

Abstract Submitted
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Visualization of quantized vortices near the λ -transition using nanoparticles¹ ENRICO FONDA, Università di Trieste - University of Maryland, KRISTINA T. GAFF, MATTHEW S. PAOLETTI, University of Maryland, KATEPALLI R. SREENIVASAN, International Centre for Theoretical Physics - University of Maryland, DANIEL P. LATHROP, University of Maryland — The dynamics of an irregular tangle of quantized vortices in superfluids, i.e. quantum turbulence, has recently drawn interest for its connections with different areas of research and for the promise of shedding light on classical turbulence. Previous experiments (Bewley et al. 2006, Paoletti et al. 2008) studied the superfluid flows in ^4He using micron-sized solid hydrogen particles as tracers. Because of their size, Stokes drag does not allow them to stay trapped on quantized vortices close to the λ -transition, where the trapping potential is weaker. A new technique has been discovered to create and visualize sub-micron particles. Several size estimates of these nanoparticles have been made based on both optical and fluid dynamical properties. Being smaller, but not small enough to be influenced by thermal motions, the particles are more passive and are less affected by Stokes drag. Thus they stay trapped closer to transition and on faster moving vortices. Preliminary results from near-transition observations are presented.

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