Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Ferromagnetic Fluctuations Enhanced by Mn Doping in Sr_2RuO_4
JOHN ORTMANN, JIN PENG, Tulane University, X. WU, Nanjing University, ZHIQIANG MAO, Tulane University — Sr_2RuO_4 is the first experimentally established example of a spin-triplet superconductor [1]; it has attracted a great deal of interest since its discovery in 1994. Like other unconventional superconductors, the superconductivity of Sr_2RuO_4 also occurs in close proximity to magnetic instability. Its normal state is characterized by incommensurate antiferromagnetic (AFM) fluctuations associated with Fermi surface nesting. Moreover, the other ruthenate compounds related to Sr_2RuO_4 in the Ruddlesden-Popper series are all magnetic. The Sr-based members $Sr_3Ru_2O_7$, $Sr_4Ru_3O_{10}$ and $SrRuO_3$ are either metamagnetic or ferromagnetic (FM), whereas the Ca-based members Ca_2RuO_4 and $Ca_3Ru_2O_7$ are AFM. We have investigated the Mn doping effect in Sr_2RuO_4 using floating-zone grown single crystal samples and observed significantly enhanced FM fluctuations in the Mn-doped Sr_2RuO_4 samples. The system becomes nearly FM with only a few percent Mn doping. This finding suggests that Sr_2RuO_4 involves competing, orbital dependent magnetic fluctuations.

[1] A. P. Mackenzie and Y. Maeno, Rev. Mod. Phys. **75**, 657 (2003).

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Date submitted: 19 Dec 2012 Electronic form version 1.4