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**Dynamics of artificial square spin ice during a non-equilibrium field ramp and quench**[1] JUAN CARLOS ANDRESEN, Department of Theoretical Physics, KTH Stockholm, SHRAWAN MISHRA, Advanced Light Source, Lawrence Berkeley National Laboratory, JAMES LEE, XIAOWEN SHI, Advanced Light Source, Lawrence Berkeley National Laboratory & Deptartment of Physics, University of Oregon, BARRY FARMER, LANCE DE LONG, University of Kentucky, PATRIK HENELIUS, Department of Theoretical Physics, KTH Stockholm, STEVE KEVAN, SUJOY ROY, Advanced Light Source, Lawrence Berkeley National Laboratory — Recent advances in nanotechnology make it possible to create arrays of single-domain ferromagnetic nanoislands that can be fabricated to mimic a variety of Ising-like model systems. This has opened up new ways of studying frustrated systems, such as artificial square spin ice. One of the main advantages of studying these nanomagnet systems is that the Ising-like moments can be directly visualized; but a persistent drawback has been the inaccessibility of the ground state, due to the highly athermal nature of these systems. We present the magnetic autocorrelation function of artificial square spin ice, as measured by XPCS following a non-equilibrium field quench. Our large-scale Monte Carlo simulations agree qualitatively with the experimental relaxation measurements. Furthermore, our simulation results indicate that a simple field ramping demagnetization protocol can be a viable way of reaching a low-energy state.

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