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Gravitational waves from primordial black hole reheating in a general cosmological background

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Although there is substantial observational evidence for an early period of exponential expansion of the Universe, known as inflation, followed by a subsequent era of radiation domination, the intermediate period connecting these two epochs, referred to as reheating, remains challenging to constrain.

In this talk, I will present the primordial black hole (PBH) reheating scenario, where tiny black holes temporarily dominate the Universe and reheat it via Hawking radiation from their evaporation. I will discuss the gravitational wave (GW) spectrum induced by PBH number density fluctuations, paying particular attention to how features of the spectrum depend on the (so far unconstrained) equation of state of the primordial fluid. The GW signal may enter the observational window of several future GW detectors, such as LISA and the Einstein Telescope, indicating that it may soon be possible to directly probe the physics of the earliest moments of the Universe via induced GWs.

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