

## Primordial Black Hole Reformation in the Early Universe

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Light primordial black holes (PBHs) can be formed in a variety of scenarios from inflationary scenarios to first order phase transitions. Extremely light PBHs with masses  $M < 10^8$  g evaporate before the era of BBN, leaving behind little trace of their existence except for gravitational waves. We show that if these PBHs are produced in high enough abundances to initiate an early matter-dominated era, then the growth of PBH perturbations during this phase is enough to trigger a secondary collapse into larger PBHs. These heavier reformed PBHs have extended lifetimes and can produce observable signals in the present, such as high energy gamma rays along with a coincident gravitational wave background.

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