Abstract Submitted
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Magnon bands with non-trivial topology in an artificial square spin ice[1] OLLE HEINONEN, Argonne Natl Lab, EZIO IACOCCA, University of Colorado, Boulder, CO — Artificial square spin ices can be viewed as reconfigurable magnonic crystals in which the magnon band structure can be manipulated by re-arranging the equilibrium magnetic configuration of the magnetic islands[1,2]. Depositing the islands on a spin-orbit scatterer such as Ta or Pt, endows the islands with an interfacial Dzyalishinskii-Moriya interaction. Here, we show using a semi-analytical model that this leads to a non-trivial topology in the magnon band structure. We use micromagnetic simulations to obtain the equilibrium magnetic states and to validate the semi-analytical model for the magnon dispersions in the first Brillouin zone. Our results are amenable to experimental verification using lithography and micro-focused Brillouin light scattering. The emergence of non-trivial topologies in the magnon bands implies the existence of topologically protected edge bands. This potentially leads to new applications using magnons in information technology. 1. E. Iacocca, S. Gliga, R.L. Stamps, and O. Heinonen, Phys. Rev. B **93**, 134420 (2016). 2. Y.-L. Wang et al., Science **352**, 6288 (2016).

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