TUAT Fluid Dynamics Seminar

Date: Thursday, 30th March, 2023
Time: 10:00 - 11:00 / Place: Building 6 - Room201

Lecturer:

Luuk Blaauw (PhD Student)

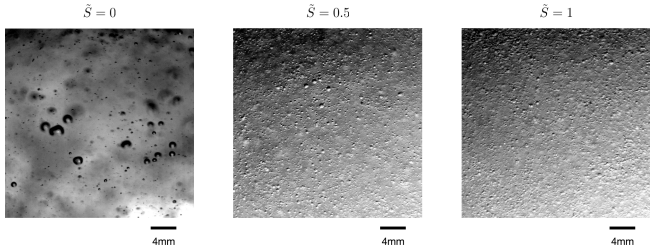
University of Twente

Title

The effects of different salts on bubbly drag reduction in turbulent Taylor-Couette flow

Abstract

Just a small air volume fraction (4%) in turbulent Taylor-Couette flow, the flow between two concentric independently rotating cylinders, can reduce the drag on the inner cylinder tremendously (up to 40%). This phenomenon is of great interest for the shipping industry to reduce the drag experienced by the ship hull and with that reduce the fuel consumption. Despite the abundance of ions and surfactants in ocean water, the effects of contaminants on drag reduction has received very little attention. In this study we investigate the effects of different salts on the drag reduction achieved by bubbles inside turbulent Taylor-Couette flow.



Lecturer:

Mees Flapper (PhD Student)

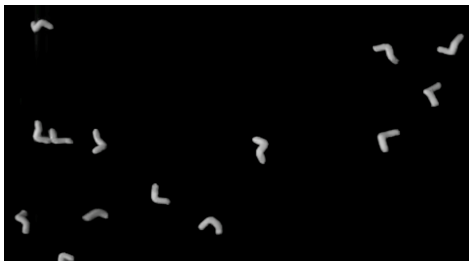
University of Twente

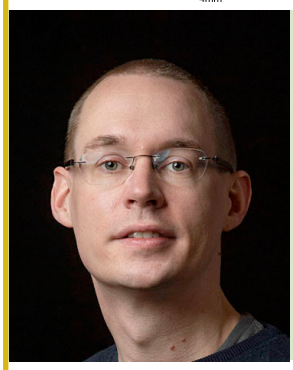
Title

Tracking of Anisotropic particles in Turbulence

Abstract

Particle-seeded turbulence commonly occurs in nature and industry, and has been studied extensively already. In this specific research, we are tracking the location and orientation of anisotropic particles, to study the two-way coupling between particles and flow. This talk sketches the research problem, and illustrates the accompanying challenges and approaches of complicated particle tracking.





Lecturer:

Associate Prof. *Sander* Huisman

Physics of Fluids group, University of Twente

Title

High humidity enhances the evaporation of non-aqueous volatile sprays

Abstract

We experimentally investigate the evaporation of very volatile liquid droplets (Novec 7000 Engineered Fluid, chemical name hydrofluoroethers HFE-7000) in a turbulent spray. Droplets with diameters of the order of a few micrometres are produced by a spray nozzle and then injected into a purpose-built enclosed dodecahedral chamber filled with air containing various amounts of water vapour. The ambient temperature and relative humidity in the chamber are carefully controlled. We observe water condensation on the rapidly evaporating droplet, both for the spray and for a single acoustically levitated millimetric Novec 7000 droplet. We further examine the effect of humidity, and reveal that a more humid environment leads to faster evaporation of the volatile liquid, as well as more water condensation. This is explained by the much larger latent heat of water as compared with that of Novec 7000. We extend an analytical model based on Fick's law to quantitatively account for the data.

Organized by: Prof.Y.Tagawa (tagawayo@cc.tuat.ac.jp)