

Feedback in the dark: a critical examination of CMB bounds on primordial black holes

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Primordial Black Holes (PBHs) may exist, possibly contributing to the Dark Matter abundance. We will revisit some key aspects of the cosmological bound on a subdominant population of heavy PBHs, originating from the accurate measurement of the anisotropies in the Cosmic Microwave Background (CMB). We will analyze the role of accretion physics, with particular focus on the interplay between the radiation feedback and the “accretion boost” provided by the bulk of the dark matter that cluster around PBHs and form mini-halos. We will demonstrate that the local increase in temperature around PBHs provided by the radiation emitted by the accreted matter can prevent the dark matter mini-halos from strongly enhancing the accretion process, in some cases significantly weakening previously derived CMB constraints. In the last part of the talk, we also review other uncertainties in the bound under scrutiny and provide a comprehensive assessment on the robustness of the bound.

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