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DC Magnetization and FMR results of Fibonacci Distortions on the Honeycomb Artificial Spin Ice JUSTIN WOODS, BARRY FARMER, TODD HASTINGS, JUSTIN VISAK, LANCE DE LONG, Univ of Kentucky — Nanofabrication techniques allow magnetic thin films to be lithographically-patterned into arrays of interacting macro-spins that can be designed to study emergent physical properties. Here we discuss the effects of continuous symmetry breaking on the equilibrium and dynamic magnetic properties of frustrated magnetic metamaterials. We have pattered five Permalloy ($Ni_{0.80}Fe_{0.20}$) samples of distorted Kagome ASI arrays that are generated by repeated application of a substitution algorithm. This algorithm employs an aperiodic Fibonacci sequence of binary digits that can be mapped into short (d_1) and long (d_2) distances. This distorts film segment lengths while the width (nominally 70 nm) and thickness (25 nm) remain constant. Additionally, the coordination of each three-fold Kagome vertex is continuously modified via these distortions. Micromagnetic simulations predict the Fibonacci distortions causes jamming of Dirac String propagation. We report DC magnetization and FMR dispersion for different magnitudes of distortion, and compare these results to simulation. Research at University of Kentucky supported by U.S. Nationsal Science Foundation grant no. DMR-1506979.

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