

Scalars 2023

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Primordial Black Holes as a Probe of First Order Phase Transition

Friday 15 Sep 2023 at 10:00 (00h30')

Content :

We discuss production of primordial black holes from first-order electroweak phase transition in the framework of the nearly aligned Higgs effective field theory, in which non-decoupling quantum effects are properly described. Since the mass of such primordial black holes is evaluated to be about 10^{-5} of the solar mass, current and future microlensing observations such as Subaru HSC, OGLE, PRIME and Roman Space Telescope may be able to probe the electroweak phase transition. We study parameter regions where primordial black holes can be produced by the first-order electroweak phase transition and explore their detectability at these observations. Complementarity of primordial black hole observations, gravitational wave observations and collider experiments is also discussed for testing the nature of the electroweak phase transition. The talk is based on our paper 2211.16225 and 2111.13099 with recent developments.

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