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Invisible traces of conformal symmetry breaking

In our work we study the cosmological phase transition (PT) in a conformal extension of the Standard Model (SM). The model considered is called $SU(2)_{cSM}$, it extends the SM gauge group by an additional hidden $SU(2)_X$ gauge group, and a scalar doublet (whilst singlet under SM gauge group). The tree-level potential has no mass terms, all the masses are generated via the Coleman-Weinberg mechanism. The new gauge boson X can be considered as a dark matter candidate, also the model may be extended in order to include a mechanism of baryogenesis as well. Due to the large supercooling a strong gravitational waves (GWs) signal can be generated during the PT. \\

We carefully investigate the PT, taking into account recent developments in order to improve existing results and provide meaningful information for the forthcoming LISA searches.

We study the RG improved potential, distinguish between percolation and nucleation temperature of the bubbles, discuss the hydrodynamics, i.e possible runaway, and present resulting GW spectra. We briefly comment on the dark matter phenomenology.

Collaboration / Activity

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