Simulating Anomalous Dispersion and Multiphase Segregation in Porous Media with the Lattice Boltzmann Method RASTIN MATIN, MAREK K. MISZTAL, ANIER HERNANDEZ-GARCIA, JOACHIM MATHIESEN, Niels Bohr Institute — Many hydrodynamic phenomena such as flows at micron scale in porous media, large Reynolds numbers flows, non-Newtonian and multiphase flows have been simulated numerically using the lattice Boltzmann method. By solving the Lattice Boltzmann Equation on three-dimensional unstructured meshes, we efficiently model single-phase fluid flow in real rock samples. We use the flow field to estimate the permeability and further investigate the anomalous dispersion of passive tracers in porous media. By extending our single-phase model with a free-energy based method, we are able to simulate binary systems with moderate density ratios in a thermodynamically consistent way. In this presentation we will present our recent results on both anomalous transport and multiphase segregation.

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