

Abstract Submitted
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Vortex matching effect in artificial-spin-ice /superconductor hybrids¹ JING XU, Northern Illinois Univ, Argonne National Lab, YONGLEI WANG, Argonne National Lab, University of Notre Dame, XIAOYU MA, University of Notre Dame, ZHILI XIAO, Northern Illinois Univ, Argonne National Lab, BOLDIZSAR JANKO, University of Notre Dame, WAI-KWONG KWOK, Argonne National Lab — Superconducting (SC) and ferromagnetic (FM) hybrid systems provide an intriguing combination of two contrasting phenomena and their mutual interaction has been extensively studied to tailor their electromagnetic behavior. Here, we present a novel FM/SC hybrid structure consisting of a unique artificial spin structure deposited onto a superconducting MoGe film. The spin structure can produce magnetic charge ice structures mimicking those of a square artificial spin ice with the added value that the long-range ordering can be easily realized and controlled with the application of an in-plane magnetic field [Science 352, 962 (2016)]. The magnetic charge ice can affect the behavior of superconducting vortices present in the underlying MoGe film. The novelty of the magnetic spin ice structure and its impact on vortex matching effect and dynamics will be presented.

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