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Production of Primordial black holes via single field inflation and observational constraints

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In a class of single field models of inflation, the idea of primordial black holes (PBHs) production is studied. In this case, the dynamics on small cosmological scales differs significantly from that of the large scales probed by the observations of cosmic microwave background (CMB). This difference becomes a virtue in producing correct physical ambience for the seeds required to produce PBHs. Thus, once the perturbed scales re-enter the horizon of our Universe during the later epochs of radiation domination and subsequent matter domination, these seeds collapse to produce PBHs. We have shown, in this class of model, depending on the model parameters and the class defining set parameters, one can have PBHs formed for a vast mass ranges from 10^{-18} to 10^6 solar mass (M_{\odot}). We have also shown, for a particular class of model, the total dark matter density today can be attributed to the PBHs density. The vast range of the mass depending on the class parameter, gives ample opportunity to study enriched phenomenological implications associated with this model to probe the nascent Universe dynamics.

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