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Non-reflecting boundary conditions for fluctuating hydrodynamics of compressible fluids RAFAEL DELGADO-BUSCALIONI, Universidad Autonoma de Madrid, ANNE DEJOAN, CIEMAT, Madrid — Many important phenomena in microfluidics involve propagation of fast sound waves. Computational modeling of such problems requires a way to evacuate the reflected waves out of the computational box. However, a way to construct open boundary conditions for Fluctuating Hydrodynamics (FH) is lacking in the literature. This work presents open boundary conditions for fluctuating hydrodynamics solvers based on the Navier-Stokes Landau-Lifshitz equations. The objectives are i) ensure robust non-reflecting boundary conditions and ii) keep thermodynamic consistency for total mass fluctuation, i.e. agreement with the grand canonical ensemble. We show that by ensuring the fluctuation-dissipation balance for the total mass, one also gets the correct equilibrium power spectra of local mass and momentum at each point of the computational box. We consider real compressible fluids (argon and water) under isothermal condition and present results for the equilibrium and several out-of-equilibrium states involving generation of sound waves.

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