Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**Anisotropic field-induced melting of orbital ordering phase in Pr0.6Ca0.4MnO3**[1] RUN-WEI LI, HUALI LI, YIWEI LIU, Ningbo Institute of Material Technology and Engineering, CAS, Ningbo 315201, P. R. China, JIANDI ZHANG, Louisiana State University, WEI KU, Brookhaven National Laboratory, QINGFENG ZHAN, Ningbo Institute of Material Technology and Engineering, CAS, Ningbo 315201, P. R. China, ZHAOHUA CHENG, BAO-GEN SHEN, Beijing National Laboratory for Condensed Matter Physics & Institute of Physics, CAS, Beijing — The orbital degree of freedom in correlated electron systems plays an essential role in creating versatile phenomena via its coupling with charge, spin, and lattice. One extraordinary phase in doped oxide compounds is the charge/orbital-ordered (OO) antiferromagnetic (AF) insulating state, which, interestingly, can be melted to an orbital-liquid metallic state by external magnetic field. By measuring the field-dependent transport behavior of Pr0.6Ca0.4MnO3 single crystal at different temperatures, we have found a field-orientation dependent melting of the charge-orbital ordered state, regardless whether or not the system is in AF phase. The field-induced melting is found stronger when the applied field is in theab (basal)-plane. This can be understood as suppression of the CE-type OO state via spin-orbit coupling induced preference of in-plane orbital direction.

[1]Supported by Chinese Academy of Science and National Natural Science Foundation of China. J.Z. is supported by US NSF NSF DMR1005562.

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Date submitted: 23 Nov 2011 Electronic form version 1.4