Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Pseudogap Phase of Magnetite YOHANES PRAMUDYA, HANNA TERLETSKA, EFSTRATIOS MANOUSAKIS, VLADIMIR DOBROSAVLJEVIC, NHMFL-Florida State University — Despite extensive experimental and theoretical work, the description of the electrical transport mechanism in magnetite (Fe_3O_4) is still an unresolved issue [1]. This unusual resistivity behavior close to the Verwey transition in magnetite has long been a matter of controversy. In our study, we focus on the temperature regime above Verwey transition and far below the magnetic phase transition, where a nearly charge ordering state (due to the long-range Coulomb frustration) is expected. Here, we expect similar behavior to what has been discussed in a nearly frozen Coulomb liquid [2] with the existence of a pseudogap phase. Following this line of thought, we use extended dynamical mean field theory (EDMFT) and Monte Carlo simulation to study the simplest spinless model describing this system. Our studies do capture the main transport trends in this temperature regime with a typical pseudogap–like behavior.

[1] N. F. Mott, "Metal-Insulator Transitions", Taylor&Francis (1990).
[2] S. Pankov and V. Dobrosavljevic, Phys. Rev. Lett. **94**, 046402 (2005).

Yohanes Pramudya
NHMFL-Florida State University

Date submitted: 10 Dec 2010 Electronic form version 1.4