Seminar thesis:

Modeling gas-liquid displacement fronts

Electrolyzers are mainly utilized to produce hydrogen from water and green energy. Oxygen management reportedly affects electrolyzers' efficiency and needs to be investigated for better understanding. Particularly, the replacement of water inside electrolyzer channels by oxygen plugs shall be investigated in this work (see figure below). The two-phase flow shall be modeled by solving the incompressible Navier-Stokes equations (incl. surface tension forces) on a Finite Volume grid and by capturing the fluid-fluid interfaces via the Volume of Fluids method (solver already implemented in C++ based OpenFOAM code). The model solution needs to be checked for its dependency on adopted grid resolution, differencing scheme and flux limiter.

Desirable knowledge/skills:
- Passed exam in Numerical Fluid Dynamics
- Experience with Linux
- Experience with postprocessing of simulations (Paraview, Matlab etc.)

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