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Superfluid density anisotropy as a probe of electronic nematic order in cuprate superconductors[1] BENJAMIN PHILLABAUM, Purdue University, YEN LEE LOH, Ohio State University, ERICA CARLSON, Purdue University, KARIN DAHMEN, University of Illinois at Urbana-Champaign — We propose that hysteretic effects in superfluid density anisotropy may be used as a probe of electronic nematic order in cuprate superconductors. Stripes, a unidirectional, nanoscale modulation of electronic charge, are strongly affected by quenched disorder in two-dimensional and quasi-two-dimensional systems. While stripe orientations tend to lock to ma jor lattice directions, dopant disorder locally breaks rotational symmetry. In a host crystal with otherwise C4 rotational symmetry, stripe orientations in the presence of quenched disorder map to the random field Ising model. We use simulations of the random field Ising model to generate ensembles of local stripe orientations, and then further simulate the effects of such a pattern on the superfluid density within the XY model. We find clear hysteretic effects in the superfluid density anisotropy as a function of applied orienting field.

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