



Contribution ID: 19

Type: **not specified**

Close Encounters of the Primordial Kind

Tuesday, 18 June 2024 11:30 (20 minutes)

Primordial black holes (PBHs) remain a viable dark matter candidate in the asteroid-mass range. I will show that, if PBHs lie within this mass range and make up most or all of the dark matter, 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. Using a suite of simple Solar System simulations, I will make the case that the abundance of asteroid-mass PBHs can be probed by existing and near-term data, potentially furnishing us with a new direct probe of PBH dark matter.

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Session Classification: Session 6