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The Matter Bispectrum in N-body Simulations with non-Gaussian Initial Conditions

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(Submitted on 26 Feb 2010)

We present measurements of the dark matter bispectrum in N-body simulations with non-Gaussian initial conditions of the local kind for a large variety of triangular configurations and compare them with predictions from Eulerian Perturbation Theory up to one-loop corrections. We find that the effects of primordial non-Gaussianity at large scales, when compared to Perturbation Theory, are well described by the initial component of the matter bispectrum, linearly extrapolated at the redshift of interest. In addition, we find that, for f_NL=100, the nonlinear corrections due to non-Gaussian initial conditions are of the order of ~3, 4% for generic triangles up to ~20% for squeezed configurations, at any redshift. We show that the predictions of Perturbation Theory at tree-level fail to describe the simulation results at redshift z=0 already at scales corresponding to k ~ 0.02 - 0.08 h/Mpc, depending on the triangle, while one-loop corrections can significantly extend their validity to smaller scales. At higher redshift, one-loop Perturbation Theory provides indeed quite accurate predictions, particularly with respect to the relative correction due to primordial non-Gaussianity.

Comments:	17 pages, 7 figures
Subjects:	**Cosmology and Extragalactic Astrophysics (astro-ph.CO)**
Cite as:	**arXiv:1003.0007v1 [astro-ph.CO]**

Submission history

From: Emiliano Sefusatti [view email]
[v1] Fri, 26 Feb 2010 23:23:31 GMT (4550kb,D)

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