observed enhancement in the value of the specific heat. A microscopic many-electron approach has been proposed and explains the referred enhancement in terms of non-quasiparticle effects. It has been argued that Fermi liquid theory is not sufficient to provide the appropriate renormalization able to explain the observed enhancement in the electronic specific heat of HMFs. Contrary to this statement, we have shown that the introduction of a spin-dependent density of states, in the framework of the Fermi liquid theory for spin polarized systems, gives place to a renormalization which, indeed, provides a reasonable account of the observed enhancement in the electronic specific heat of the HMF CrO_2.

[1]Work supported by grant DOE/DEFG0297ER45636

Raul Chura
Boston College-Unsaac

Date submitted: 03 Dec 2006 Electronic form version 1.4