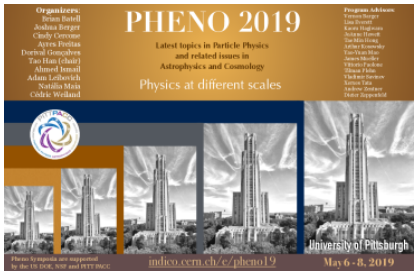

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Direct detection of primordial black hole dark matter

Monday 6 May 2019 18:15 (15 minutes)

If dark matter is composed of primordial black holes, such black holes can span an enormous range of masses. A variety of observational constraints exist on massive black holes, while black holes with masses below 10^{15} g are often assumed to have completely evaporated by the present day. If the evaporation process halts at the Planck scale it would leave behind a stable relic, and such objects could constitute the entirety of dark matter. Neutral Planck-scale relics are effectively invisible to both astrophysical and direct detection searches. However, we argue that such relics may typically carry electric charge, making them visible to terrestrial detectors. We evaluate constraints and detection prospects in detail, and show that if not already ruled out by monopole searches, this scenario can be largely explored within the next decade using existing or planned experimental equipment. A single detection would have enormous implications for cosmology, black hole physics, and quantum gravity.

Summary

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