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Università di Roma Tor Vergata
Dipartimento di Fisica



Seminar

Wednesday, 5 October 2016 - h. 16:00

Sala Grassano (Dipartimento di Fisica)

Prof. Itamar Procaccia

Weizmann Institute of Science (Rehovot, Israel)

“Dynamics of the Density of Quantized Vortex-Lines in Superfluid Turbulence”

Abstract

The quantization of vortex lines in superfluids requires the introduction of their density in the description of quantum turbulence. The space homogeneous balance equation for this object, proposed by Vinen on the basis of dimensional and physical considerations, allows a number of competing forms for the production of vortex lines. Attempts to choose the correct one on the basis of time-dependent homogeneous experiments ended inconclusively. To overcome this difficulty we employed an inhomogeneous channel flow which is excellently suitable to distinguish the implications of the various possible forms of the desired equation. We demonstrated that the originally selected form which was extensively used in the literature is in strong contradiction with our data. We therefore presented a new inhomogeneous equation for the density of vortex lines that is in agreement with our data and proposed that it should be considered for further studies of superfluid turbulence.

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