

Particles, fibers and drops in turbulent flows

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Venue: Faculty of Engineering Bldg. 2, 3F Room31A

Abstract: We investigate the modulation of turbulence caused by the presence of finite-size dispersed particles. Bluff isotropic spheres and slender anisotropic fibers are considered to understand the effect of the object anisotropy on the carrier flow. While both objects provide a similar bulk effect characterized by large-scale energy depletion, a scale-by-scale analysis of the energy transfer reveals that the alteration of the whole spectrum is intrinsically different. For bluff objects, the classical energy cascade is shrunk in its extension but unaltered in the energy content and its typical features, while for slender ones we find a new, apparent energy cascade which is essentially mediated by the fluid-solid coupling. We will then show how the results changes with the Reynolds number of the carrier flow.



Short bio: Marco Edoardo Rosti is an Assistant Professor at the Okinawa Institute of Science and Technology (OIST), Japan, since 2020. He received a Master in Aeronautical Engineering from Politecnico di Milano in 2013, and PhD in Aeronautical Engineering at City, University of London in 2016. Before joining OIST, he spent time as postdoctoral fellow at the KTH Royal Institute of Technology, Sweden, and at the University of Tokyo, Japan. Marco's research interests are in the general area of multiphase turbulence and complex fluids. He was the recipient of the RYUMON Award for distinguished young researcher in fluid mechanics, by the Japanese Society of Fluid Mechanics in 2021, and he is associate editor of the European Journal of Mechanics/B and Editor of Results in Engineering.