**Directional variations of cosmological parameters from the Planck CMB data**

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## Abstract

In an earlier work, we performed a statistical analysis of the angular distribution of the cosmological parameters by adding hemispherical masks in different directions to the Planck 2018 CMB temperature and polarization data. We found that the standard ΛCDM parameters $\Omega_b h^2$, $\Omega_c h^2$, $n_s$, $100\theta_{\rm MC}$, and $H_0$ closely follow a dipole form, with 2-3 σ-level directional variations. The dipole axes all generally align around a direction that is about 45° away from that of the CMB kinematic dipole. In this talk, we show that the directional variation of the CMB angular acoustic angle calculated with the fully asymmetric Bianchi Type I metric cannot account for the observed dipole-like anisotropy. Rather, we argue that local structures are likely to be the cause. If confirmed, our result implies that future CMB analyses should account for this foreground effect.