European Research Council
Established by the European Commission

Università di Roma Tor Vergata

Università di Roma Tor Vergata
Dipartimento di Fisica

Two Seminars

Thursday, 1 October 2015

Sala Struttura della Materia (Dipartimento di Fisica)

Prof. Anna Pomyalov – h. 14:30

Chemical Physics Department, Weizmann Institute of Science
(Israel)

”Dynamics of the density of quantized vortex lines in the counteflowing superfluid turbulence”

Abstract

I will talk about our recent progress in the description of the channel flow of the counterflowing superfiuid Helium.
The thermal counteflow is a form of motion peculiar to the two-fluid superfluid hydrodynamics, that does not have a direct classical analog in any viscous fluid. A consistent description of such a flow requires accounting for the dynamics of the quantized vortex lines, generated by the counterflow.
We suggest a new form of the equation of motion for the vortex line density and propose to use an inhomogeneous channel flow to test possible closures.
We use a Vortex Filament Method to simulate the quantum counterflow turbulence in the channel and demonstrate that the proposed form of the equation gives much better agreement with the numerical results than the commonly used version.

Prof. Victor L'vov – h. 15:10

Chemical Physics Department, Weizmann Institute of Science
(Israel)

”Energy spectra, intermittency and cross-velocity correlations in superfluid turbulence”

Abstract

Turbulence in superfluid helium is unusual and presents a challenge to fluid dynamicists because it consists of two coupled, inter penetrating turbulent fluids: the first is inviscid with quantized vorticity, the second is viscous with continuous vorticity. Due to this double nature, the observed spectra of the superfluid turbulent velocity at sufficiently large length scales sometimes are similar to and also can be very different from those of ordinary turbulence.
After brief historical overview I will present experimental, numerical and theoretical results which explain these similarities and differences, and illustrate the limits of our present understanding of superfluid turbulence.

ERC Advanced Grant (N. 339032) "NewTURB"
(P.I. Prof. Luca Biferale)
Università degli Studi di Roma Tor Vergata
C.F. n. 80213750583 – Partita IVA n. *02133971008* - Via della Ricerca Scientifica, 1 – 00133 ROMA