In-line Acquisition of Particle Size Distributions

M. Lichti and H.-J. Bart
University of Kaiserslautern, Chair of Separation Science and Technology, Germany

**Objectives**
- Provide process properties by acquisition of particle size distributions
- In-line measurement with fast online analysis
- Apparatus independent optical probe

**Background**
- Transmitted light approach
- Measurement in-line at any point-of-interest
- Fast online-analysis with 12 fps done by Fraunhofer ToolIP
- Particle size range from 30 µm to 6 mm
- Different and additional ranges suitable by variation of camera-lens-setup

**Method Development**
- Design of a one-sided approach via flangetube (current: DN 80)

**Application in Apparatus**
- Particle, droplet- and bubbly loaden flows
- DN 25/50, DN 100, DN 150, DN 450, DN X
- Bubble column, Entrainment in distillation column, Pipe flow monitoring
- Coalescence/breakup, Solid particle flow, Three-phase system

**Conclusion**
- New approach for an optical in-line probe
- Endoscopic access with transmitted light
- Fast online analysis
- Operation under harsh conditions
- Detection of particles, bubbles and droplets with one multipurpose probe

**Future Directions**
- Improvement of the probe with respect to design, construction and process-relevant parameters (pressure, temperature, safety aspects)
- Improvement of analysis in cooperation with Fraunhofer ITWM within the AIF project: „Optische Bildanalyse von Tropfen unter Prozessbedingungen“ - acronym: OBITRO
- Enlargement of application range to high temperature and pressure

**References**

**Acknowledgement:** The authors would like to thank the German Federation of Industrial Research Associations (AIF) and the German Federal Ministry for Economic Affairs and Energy for their financial support.

---

**Poster „2go“:**

- DN 25/50
- DN 100
- DN 150
- DN 450
- DN X