Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Experimental Observation of Quantized Vortex Reconnection in Superfluid Helium[1] MATTHEW PAOLETTI, University of Maryland, GREGORY BEWLEY, Max Planck Institute for Dynamics and Self-Organization and University of Maryland, KATEPALLI SREENIVASAN, International Centre for Theoretical Physics and University of Maryland, DANIEL LATHROP, University of Maryland — We present experimental studies of the first direct visualization of reconnecting superfluid vortices and the decay of superfluid turbulence in ^{4}He. Micron-sized solid hydrogen particles allow for particle image velocimetry and particle tracking. As previously shown, the cores of the superfluid vortices can trap the hydrogen, thereby allowing direct visualization of the dynamics of the line-like defects. We generate superfluid turbulence by driving a thermal counterflow. Upon cessation of the counterflow, the system relaxes through a cascade of reconnection events. The velocities and energies of the particles are determined by particle-tracking. Surprisingly, the probability distributions of velocity and energy are shown to have power-law tails, but these may be understood with scaling arguments for reconnecting vortices.

[1]We would like to acknowledge support from NSF, NASA and the Center for Nanophysics and Advanced Materials at the University of Maryland.

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Date submitted: 19 Jul 2007 Electronic form version 1.4