Abstract for an Invited Paper
for the MAR10 Meeting of
The American Physical Society

Sheets of enhanced diamagnetic susceptibility in pnictide superconductors

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Superconducting quantum interference device (SQUID) microscopy shows stripes of increased diamagnetic susceptibility in underdoped, but not overdoped, single crystals of $Ba(Fe_{1-x}Co_x)_2As_2$. These stripes of increased diamagnetic susceptibility are consistent with enhanced superfluid density on twin boundaries. Individual vortices avoid pinning on or crossing the stripes, and prefer to travel parallel to them. These results indicate a relationship between superfluid density, local strain, and frustrated magnetism. The data suggests two mechanisms for enhancing critical currents and hints to an enhanced Tc on the twin boundaries [1].

[1] B. Kalisky, J.R. Kirtley, J.G. Analytis, J.-H. Chu, A. Vailionis, I.R. Fisher, K.A. Moler, arXiv:0906.5184v2.