

Abstract Submitted
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Semi-implicit Unstructured Finite Element Lattice Boltzmann Equation Method for Incompressible Binary Fluids¹ TAEHUN LEE, City College of New York — A semi-implicit finite element lattice Boltzmann equation method for incompressible binary fluids with large density and viscosity differences is proposed. The collision is treated implicitly and the intermolecular forcing terms are treated explicitly in order to achieve stability at high Reynolds number and avoid implicit treatment of the non-linear forcing terms. The characteristic Galerkin finite element approximation is adopted for the solution of the streaming, which provides geometric flexibility while retaining high-order accuracy. Unstructured body-fitted mesh enables mass conservation at the solid/liquid/gas triple contact line. The equilibrium contact angle is naturally imposed by the surface integral of the free energy. The proposed method is applied to several benchmark cases including drop sliding on patterned superhydrophobic surfaces.

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