

WORKGROUP FOR MULTIPHASE FLOWS



Research

The research focus of the Multi-Phase Flows group is in the areas of multi-phase flows and particle technology and include both experimental and theoretical and numerical work. The main focus of the research is on the analysis and modeling of the elementary processes relevant for multiphase systems or flows, e.g. movement of non-spherical particles, particle collision and agglomeration, particle wall interaction, drop coalescence and oscillating bubble movement. For this purpose, detailed experiments on the particle or bubble scale are carried out using modern optical measurement methods. For such examinations, imaging methods which are particularly well-suited for use with high-speed cameras are particularly suitable.

Furthermore, the elementary processes are analyzed by means of fully resolved direct numerical simulations (DNS). The developed models then find their way into numerical methods (CFD - computational fluid dynamics) for the calculation of technically and industrially relevant multi-phase processes.

For these calculations, the Euler / Lagrange method is used with various approaches to turbulence modeling and taking into account the full coupling between the phases.

In the field of particle technology, standardized methods are used to characterize bulk material properties. Based on this, bulk material processes are designed such as, for example, The dimensioning of silo plants. Furthermore, processes with nanoparticles are analyzed and numerical calculation methods based on the Euler / Lagrange approach are further developed and used.

Multiphase Flows

- ▶ Particle-laden flows, particle deposition, particle separation
- ▶ Atomisation and sprays
- ▶ Bubble flows

Particle technology

- ▶ Particle measurement technology
- ▶ Nano particles

Numerical calculations

- ▶ Euler/Lagrange approach
- ▶ Lattice Boltzmann approach
- ▶ Experimental facilities

Projects

