

Kolloquium für Mechanik

Referee: **Prof. Dr. Mark Avila**
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Date: Thursday, June 21, 2018
Time: 15:45 h
Location: 10.81, HS 62 (R 153)

Title: **Experiments and simulations of turbulent mixing: application to
nanoparticle precipitation**

Abstract

The mixing of liquid by turbulence determines the efficiency of many processes, including chemical reactions and the precipitation of nanoparticles. In this talk I will present a comprehensive combined experimental-computational study of a simple T-shaped mixer for Reynolds numbers up to 4000. In the experiments, we determine the micromixing time by applying the Villermaux–Dushman characterization to a water-water mixture. In the numerical simulations, we resolve down the smallest (Kolmogorov) flow scales in space and time, thereby permitting a model- and parameter- free quantitative comparison between simulation and experiment. Excellent agreement is obtained between the experimentally measured micromixing time and numerically computed intensity of segregation index, especially in the turbulent regime, which validates both approaches. We confirm that the micromixing time is mainly determined by the power input, as assumed in most models, but we show that by suitably manipulating the inflow conditions, the power input necessary to achieve a given micromixing time can be reduced by an order of magnitude (or a factor of two in the flow rate). The influence of mixing on anti-solvent precipitation of organic nanoparticles will also be discussed in the talk based on the example of ibuprofen.

Alle Interessenten sind herzlich eingeladen.

Prof. Dr.-Ing. Bettina Frohnafel