Analyzing the Viability of Primordial Black Holes as a Significant Component of Cosmological Dark Matter

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Dark matter is a clear and necessary component of our Universe today, yet no candidate in any mass range has yet been discovered. Thus, in light of gravitational wave observations of the surprisingly high mass black hole binary coalescences in recent years, the old theory of primordial black holes (PBHs) has been revived, and these objects have become a prime leading candidate for dark matter. While there are many current constraints that rule out PBHs as making up the dark matter in the higher mass windows, one lower mass window remains. Upcoming higher-sensitivity gravitational wave observatories will have the ability to discriminate through their gravitational wave signals if they are seeing normal astrophysical or primordial black coalescences, giving us hints on whether PBH do make up all, or any, of the dark matter.

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