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Manipulation of interlayer "kinks" in individual vortices in underdoped $YBa_2Cu_3O_{6+x}$[1] OPHIR AUSLAENDER, LAN LUAN, Stanford University, DOUGLAS BONN, RUIXING LIANG, WALTER HARDY, University of British Columbia, KATHRYN MOLER, Stanford University — We use magnetic force microscopy (MFM) to both image and manipulate individual vortex lines threading single crystalline $YBa_2Cu_3O_{6+x}$, a layered superconductor. We find that when we pull the top of a pinned vortex, it may not tilt smoothly, as in more isotropic superconductors [1]. In some cases, we observe a vortex breaking into discrete segments that can be described as short stacks of two-dimensional pancake vortices. This is similar to the "kinked" structure proposed by Benkraouda and Clem [2]. Quantitative analysis gives an estimate of the pinning force and the coupling between the pancake stacks. Our measurements highlight the discrete nature of stacks of pancake vortices in layered superconductors.

1. O. M. Auslaender, Lan Luan, E. W. J. Straver, J. E. Hoffman, N. C. Koshnick, E. Zeldov, D. A. Bonn, Ruixing Liang, W. N. Hardy and K. A. Moler, Nat. Phys., in press (2008).

2. M. Benkraouda and J.R. Clem, Phys. Rev. B, **53**, 438 (1996).

[1]Preprint at http://arxiv.org/abs/0811.0584

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