

Primordial Black Hole Formation from Power Spectrum with Finite-width

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Primordial Black Holes (PBHs) may be produced by gravitational collapse in regions with a large amplitude of density contrasts in the early Universe. They may provide the seeds for galaxy formation, account for a population of the LIGO-Virgo events, and the candidates of cold dark matter. The main purpose of our study is to develop a more accurate estimation for PBH abundance. We address the calculation of the PBH abundance by applying peak's theory to primordial field perturbations with a Gaussian probability distribution. Our study makes the application of peak's theory in PBH abundance estimation no longer limited to monochromatic perturbations, power spectrum with any width or shape can be generally solved by handling the smoothing effects in a proper way.

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