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Probing inflationary primordial black holes for the LIGO gravitational wave events

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Primordial black holes (PBHs) are one of the candidates to explain the gravitational wave (GW) signals observed by the LIGO detectors. Among several phenomena in the early Universe, cosmic inflation is a major example to generate PBHs from large primordial density perturbations. In this talk, we discuss the possibility to interpret the observed GW events as mergers of PBHs which are produced by cosmic inflation. In this case, the primordial curvature perturbation should be large enough to generate a sizable amount of PBHs, and thus we have several other probes to test this scenario. We point out that the current pulsar timing array (PTA) experiments already put severe constraints on GWs generated via the second-order effects, and that the observation of the cosmic microwave background (CMB) puts severe restriction on its small-scale distortions, such as ¥mu-distortion. In particular, for simple inflation models, it is found that the scalar power spectrum should have a sharp peak at k ˜ 10ˆ6 Mpcˆ-1 to fulfill the required abundance of PBHs while evading constraints from the PTA experiments and the mu-distortion.

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