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PBH from Numerical Relativity

We simulated the formation of spinning and non-spinning PBH from the collapse of superhorizon density fluctuations using full numerical relativity in the case of the approximately matter dominated case. We showed that there are two formation mechanisms (1) direct collapse where the perturbation itself forms a BH and (2) accretion collapse where the perturbation generates a potential well which causes subsequent BH formation due to accretion. We argue that the dynamics of formation matters in the final properties of the PBH, which is not captured by the usual “kinematics” threshold arguments

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