

Abstract for an Invited Paper  
for the MAR09 Meeting of  
The American Physical Society

**Ca<sub>3</sub>(Ru<sub>1-x</sub>Cr<sub>x</sub>)<sub>2</sub>O<sub>7</sub>: A new paradigm for spin valves<sup>1</sup>**

GANG CAO, University of Kentucky

A spin valve is a device structure whose electrical resistance can be manipulated by controlling the relative spin alignment of adjacent metallic, magnetic layers separated by nonmagnetic insulating layers. The spin valve effect is a quantum phenomenon so far only realized in multilayer thin films or heterostructures. Here we report a *novel, strong* spin valve effect existing in *bulk* single crystals of Ca<sub>3</sub>(Ru<sub>1-x</sub>Cr<sub>x</sub>)<sub>2</sub>O<sub>7</sub> having an anisotropic, bilayered crystal structure [1]. This discovery opens new avenues to understand the underlying physics of spin valves, and fully realize its potential in practical devices.

[1] G. Cao, V. Durairaj, S. Chikara, and L.E. DeLong and P. Schlottmann, *Phys. Rev. Lett.* **100**, 016604 (2008)

<sup>1</sup>In collaboration with V. Durairaj, S. Chikara, Dr. L. DeLong and Dr. P. Schlottmann. This work was supported by NSF through grant DMR-0552267