Bubble Wall Velocity at Strong Coupling

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Abstract

Using the holographic correspondence as a tool, we determine the steady-state velocity of expanding vacuum bubbles nucleated within chiral finite temperature first-order phase transitions occurring in strongly coupled large N QCD-like models. We provide general formulae for the friction force exerted by the plasma on the bubbles and for the steady-state velocity. In the top-down holographic description, the phase transitions are related to changes in the embedding of Dq/anti-Dq flavor branes probing the black hole background sourced by a stack of N Dp-branes. We first consider the Witten-Sakai-Sugimoto D4/D8/anti-D8 setup, compute the friction force and deduce the equilibrium velocity. Then we extend our analysis to more general setups and to different dimensions. Finally, we briefly compare our results, obtained within a fully non-perturbative framework, to other estimates of the bubble velocity in the literature.