

Abstract Submitted
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Metastable pin sites for a superfluid vortex RENA ZIEVE, IN-GRID NEUMANN, University of California, Davis — Circulation trapped around a straight, fine wire can be detected through its effect on the wire's vibration. Here we use such a wire in a cylindrical cell to examine pinning of a superfluid helium vortex line at a macroscopic bump. Hydrodynamic considerations imply that, as long as the fluid velocity is fixed and not too large, a vortex can pin at a unique place on the bump. However, for two separate geometries we find that the vortex has metastable locations both at the apex of the bump and near its edge. In one case, the vortex is trapped around the wire, which terminates in the center of a bump on the cylinder endcap. We find that the vortex can follow the entire length of the wire to the bump apex, or it can leave the wire and make its way through the fluid to the edge of the bump. The former situation is more stable, but the latter can also persist for long times. The second geometry involves a free vortex that extends from the wire to a bump on the cylindrical wall of the container. Again our measurements show pinning at multiple sites on the bump. Interaction of the vortex with the surface curvature may produce the unexpected additional pin sites.

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