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Surface effects on hydrodynamic evolution

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We study the effect of surface tension of the phase boundary in the dynamics of an expanding fluid. A fluid at local thermal equilibrium, but has a slowly varying temperature profile, like the plasma formed in heavy ion collisions, will have rapidly varying order parameter field at the edge of the plasma where the temperature falls below the transition temperature. In the case where the free energy admits a first order transition, the gradient energy of this field will act as surface tension. We couple hydrodynamics and order parameter field evolutions to study the effect of this surface in the expansion of the plasma. We see that the surface slows down the expansion which reflects in the development of radial flow and momentum anisotropy.

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