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Is there a Tolman length in droplet solutions of the Allen-Cahn equation? ERIC HORSLEY, MAXIM LAVRENTOVICH, RANDALL KAMIEN, Univ of Pennsylvania — In the nucleation process of first-order transitions, the basic phenomenological description involves the competition between an interfacial and bulk energy. Generically, the surface tension associated with the interfacial energy is assumed to be constant; however, Tolman showed in 1949 that the surface tension could depend on the nucleated droplet radius. The matter remains unresolved. We investigate the droplet size dependence of the surface tension by means of the dynamics of a continuum scalar field given by the Allen-Cahn equation. Particular analytical solutions of the Allen-Cahn equation require an assumption that the interface width is much smaller than the droplet radius. If the surface tension is expected to change at small radii, as Tolman's result suggests, then this assumption becomes unsavory. Therefore, we choose to numerically solve the Allen-Cahn equation without this assumption.

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