Abstract Submitted
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Efficient Time-Stepping Scheme for Incompressible Two-Phase Flows with Large Density Ratios[1] SUCHUAN DONG, Purdue University — We present an efficient time-stepping scheme within the phase field framework for flows of two immiscible incompressible fluids with large density ratios. The scheme has several attractive characteristics: (1) It is suitable for large density ratios, and numerical experiments with density ratios up to 1000 will be presented; (2) It involves only constant (time-independent) coefficient matrices for all flow variables, which can be pre-computed during pre-processing, so it effectively overcomes the performance bottleneck induced by variable coefficient matrices associated with variable density and variable viscosity; (3) It completely de-couples the computations for all flow variables (velocity, pressure, and phase field function). Numerical simulations will be presented for wall-bounded liquid-gas flows involving large density ratios, moving contact lines, and interfacial topology changes.

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