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**Dragging Individual Vortices to Probe the Dimensionality of Pinning in $YBa_2Cu_3O_{7-\delta}$** O. M. AUSLAENDER, LAN LUAN, K. A. MOLER, Stanford University, R. A. HUGHES, J. S. PRESTON, McMaster University, D. A. BONN, RUIXING LIANG, W. N. HARDY, University of British Columbia — We have used a magnetic force microscope (MFM) to image and to manipulate individual vortices in optimally doped $YBa_2Cu_3O_{7-\delta}$ samples: a 200nm film and a detwinned single crystal. In the film, if the force exerted by the MFM tip is strong enough to overcome the pinning potential, a pinned vortex jumps as a whole to a new pinning site. We find a wide spread of depinning forces, attesting to the importance of point pinners as opposed to pinning along one-dimensional defects. The behavior in the single crystal is very different. Even when a vortex is pinned the shape of its image is distorted, perhaps indicating meandering of the vortex line to take advantage of pinning centers as it traverses the crystal. When we drag a vortex, it tilts significantly before depinning, as signified by pronounced stretching of its image. This effect is highly anisotropic and depends on the pulling direction.

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