

Primordial black holes from slow phase transitions: a model-building perspective

Sunday, 2 June 2024 11:20 (25 minutes)

We discuss the relation between the Higgs potential structure and primordial black hole (PBH) formations. Recently, it has been discussed that PBHs can be formed by first-order phase transitions at the early Universe. In this talk, we consider the PBH formation mechanism through delayed first-order phase transitions at the early Universe. If the phase transition is delayed, the large energy density fluctuation can be realized between symmetry broken and unbroken regions. If the density fluctuation can be larger than a certain criterion, the overdensity region may collapse to PBHs. We discuss the form of the Higgs potential needed to realize this PBH formation. In addition, we show that the commonly used exponential approximation of the bubble nucleation rate fails to capture such PBH formation.

Paper info

<https://inspirehep.net/literature/2772958>

Primary author: TANAKA, Masanori (Peking University)

Co-authors: Prof. XIE, Ke-Pan (Beihang University); KANEMURA, Shinya (Osaka University)

Presenter: TANAKA, Masanori (Peking University)

Session Classification: Astrophysics