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Traces of Vortices in Superfluid Helium Droplets[1] LUIS F. GOMEZ, Department of Chemistry, University of Southern California, Los Angeles, CA, EVGENY LOGINOV, SICPA SA, Prilly, Switzerland, ANDREY F. VILESOV, Department of Chemistry and Department of Physics, University of Southern California, Los Angeles, CA — We report on the observation of vortices in superfluid ^{4}He droplets produced by a free fluid-jet expansion. The vortices were traced by introducing silver atoms into the droplets, which clustered along the vortex lines. The silver clusters were subsequently surface deposited and imaged via electron microscopy. The prevalence of elongated track-shaped deposits shows that vortices are ubiquitous in droplets larger than about 300 nm and that their lifetime exceeds a few milliseconds. In these experiments the droplets become superfluid within a few microseconds, which is at least 10^6 times faster than in previous bulk helium experiments. We discuss possible formation mechanisms and the stability of the vortices obtained during this rapid phase transition.

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