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Model for nodal quasiparticle scattering in a disordered vortex lattice MARIANNA MALTSEVA, PIERS COLEMAN, Rutgers University — Recent experiments by T. Hanaguri et al. on underdoped $\text{Ca}_{2-x}\text{Na}_x\text{CuO}_2\text{Cl}_2$ [1] have observed quasiparticle interference effects [2], which are sensitive to the sign of the d-wave order parameter. In a magnetic field, they observe a sizable transfer of scattering spectral weight from scattering events between anti-nodes of opposite sign to scattering events between anti-nodes of the same sign. We interpret high momentum phase-coherent scattering in terms of the quasiparticle scattering off the vortex walls. The reduction of scattering at even-odd scattering points indicates that the vortices “screen” some of the underlying impurity scattering, as the impurities get trapped inside the vortex cores. [1] T. Hanaguri, Y. Kohsaka, J. C. Davis, C. Lupien, I. Yamada, M. Azuma, M. Takano, K. Ohishi, M. Ono, H. Takagi, cond-mat/07083728. [2] Y. Kohsaka, C. Taylor, K. Fujita, A. Schmidt, C. Lupien, T. Hanaguri, M. Azuma, M. Takano, H. Eisaki, H. Takagi, S. Uchida, J. C. Davis, Science 315, 1380-1385 (2007).

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