Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin-charge coupled phenomena in Mo pyrochlore oxides under pressure: Monte Carlo study of the double-exchange model on a frustrated pyrochlore lattice YUKITOSHI MOTOME, University of Tokyo, NOBUO FURUKAWA, Aoyama Gakuin University, ERATO-MF — Mo pyrochlore oxides $R_2Mo_2O_7$ is known to show an interesting competition between ferromagnetic metal and spin-glass insulator by changing the reare-earth element R. Recent experiments by applying external pressure revealed some new aspects on the phase competition. In particular, it was shown that the ferromagnetic metal turns into a peculiar diffusive metal under pressure, with showing an intervening spin-glass metallic state [1]. We theoretically investigate the origin of these complex behaviors by studying the pyrochlore double-exchange model. We find that the experimental results are well explained by the keen competition between the double-exchange ferromagnetic interaction and the super-exchange antiferromagnetic interaction as well as the interplay between spin and charge on the frustrated lattice: The system exhibits an incoherent metallic state with extremely suppressed spin correlation and an electronic phase separation between two metallic states which potentially corresponds to the spin-glassy metallic behavior.

[1] S. Iguchi et al., Phys. Rev. Lett. **102**, 136407 (2009).

Yukitoshi Motome
University of Tokyo

Date submitted: 18 Dec 2009 Electronic form version 1.4