Contribution ID: **2** Type: **not specified**

Phase transition catalyzed by primordial black holes

Tuesday, 9 April 2024 17:10 (20 minutes)

We investigate the first-order phase transition catalyzed by primordial black holes˜(PBHs) in the early Universe. We find that super-horizon curvature perturbations generated in this scenario lead to the production of gravitational waves when the scalar modes re-enter the horizon. If PBHs with masses about $10^{-13}M_{\odot}$ constitute all dark matter, the first-order electroweak phase transition catalyzed by PBHs can explain the gravitational wave signal observed by pulsar timing array collaborations without the overproduction of PBHs.

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Session Classification: Plenary