



TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Dipartimento di Fisica



European Research Council
Established by the European Commission

Seminar

Thursday, 2 May 2024 - h. 14:30

Fisica della Materia room (Department of Physics)

Prof. Filippo Coletti

ETH, Zurich

“Particle transport on the surface of turbulent water”

Abstract

Every year, millions of tons of plastics enter the ocean. Devising effective strategies to mitigate such pollution requires the quantitative understanding of how floating particles travel and spread. Past studies have mostly focused on the influence exerted by the surface on the flow underneath, while the characterization of the transport along the surface remains incomplete. I will summarize our recent experiments on small particles floating in turbulent water, using laboratory and field-scale facilities. Although the particles move in two dimensions, their motion display many of the hallmarks of three-dimensional turbulence - with some important caveat. Due to the compressibility of the free surface, the particles cluster over spatial and temporal scales comparable to the integral scales of the turbulence. Capillarity-driven attraction breaks the equilibrium between cluster formation and breakup, thus the aggregates steadily grow in size. Particle size also matters: larger particles filter the small-scale velocity fluctuations, which results in a more time-correlated motion and, in turn, faster dispersion.

***ERC-2019-ADG Grant N. 882340 “Smart-TURB”
(P.I. Prof. Luca Biferale)***

Dipartimento di Fisica - Università degli Studi di Roma “Tor Vergata”
C.F. n. 80213750583 – Partita IVA n. 02133971008 - Via della Ricerca Scientifica, 1 – 00133 ROMA