

A new universal property of cosmological gravitational wave anisotropies

Friday, June 2, 2023 11:52 AM (5 minutes)

The anisotropies of the stochastic gravitational wave background, as produced in the early phases of cosmological evolution, can act as a key probe of the primordial universe particle content. We point out a universal property of gravitational wave anisotropies of cosmological origin: for adiabatic initial conditions, their angular power spectrum is insensitive to the equation of state of the cosmic fluid driving the expansion before BBN. Any deviation from this universal behaviour points to the presence of non-adiabatic sources of primordial fluctuations. In this work we prove this general result, and we illustrate its consequences for a representative realisation of initial conditions based on the curvaton scenario. In the case of the simplest curvaton setup, we also find a fourfold enhancement in the cross-correlation between gravitational wave anisotropies and the CMB temperature fluctuations, vis-à-vis the purely adiabatic scenario.

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no

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Session Classification: Gravitational Waves