Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Magnetic Correlation in rare-earth artificial honeycomb system[1]
JAGATH GUNASEKERA, BROCK SUMMERS, ASHUTOSH DAHAL, PETER KAMPSCHROEDER, DEEPAK SINGH, Univ of Missouri - Columbia — 2D artificial honeycomb lattice provides new avenue for the exploration of novel phases of magnetism, such as charge ordered and spin ordered states due to the spin chirality of vortex-type magnetic configuration in the structure. Previous experiments in this pursuit are limited by the present fabrication technique, which results in large element size and small samples. Using a new approach of hierarchical nanofabrication technique, we have been able to fabricate macroscopic size artificial honeycomb lattice of rare-earth magnet (Nd) with ultra-small bond size (12 x 5 x 5 nm). Magnetic and electronic measurements on the newly fabricated honeycomb sample reveal temperature dependent evolution of magnetic correlation in the system. In an interesting observation, it is found that magnetic properties changes from paramagnetic to diamagnetic in low applied magnetic field measurements (<50 Oe). The corresponding transition temperature increases as the applied field decreases. This observation is in complete contrast to the permalloy honeycomb lattice, where a tendency to the spin solid state was detected at low temperature. The experimental results, in conjunction with micromagnetic simulations and theoretical calculations, will be discussed in the talk.

[1]DOE, Office of Basic Energy Sciences under grant no. DE-SC0014461

Jagath Gunasekera
Univ of Missouri - Columbia

Date submitted: 11 Nov 2016 Electronic form version 1.4