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Lattice Boltzmann simulations of liquid lens coalescence

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The lattice Boltzmann method is an efficient approach to simulate complex fluids and wetting processes. We present results based on the colour gradient method which is particularly designed for multicomponent fluids and is able to obtain thermodynamically consistent results over wide ranges of viscosities and surface tensions. After demonstrating benchmarks to analytically accessible solutions such as the Laplace pressure, Neumann angles, Hagen-Poiseuille velocity profiles or surface tension deducted from drop oscillations, the method is applied to investigate the dynamics of liquid lens coalescence. Thereby the respective asymptotic power-laws obtained from similarity solutions of the thin-film equations are verified in the viscous and inertial limit.

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