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Title: Beyond the standard cosmological model

Abstract:

In the standard Λ CDM model of cosmology it is assumed that the universe is statistically isotropic and homogeneous when averaged on scales exceeding ~ 100 Mpc. The observed dipole anisotropy of the CMB is explained as due to our 'peculiar motion' because of local inhomogeneities. This requires that there be a corresponding dipole in the sky map of high redshift objects. Using a new catalogue of 1.4 million quasars we find however that this kinematic hypothesis is rejected at 4.9σ . This calls into question the standard practice of boosting to the 'CMB frame' to analyse cosmological data. In the heliocentric frame where observations are made, we find the acceleration of the Hubble expansion rate to also be anisotropic at 3.9σ . It is no longer justifiable to make it look isotropic by boosting to the CMB frame, in order to interpret it as due to a Cosmological Constant.