Slabs of correlated nucleons with nonequilibrium Green's functions

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Nonequilibrium Green's Functions (NGF) represent a practical framework for theoretical investigations of many-body systems out of equilibrium. Expanding our past results for nuclear systems with NGF in one dimension, we incorporate into those short-range two-body correlations, in a self-consistent second-order approximation, and we differentiate between neutrons and protons. The specific treatment of the correlations accounts for the scattering of nucleons in the Born approximation. We discuss the preparation of the stationary initial state for the dynamics and examine the impact of correlations there. Next, we excite a finite symmetric nuclear system to oscillate in an isovector dipole mode and explore the dissipation effects in the oscillation. Finally, in preparation for studies of slab collisions, we demonstrate application of a Galilean boost to a slab that yields a stable uniform motion, with correlations included.