Contribution ID: **3** Type: **not specified**

The trichotomy of Primordial Black Holes initial conditions

Monday 2 February 2026 10:25 (25 minutes)

In this talk, I will show that the formation of primordial black holes, in an asymptotically flat and radiation dominated Friedman-Robertson-Walker (FRW) Universe, is not mainly determined by the behaviour of the smoothed linear over-density at its maximum, as earlier thought, but also by the three-dimensional curvature at smaller (but super-horizon) scales, which is called "the core". I will present three classes of initial condition characterised by an open, closed or flat FRW core. I will motivate the use of the three-dimensional curvature as the key parameter to determine the threshold of PBH formation.

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