

# Direct detection of light dark matter from evaporating primordial black holes

Wednesday, 22 September 2021 15:00 (15 minutes)

The direct detection of sub-GeV dark matter interacting with nucleons is hampered by the low recoil energies induced by scatterings in the detectors. This experimental difficulty is avoided in the scenario of boosted dark matter where a component of dark matter particles is endowed with large kinetic energies. In this Letter, we point out that the current evaporation of primordial black holes with masses from  $10^{14}$  to  $10^{16}$  g is a source of boosted light dark matter with energies of tens to hundreds of MeV. Focusing on the XENON1T experiment, we show that these relativistic dark matter particles could give rise to a signal orders of magnitude larger than the present upper bounds. Therefore, we are able to significantly constrain the combined parameter space of primordial black holes and sub-GeV dark matter. In the presence of primordial black holes with a mass of  $10^{15}$  g and an abundance compatible with present bounds, the limits on DM-nucleon cross-section are improved by four orders of magnitude.

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## Summary

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**Session Classification:** Parallel Sessions: Cosmology

**Track Classification:** Cosmology & Astroparticle Physics