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**Manifestations of monopole physics in spin ice: Thermal quenches** CLAUDIO CASTELNOVO, University of Oxford, RODERICH MOESSNER, MPI-PKS, SHIVAJI SONDHI, Princeton University — We study the diffusion annihilation process which occurs when spin ice is quenched from a high temperature paramagnetic phase deep into the spin ice regime, where the excitations - magnetic monopoles - are sparse. We find that due to the Coulomb interaction between the monopoles, a dynamical arrest occurs, in which non-universal lattice-scale constraints impede the complete decay of charge fluctuations. This phenomenon is outside the reach of universal mean-field theory for a two-component Coulomb liquid. We identify the relevant timescales for the dynamical arrest and propose an experiment for detecting monopoles and their dynamics in spin ice based on this non-equilibrium phenomenon.

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