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Early structure and binary formation with primordial black holes

Partially due to the detection of gravitational waves LIGO, Virgo and KAGRA (LVK), there has been renewed interest in the possibility that primordial black holes (PBHs) make up all, or a fraction of, dark matter. However, the origin of the LVK black holes is still not well understood. To explore the possibility that (at least some) of the LVK black holes are primordial in nature requires an understanding of the environments in which binary PBHs might and evolve, and how PBHs can affect structure formation. In this talk, I will present the first results from a new suite of fully collisional cosmological simulations with PBH dark matter, looking at how early structure formation is affected, and how this affects the formation and evolution of binary PBHs.

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