

WORKGROUP FOR MULTIPHAS FLOWS

Development of a 3 fluid model based on the Lattice-Boltzmann method

Grant number

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Project title

Development of a 3 fluid model based on the Lattice-Boltzmann method

Project leader

> (mailto:martin.sommerfeld@ovgu.de) Prof. Dr.-Ing. habil. Martin Sommerfeld

Realized by

> (mailto:philipp.malli@ovgu.de) Dipl.-Ing. Philipp Malli

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Short Description by the project

Within the scope of this project a model is to be developed, which can predict the behavior of 3-fluid systems correctly. These systems are particularly relevant in the petroleum industry. For example, the flow behavior of water, oil, and air during transport in pipelines is important for determining pressure drop and gas hold up, thus ensuring safe operation.

In order to simulate these systems, an already existing model, which has proven to work for two fluid phases, is first implemented and then extended to three fluid phases. The Lattice-Boltzmann gradient model is chosen as the basis for this. This model uses, among other things, a diffuse boundary surface which, on the one hand, makes it unnecessary to trace the phase boundary separately and, on the other hand, simplifies the handling of the contact between two fluid particles.

To have complete control over the implementation, both the 2-phase model and the 3-phase model are implemented from scratch in C++.

