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25/02/13

EINLADUNG

zu einem Vortrag im Rahmen des

Kolloquiums Thermo- und Fluidodynamik

- Datum:** Mittwoch, 6. März 2013
- Zeit:** 16:15 Uhr
- Ort:** Maschinenlaboratorium ETH Zürich
Hörsaal ML H 44
- Referent:** Dr. Shilpa Khatri
Department of Mathematics
University of North Carolina at Chapel Hill, USA
- Thema:** **Settling and Rising in Density Stratified Fluids: Analysis and Experiments**

The fluid dynamics of particles settling and droplets rising in density stratified fluids is vital to understanding the effect of stratification in marine settings. Whether studying particles settling or droplets rising, similar small scale dynamics are observed.

An example of settling is provided by marine snow aggregates, particles composed of organic and inorganic matter, which play a major role in the carbon cycle. Most of these macroscopic particles are extremely porous, allowing diffusion of a stratifying agent (heat or salt) from the ambient fluid to affect the density and therefore the settling dynamics of these particles. As a first step towards understanding these dynamics, we study the case of a single spherical particle settling in water stratified by salt, focusing on effects of porosity and salt diffusion. For linear stratification in viscosity dominated regimes, an explicit solution for the sphere's position in time is derived. For more general ambient fluid stratification, the sphere's position can be solved for numerically, under the asymptotic assumptions about the typical time scales of diffusion and settling. As well, a discussion about the competing effects of entrainment and diffusion will be included. A parametric study of the settling behaviors and comparisons with experiments will be presented.

For the case of rising droplets, which occur in the environment as oil seeps and jets in the ocean, we study a single oil droplet in a similar setup as the porous particles. Preliminary results will be presented, and similarities and differences with the previous case of settling particles will be discussed.

Host: Prof. P. Koumoutsakos

Gäste sind willkommen!