

## Hydrodynamic perspectives on cosmological first-order phase transitions

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The detection of stochastic gravitational wave backgrounds from cosmological first-order phase transitions (FOPT) is a promising probe for new physics beyond the standard model of particle physics. However, the terminal wall velocity as one of the key parameters has been largely left undetermined thanks to its intimate relation to the non-equilibrium nature of FOPT near the bubble wall. In this talk, I will first introduce the general effective equation of motion of bubble wall expansion during both accelerating expansion and asymptotic expansion stages, then I will introduce the general backreaction from plasma against expansion followed by a particular focus on the strong-coupling limit, and next, I will introduce a new method to identify the terminal wall velocity from hydrodynamics. In the end, I will introduce a new analytic estimation of the sound-wave spectrum before bubble percolations as well as recent developments on sound waves.

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