Fachbereich 4
Produktionstechnik
Maschinenbau &
Verfahrenstechnik

CENTER OF
APPLIED SPACE TECHNOLOGY
AND MICROGRAVITY
ZARM

Fluids and Space Engineering Seminar

Date: Wednesday, May 8, 2019 at 13:00
Location: ZARM, Room 1730

Drop breakup in turbulence

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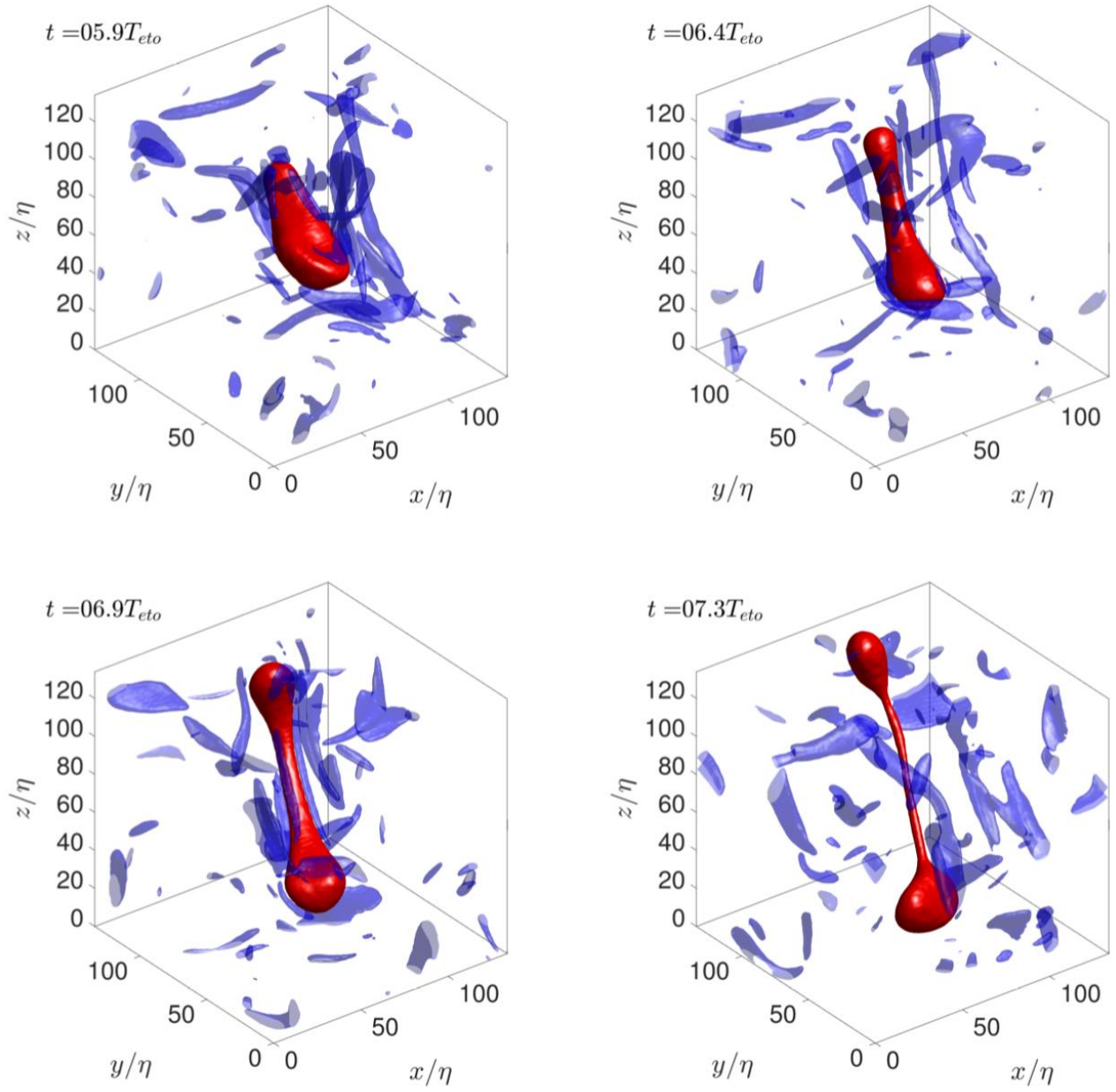

The formation and breakage of drops is ubiquitous in nature and is of key importance in engineering. Examples are the formation of rain, the delivery of fuel in combustion chambers and the emulsification of fat in water. In applications, it is often desirable to reduce drops sizes as much as possible in order to increase interface areas and thus accelerate heat and mass transfer. Hence many experimental studies have focused on determining drop-size distributions and breakage rates in turbulent flow. In this talk, I will address the physical mechanisms of drop breakup. The focus will be on a single drop dispersed in homogeneous isotropic turbulence, which is here simulated by solving the Navier–Stokes–Cahn–Hilliard equations. A highly efficient pseudo-spectral GPU code enables for the first time the simulation of thousands of cases, which reveals the stochastic nature of the process and its dependence on the Weber number. Our results set the stage for the development of predictive parameter-free breakup models to be used in engineering practice.

The work is a collaboration with Alberto Vela-Martín (UPM, Spain).