

PROJECT AIM

We use various types of CFD models (both commercial codes but mostly "in-house" made codes) to study the relevant hydrodynamic phenomena at all relevant length and time scales (i.e. at the microscopic, mesoscopic and macroscopic scale) in bubbly flows. Our main focus is on interface forces, mass-transfer, break-up and coalescence in bubble column reactors.

PROGRESS

See the different sub-projects.

DISSERTATIONS

1. Dijkhuizen, W.: Deriving Closures for Bubbly Flows using Direct Numerical Simulations; PhD thesis University of Twente, Enschede, 2008.

SCIENTIFIC PUBLICATIONS

1. B. Niceno, M.T. Dhotre, N.G. Deen (2008): One Equation Subgrid Scale (SGS) Modeling for Euler-Euler Large Eddy Simulation (EELES) of Dispersed Bubbly Flow, Chemical Engineering Science, Volume 63, Issue 15, August 2008, Pages 3923-3931.
2. N.G. Deen, M. van Sint Annaland and JAM Kuipers (2008): Multi-scale modeling of bubbly flows: from fundamentals to practice, Invited lecture, Physics@FOM, Veldhoven 22 January 2008.
3. W. Dijkhuizen, M. van Sintannaland and JAM Kuipers (2008): Direct Numerical Simulation of the Lift Force in Blubby Flows, 6th International Conference on Computational Fluid Dynamics in the Oil & Gas, Metallurgical and Process Industries Trondheim, Norway 10-12 June 2008.
4. W. Dijkhuizen, I. Roghair, M. van Sint Annaland and JAM Kuipers (2008): Numerical derivation of the drag force coefficient in bubble swarms using a Front Tracking model, 6th International Conference on Computational Fluid Dynamics in the Oil & Gas, Metallurgical and Process Industries Trondheim, Norway 10-12 June 2008.
5. I. Roghair, W. Dijkhuizen, M. van Sint Annaland and JAM Kuipers (2008): Front Tracking Simulations on Liquid-Liquid Systems; an Investigation of the Drag Force on Droplets, 6th International Conference on Computational Fluid Dynamics in the Oil & Gas, Metallurgical and Process Industries Trondheim, Norway 10-12 June 2008.
6. W.Bai, N.G. Deen, R.F. Mudde and JAM Kuipers (2008): Accuracy of four-point optical probe for determination of bubble velocity, 6th International Conference on Computational Fluid Dynamics in the Oil & Gas, Metallurgical and Process Industries Trondheim, Norway 10-12 June 2008.
7. N.G. Deen, W. Dijkhuizen, D. Darmana, M. van Sint Annaland and JAM Kuipers (2008): DNS of deformable bubbles, Thematic JMBC Workshop on Modelling and Measuring of Multi-phase Flow Phenomena in Micro-fluidic and thin-film systems, June 19, 2008, Leiden, The Netherlands.

PROJECT LEADERS

JAM Kuipers

RESEARCH THEME

Complex dynamics of fluids
Mathematical and computational
methods for fluid flow analysis

PARTICIPANTS

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COOPERATIONS

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FUNDED

FOM, STW, DSM, AkzoNobel, Shell,
Corus, Marin.

1st 10% 2nd 50% 3rd 40%

START OF THE PROJECT

1996

INFORMATION

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