

What the heck happens when the Universe boils?

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Ultra-relativistic bubbles from the simplest Higgs portal and their cosmological consequences

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We analyze the phase transitions in the minimal extension of the SM with a real singlet scalar field. The novelty of our study is that we identify and analyze in details the region of parameter space where the first order phase transition can occur and in particular when the bubbles with true vacuum can reach relativistic velocities. This region is interesting since it can lead to the new recently discussed baryogenesis and Dark Matter production mechanisms. We fully analyze different models for the production of Dark Matter and baryogenesis as well as the possibilities of discovery at the current and future experiments.

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