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Signature from Primordial Black Hole evaporation

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Primordial Black Holes are hypothetical Black Holes formed in the very early universe and are potential Dark Matter Candidates. Focusing on the Primordial Black Holes mass range $[5 \cdot 10^{14}–1 \cdot 10^{17}]$ g, we point out that their evaporation can produce detectable signals in existing experiments. First of all, we study neutrinos emitted by PBHs evaporation. They can interact through the coherent elastic neutrino-nucleus scattering producing an observable signal in multi-ton DM direct detection experiments. We show that using future experiments with higher exposure it will be possible to constraints the fraction of Dark Matter composed of Primordial Black Holes. Furthermore, we study the emission of a light Dark matter candidate endowed with large kinetic energies. Focusing on the XENON1T experiment, we show that these relativistic dark matter particles could give rise to signal orders of magnitude larger than the present upper bounds. The non-observation of such a signal can be used to constraints the combined parameter space of primordial black holes and sub-GeV dark matter.

Summary

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