Scalar-Scalar, Scalar-Tensor, and Tensor-Tensor Correlators from Anisotropic Inflation

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We compute the phenomenological signatures of a model (Watanabe et al' 09) of anisotropic inflation driven by a scalar and a vector field. The action for the vector is U(1) invariant, and the model is free of ghost instabilities. A suitable coupling of the scalar to the kinetic term of the vector allows for a slow roll evolution of the vector vev, and hence for a prolonged anisotropic expansion; this provides a counter example to the cosmic no hair conjecture. We compute the nonvanishing two point correlation functions between physical modes of the system, and express them in terms of power spectra with angular dependence. The anisotropy parameter g_* for the scalar-scalar spectrum (defined as in the Ackerman et al '07 parametrization) turns out to be negative in the simplest realization of the model, which, therefore, cannot account for the angular dependence emerged in some analyses of the WMAP data. A g_* of order -0.1 is achieved when the energy of the vector is about 6-7 orders of magnitude smaller than that of the scalar during inflation. For such values of the parameters, the scalar-tensor correlation (which is in principle a distinctive signature of anisotropic spaces) is smaller than the tensor-tensor correlation.

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