Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Magnetization dynamics in an artificial spin ice on kagome[1] OLGA PETROVA, PAULA MELLADO, OLEG TCHERNYSHYOV, Johns Hopkins University — We study magnetization dynamics in an artificial spin ice on kagome realized as a honeycomb network of connected ferromagnetic nanowires studied recently by several experimental groups [1]. The sites of the honeycomb network carry magnetic charge, defined as the source of the magnetic field **H**, of strength ± 1 in suitably chosen units. Magnetization reversal in individual wires under the action of an applied magnetic field is mediated by the emission of a domain wall carrying magnetic charge ± 2 at one of the wire's ends, its propagation along the wire and its absorption at the other end. We include the effects of quenched disorder, arising from lattice imperfections, domain wall's inertia, observed recently in permalloy nanowires, and magnetostatic interactions between magnetic charges [2]. The inertia and magnetostatic repulsion between like charges are responsible for avalanches in magnetization reversal observed experimentally [1]. That and an inherently dissipative character of the magnetization dynamics suggest interesting parallels with granular materials [3]. [1] Y. Qi, T. Brintlinger, and J. Cumings, Phys. Rev. B **77,** 094418 (2008). [2] E. Saitoh *et al.*, Nature **432,** 203 (2004). [3] X. Ke *et al.*, Phys. Rev. Lett. **101,** 037205 (2008).

[1]This work was supported in part by the NSF Grant DMR-0348679.

Oleg Tchernyshyov
Johns Hopkins University

Date submitted: 23 Dec 2009 Electronic form version 1.4