

Abstract Submitted
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Visualization of the Quantized Vortex Lattice Dynamics in ^4He
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We study the lattice structure and dynamics of quantized vortices in superfluid helium using a new rotating experiment. This setup includes control of the entire apparatus from the rotating frame as well as implementation of a novel isolation cell, which permits investigation into new phenomena such as differential rotation in helium-II. Our documentation of the vortex lattice dynamics in the (r, φ) plane (i.e. longitudinal to the vortices) includes real-time visualization of Tkachenko waves as well as evidence of differential rotation with distinct Stewartson layer boundaries. We also present possible Kelvin-Helmholtz instabilities and the formation and propagation of superfluid vortex bundles. We show that the angular velocity is a function of radius and may be driven by the geometry of the isolation cell.

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