DFD07-2007-000090

Abstract for an Invited Paper
for the DFD07 Meeting of
the American Physical Society

Vortices, particles and superfluidity

KATEPALLI SREENIVASAN, ICTP, Trieste and U. Maryland

Vortices in helium II are of the order of an angstrom in diameter and many thousands of diameters long. Except for distances of the order of a few angstroms from the core, where the appropriate physics is quantum mechanical, these vortices are classical in their behavior. Thus, they approximate nearly perfectly vortex lines of classical hydrodynamics. A three-dimensional tangle of these vortex lines gives rise to complex fluid motion, which is called the superfluid turbulence. A review of the progress made recently in understanding superfluid turbulence is a principal purpose of this talk. In particular, some attention will be paid to the visualization of superfluid vortices. The principal tool is the trapping of small particles of solid hydrogen along the cores of superfluid vortices. The particles are not always passive tracers and so the conditions under which they may be so considered will be discussed. Also to be discussed are dynamical aspects such as vortex reconnection and decay. Complementary results from simulations will also be discussed as necessary. The experimental work is principally the collaborative product with Greg Bewley and Dan Lathrop, as well as with Russ Donnelly and his group.