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Detecting nonclassical primordial gravitational waves with Hanbury Brown and Twiss interferometry

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We consider possible detection of nonclassicality of primordial gravitational waves (PGWs) by applying Hanbury Brown - Twiss (HBT) interferometry to cosmology. We characterize the nonclassicality of PGWs in terms of sub-Poissonian statistics that can be measured by the HBT interferometry. We show that the presence of matter fields during inflation makes us possible to detect nonclassical PGWs with the HBT interferometry. We present two examples that realize the classical sources during inflation. It turns out that PGWs with frequencies higher than 10 kHz enable us to detect their nonclassicality.

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