Simulating gas-liquid flow in a micro-channel with the lattice Boltzmann method[1] GRACE SHI, VOLHA LAZOUSKAYA, YAN JIN, LIAN-PING WANG, University of Delaware — The flows of water in natural soil porous media with air-water interface are important to colloid-facilitated transport of contaminants and other phenomena with groundwater as the carrier. These flows are complex in terms of the geometrical feature and physical and chemical forces involved. As first step, we here demonstrate that a gas-liquid interfacial viscous flow in a 3D micro-channel with a square cross-section can be simulated using the lattice Boltzmann method. The talk will cover the detailed ingredients of the two-phase LBE model including the proper equation of state, surface tension, and the triple-phase boundary conditions. Methods to improve the stability of the code such as using multiple relaxation times will be tested. Preliminary results will be presented and compared to parallel experimental observations using confocal laser scanning microscopy.

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