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Frozen particles as cryogenic fluid tracers: observation of Kelvin waves in superfluid helium ENRICO FONDA, University of Maryland, College Park - New York University, DAVID P. MEICHLE, University of Maryland, College Park, NICHOLAS T. OUELLETTE, Yale University, KATEPALLI R. SREENIVASAN, New York University, DANIEL P. LATHROP, University of Maryland, College Park — Injecting a dilute mixture of a seed gas into a cryogenic fluid produces a mist of frozen particles. These particles can be effective tracers for studying both classical and quantum cryogenic fluids. The particles resulting from injecting a hydrogen mixture in liquid helium right above the lambda transition, subsequently allowing the fluid to cool down below that temperature, allow visualization of thermal counterflow, quantized vortices and vortex reconnection. This technique is unsuitable for detailed study of vortex dynamics below 2K. We have recently discovered a new method for producing atmospheric sub-micron particles directly into superfluid helium, allowing us to study vortices at temperatures between 1.8K and 2K. By visualizing the reconnection of long vortices populating the system in that temperature regime, we have made the first direct observations of Kelvin waves in superfluid helium and characterized a prototypical event.

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