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Three Dimensional Observations of Quantum Vortex Dynamics in Superfluid Helium PETER MEGSON, DANIEL LATHROP, University of Maryland, College Park — Liquid helium, when cooled below 2.17 K, becomes a superfluid with exotic physical properties such as flow without friction. Superfluid flow is irrotational except about line-like topological phase defects with quantized circulation, known as quantum vortices. The dynamics of these vortices include events such as reconnection, wherein vortices meet and exchange tails, and Kelvin wave propagation, a possible mechanism for energy dissipation. We observe the dynamics of fluorescent nanoparticles trapped on the vortices using a newly developed 3D stereographic system. This talk will present new observations of reconnection events and analysis comparing vortex reconnection behavior in three dimensions to previous work that observed such events in two-dimensional projection. In particular, we discuss the power law scaling of vortex separation as a function of time and the effect of the initial angle of separation between the vortex filaments.

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