

Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

Dynamics of small tracer particles in superfluid turbulence¹

CARLO BARENGHI, University of Newcastle upon Tyne — The study of low temperature fluid dynamics has been held back over the years by the lack of direct flow visualisation. Recently, two experimental groups have successfully implemented the Particle Image Velocimetry method (PIV) in liquid helium II using micron-size particle of various materials. It is hoped that this method will help understanding quantum turbulence and the origin of the observed similarities between quantum turbulence and ordinary turbulence. The difficulty is that helium II consists of two components, the viscous normal fluid (associated with the thermal excitations) and the inviscid superfluid (associated with the ground state), so an important issue of interpretation arises: do the trajectories of the PIV particles trace the normal fluid or the superfluid? The issue is complicated by the possibility that the particles may become trapped in the quantised superfluid vortex lines, in which case the PIV method would visualise vorticity rather than velocity. In this talk I shall present recent theoretical work on this problem.

¹Work supported by EPSRC grant GR/T08876/01.

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Date submitted: 28 Aug 2006

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