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On Particle Production from Phase Transition Bubbles

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While first order phase transitions (FOPTs) have been extensively studied as promising cosmological sources of gravitational waves, the phenomenon of particle production from the expansion and collision of bubbles has received relatively little attention in the literature. Previous works have only considered semi-analytical estimates of this effect in simplified settings and have therefore left out interesting aspects. In this talk, I will discuss our improved numerical studies of particle production efficiency from more realistic scalar field configurations, revealing important qualitative details, such as the concurrence of a power law spectrum from the expansion phase and a peak from the post-collision scalar field oscillations, respectively. Our results provide easy-to-use analytic formulae that can be applied to calculate particle production in generic FOPT setups and beyond the Standard Model scenarios.

Summary

Primary authors: SHAKYA, Bibhushan (T (Cosmology)); MANSOUR, Henda (Karlsruhe Institute of Technology (TTP))

Presenter: MANSOUR, Henda (Karlsruhe Institute of Technology (TTP))

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