Astrophysics > Cosmology and Extragalactic Astrophysics

The Nature of Primordial Fluctuations from Anisotropic Inflation

Masa-aki Watanabe, Sugumi Kanno, Jiro Soda

(Submitted on 27 Feb 2010 (v1), last revised 7 Mar 2010 (this version, v2))

We study the statistical nature of primordial fluctuations from an anisotropic inflation which is realized by a vector field coupled to an inflaton. We find a suitable gauge, which we call the canonical gauge, for anisotropic inflation by generalizing the flat slicing gauge in conventional isotropic inflation. Using the canonical gauge, we reveal the structure of the couplings between curvature perturbations, vector waves, and gravitational waves. We identify two sources of anisotropy, i.e. the anisotropy due to the anisotropic expansion of the universe and that due to the anisotropic couplings among variables. It turns out that the latter effect is dominant. Since the coupling between the curvature perturbations and vector waves is the strongest one, the statistical anisotropy in the curvature perturbations is larger than that in gravitational waves. We find the cross correlation between the curvature perturbations and gravitational waves which never occurs in conventional inflation. We also find the linear polarization of gravitational waves. Finally, we discuss cosmological implication of our results.

Comments:	20 pages, 4 figures;(V2) a reference added
Subjects:	**Cosmology and Extragalactic Astrophysics (astro-ph.CO)**; General Relativity and Quantum Cosmology (gr-qc); High Energy Physics - Phenomenology (hep-ph); High Energy Physics - Theory (hep-th)
Report number:	KUNS-2257, DCPT-10/11
Cite as:	**arXiv:1003.0056v2 [astro-ph.CO]**

Submission history

From: Masaaki Watanabe [view email]
[v1] Sat, 27 Feb 2010 04:35:56 GMT (310kb)
[v2] Sun, 7 Mar 2010 03:31:26 GMT (333kb)

Which authors of this paper are endorsers?

Link back to: arXiv, form interface, contact.