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Bubble dynamics in a strong first-order quark-hadron transition

We investigate the dynamics of a strong first-order quark-hadron transition driven by cubic interaction via homogeneous bubble nucleation in the Friedberg-Lee model. The one-loop effective thermodynamics potential of the model and the critical bubble profiles have been calculated at different temperatures and chemical potentials. By taking the temperature and the chemical potential as the variables, the evolutions of the surface tension, the typical radius of the critical bubble and the shift in the coarse-grained free energy in the presence of a nucleation bubble are obtained and the limit on the reliability of the thin-wall approximation is also addressed accordingly. Our results are compared to those obtained for a weak first-order quark-hadron phase transition, especially the spinodal decomposition is relevant.

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