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Primordial black holes from stochastic tunnelling

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If inflation gives rise to large enough curvature perturbations, these will generate large overdensities in the primordial plasma, which may eventually collapse to form primordial black holes when inflation is over. Therefore, primordial black holes typically arise in inflationary scenarios where the backreaction of large amplitude fluctuations significantly modify the large-scale dynamics of the universe.

Under the program dictated by the stochastic- δN formalism, this quantum backreaction can be properly incorporated, and the impact of quantum diffusion on the properties of collapsed objects, such as primordial black holes, can be assessed.

In this framework, I will discuss the abundance of primordial black holes generated by stochastic tunnelling, which may happen when the inflationary potential displays a false vacuum state that is overshoot thanks to quantum diffusion, as well as the impact of quantum diffusion on clustering properties of primordial black holes at their formation.

Primary authors: ANIMALI, Chiara (LPENS, Paris); VENNIN, Vincent

Presenter: ANIMALI, Chiara (LPENS, Paris)

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