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Close encounters of the primordial kind: a new observable for primordial black holes as dark matter

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Primordial black holes (PBHs) remain a viable dark matter candidate in the asteroid-mass range. We point out that in this scenario, the PBH abundance would be large enough for at least one object to cross through the inner Solar System per decade. Since Solar System ephemerides are modeled and measured to extremely high precision, such close encounters could produce detectable perturbations to orbital trajectories with characteristic features. We evaluate this possibility with a suite of simple Solar System simulations, and we argue that the abundance of asteroid-mass PBHs can plausibly be probed by existing and near-future data.

Mini Symposia (Invited Talks Only)

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