Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Magnetoresistance in Permalloy Connected Brickwork Artificial Spin Ice JUNGSIK PARK, BRIAN LE, Univ of Illinois - Urbana, GIA-WEI CHERN, Univ of Virginia, JUSTIN WATTS, CHRIS LEIGHTON, Univ of Minnesota, PETER SCHIFFER, Univ of Illinois - Urbana — Artificial spin ice refers to a two-dimensional array of elongated ferromagnetic elements in which frustrated lattice geometry induces novel magnetic behavior. Here we examine room-temperature magnetoresistance properties of connected permalloy ($Ni_{81}Fe_{19}$) brickwork artificial spin ice. Both the longitudinal and transverse magnetoresistance of the nanostructure demonstrate an angular sensitivity that has not been previously observed. The observed magnetoresistance behavior can be explained from micromagnetic modelling using an anisotropic magnetoresistance model (AMR). As part of this study, we find that the ground state of the connected brickwork artificial spin ice can be reproducibly created by a simple field sweep in a narrow range of angles, and manifests in the magnetotransport with a distinct signal. Supported by the US Department of Energy, Office of Basic Energy Sciences, Materials Sciences and Engineering Division under grant number DE-SC0010778. Work at the University of Minnesota was supported by the NSF MRSEC under award DMR-1420013, and DMR-1507048.

Jungsik Park
Univ of Illinois - Urbana

Date submitted: 12 Nov 2016 Electronic form version 1.4