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Collision Integrals for Cosmological Phase Transitions

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Bubble nucleation is a key aspect of a cosmological first-order phase transition. The non-equilibrium bubble dynamics and the properties of the transition are controlled by the density perturbations in the hot plasma. We present a new spectral method devised for a fast and reliable computation of the collision integral in the Boltzmann equations. In a scalar singlet extension of the Standard Model chosen as a benchmark scenario, we test our algorithm, determining the bubble speed and profile, and we assess the impact of the out-of-equilibrium dynamics.

Primary author: Mr GUIGGIANI, Andrea (INFN,Universit'a di Firenze)

Presenter: Mr GUIGGIANI, Andrea (INFN,Universit'a di Firenze)