OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

WORKGROUP FOR MULTIPHAS FLOWS

Information on 14th workshop on Two-Phase Flow Predictions

Photo 1: The 14th workshop on Two-Phase Flow Predictions is held on**September the 7th-10th 2015**

Zentrum für Ingenieurwissenschaften
Martin Luther Universität Halle Wittenberg
D-06099 Halle (Saale), Germany
www-mvt.iw.uni-halle.de

The series of Workshops started in 1984 at the Institute of Fluid Mechanics of the University of Erlangen/Nürnberg. The participation was limited to only a few people working in the field of particle dispersion in turbulent flows. An important objective was the performance and discussion of numerical calculations for pre-defined test cases. During the past 30 years numerical calculations of dispersed multiphase flows have received considerable interest in research and technical or industrial application For numerous companies in the process industries (e.g. chemical industry or food industry) computational fluid dynamics (CFD) multiphase flow has become an essential tool for process analysis, optimisation and design. Most important for reliable numerica calculations is the modelling of the underlying elementary processes occurring on the scale of the particle, such as particle transport in turbulence, particle-wall collisions, inter-particle collisions, agglomeration, droplet/bubble collisions and coalescence as well as heat and mass transfer. This field is still in the stage of development. Important for model developments are theoretica analysis, direct numerical simulations and detailed experiments.

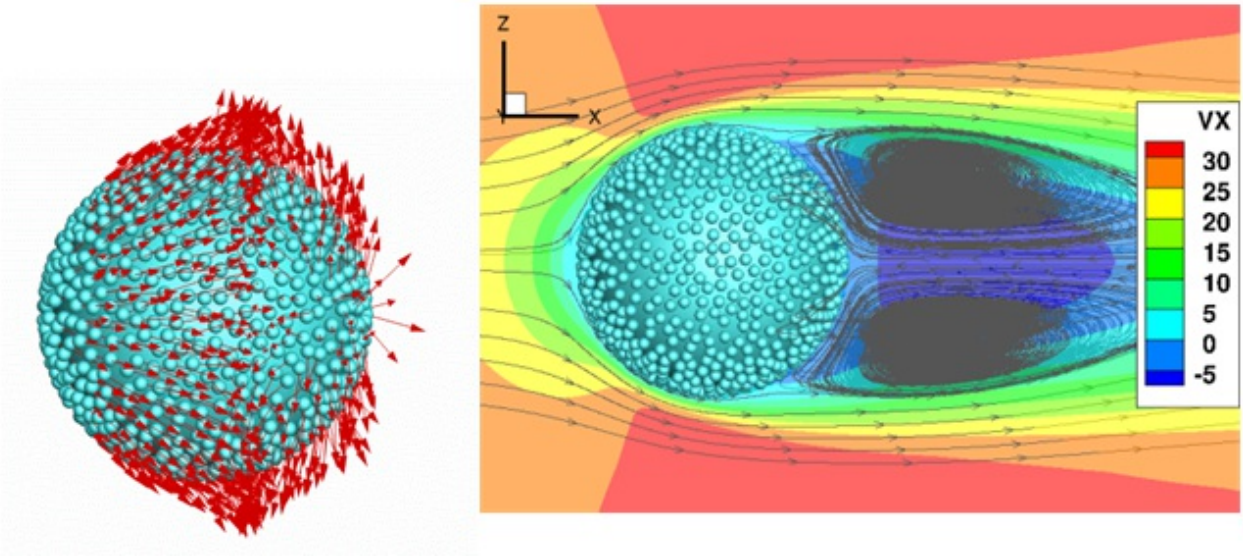

Photo 2: Lattice-Boltzmann Simulation: Influence of inter-particle collisions on particle clustering
(left: without; right: with collisions; StK = 10; αP = 0.02)

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Sponsorship

The Workshop will be co-sponsored by the ERCOFTAC (European Research Community on Flow Turbulence and Combustion) Young Ph.D. students giving a presentation may apply for financial support, which will be provided by ERCOFTAC.

Test Case Calculations

Tastcases

Dense Particle-laden free jet with different solids loading	›
Dispersion of rod-like particles in a free jet, ejected from a narrow pipe	›

Programme

Direct numerical simulations with interface resolution

Derksen, J.: Simulations of dispersed multiphase flow at the particle level (keynote lecture)	›
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Eshghinejadfard, A., Abdelsamie, A. and Thévenin, D. :Lattice-Boltzmann vs. Navier-Stokes simulation of particulate flows	
Badillo, A.: Phase-field simulations of liquid interfaces in contact with solids	-
Borrmann, S. and Schwarze, R.: Fluid-Solid-Interaction Simulations with the WCSPH Method in the Software Package Yade	
Albert, Ch., Kromer, J., Robertson A.M. und Bothe, D.: Dynamic behavior of buoyant high viscosity droplets rising in a quiescent liquid	-
Finotello, G., Deen, N.G., Padding, J.T., Jongsma, A., Innings, F. and Kuipers J.A.M.: Study of the effect of viscosity on binary droplet collisions	-
Münster, R., Mierka, O. and Turek, S.: Particulate Flow Simulations with Complex Geometries using the Finite Element-Fictitious Boundary Method	-

Experimental studies

Ostmann, S., Chaves H. and Brücker, Ch.:Qualitative study on path instabilities of light particles rising within a liquid at rotation	-
Freudigmann, H.A. and Iben, U.: Optische Untersuchung der Luftausgasung im Nachlauf einer Drosselströmung	
Pasternak, L. und Sommerfeld, M.: Experimental studies on fiber-laden cross-jet by a pulsed LED-PIV System	-

Direct and large eddy simulations of particulate flow

Stylianou, F.S. Koullapis P.G. and Kassinos S.C. : Direct and Large-Eddy Simulations of Aerosol Transport in Human Airways (keynote lecture)	-
Redlinger-Pohn, J.D. and Radl, S.: Separation Effects and Orientation Statistics of Fibres in Coiled-Pipe Suspension Flow	
Lovecchio, S., Marchioli, C. and Soldati A.: Micro-swimmer dynamics in free-surface turbulence subject to wind stress	
Marchioli, C. and Soldati, A.: Turbulent breakage of ductile aggregates	

Modelling of dispersed turbulent two-phase flows

Reeks, M.W.: The notion of particle pressure in a suspension of particles in turbulent flow (keynote lecture)	-
Achury, J. and Polifke, W.: Theoretical and numerical investigation of particle response to an axial acoustic field	
Jin, C., Potts, I. and Reeks, M.W.: A simple stochastic quadrant model for the turbulent deposition of particles in turbulent boundary layers	-
Hu, Y., Olguin, H. and Gutheil, E.: Transported joint PDF modeling of reacting dilute sprays combined with a spray flamelet/progress variable approach	-
Synek, B., Gumprich, W. and Sadiki, A.: Direct Quadratured-based Sectional Method of Moments coupled to realistic evaporation models	
Sander, S. and Fritsching, U.: Modeling of the influence of coupling between electric ion charges and hydrodynamic flow on particle charging and acceleration in electrostatic fields using OpenFOAM	-
Quintero, B., Lain, S. and Sommerfeld, M.: Numerical simulation of elongated fibres in horizontal channel flow	
Wollborn, T., Knoop, C. and Fritsching,U.: The effect of an oscillating agitated fluid on particle agglomerates and analysis of bond breakage	-
Almohammed, N. and Breuer, M.: Comparison of an energy-based and a momentum-based agglomeration model within an Euler-Lagrange LES approach	
Warncke, K., Sadiki, A. and Janicka, J.: Numerical Investigation of an airblasted liquid sheet using the embedded DNS concept	-
Lain, S. and Sommerfeld, M.: Erosion prediction in a horizontal to vertical elbow by the Euler-Lagrange approach	
Neben, M., Egbers, Ch. and Wenzke, S.: 3D-CFD-Simulations of the gas-particle flow in a cold gas Laval nozzle to predict the mechanical erosion	

Application of numerical methods for two-phase flow

Asad, A., Kratzsch, Ch. and Schwarze, R.: Application of the discrete phase model in metallurgical processes	

Rzehak, R. and Krepper E.: Euler-Euler Modeling of Mass-Transfer in Bubbly Flows	
Hoppe, F. and Breuer, M.:Large–eddy simulation of bubbly turbulent flows based on an Euler–Lagrange approach for a huge number of microbubbles	
Schmalfuß, S. and Sommerfeld, M.: Numerical and experimental analysis of particle behaviour in Fluid Phase Resonance Mixers	-
Aragall, R., Yu, F., Thurmann, M. and Brenner, B.: Transport of solid-liquid suspensions in wellbore drilling: multiscale modeling and experimental validation	
Judakova, G. and Bause, M.: Multiphase flow of natural gas through pipelines	
Krause, M.J. and Maier, M.-L. : OpenLB: An Open Source Library for Parallel Lattice Boltzmann Fluid Flow Simulations	-
Misiulia, D., Andersson, A.G. and Lundström T. S.: Effects of the inlet angle on the flow field and performance of a cyclone separator with helical-roof inlet	-
Le, H.D., Lacome, J.-M., Vignes, A., Debray, B., Truchot, B., Fede P. and Climent E.: Modelling of test case particle-laden jet with Neptune_CFD	
Greifzu, F. and Schwarze, R.: Simulation of Disperse Particle-Laden Gas Flows with OpenFOAM and ANSYS FLUENT