

Nearly Monochromatic Primordial Black Holes as total Dark Matter from Bubble Collapse

Saturday, 1 November 2025 11:00 (30 minutes)

We propose a two-field model where the inflaton χ is non-minimally coupled to the instanton ϕ . By choosing an appropriate coupling function, we realize the scenario where the difference of the values of potential between false vacuum (FV) and true vacuum (TV) is maximized during inflation. Most of the bubbles are created at this time. After inflation ends, the potential value of FV drops below that of TV so that these bubbles collapse to form primordial black holes (PBHs). By tuning the parameters of our model, we analyze the Coleman-de Luccia (CDL) and Hawking-Moss (HM) process, finding that the corresponding mass function of PBHs is sharply peaked, implying that we can realize either PBHs as cold dark matter, sub-solar PBHs, or supermassive PBHs in this scenario without enhancement of primordial curvature perturbations.

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Session Classification: Session 4