

Temperature in the early stage of universe

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Abstract

We can show a possible way to introduce naturally the concept of a dynamical temperature as a thermodynamic parameter in a cosmological model. This is done within the framework of classical field theory. Here, a scalar field is introduced that generates the dynamic temperature. Such a potential allows us to describe the time evolution of this fundamental thermal property in the framework of inflationary models of the early universe. In the model the inflation field decays into this additional field. The dynamics contains a phase transition dividing the energy propagation into a dissipative and a non-dissipative process involving a spontaneous symmetry breaking mechanism. We describe the time evolution in the rapid expanding universe. The presented description is in line with cosmological inflationary models.