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Studies of statistical isotropy of the cosmic microwave background

Studies of the cosmic microwave background (CMB) are today one of the most important pillars of observational cosmology. They provide information not only on the initial conditions of the Universe but also on scales comparable to the horizon of the observable Universe. This gives a unique opportunity to pose important questions about very fundamental assumptions made in the standard cosmological model such as statistical isotropy and Gaussianity of the initial fluctuations. This also allows to test deviations from the statistical isotropy predicted in models of the Universe with multi-connected topology and deviations generated by gravitational lensing of the CMB, predicted in the standard cosmological model. Considerable effort spent on analyzing the statistical properties of the CMB maps has resulted in several reports of a breaking of statistical isotropy at large angular scales and detection of the gravitational lensing effect. I will review these studies paying special attention to the results obtained recently for the state-of-the-art data from the Planck satellite.

Serdecznie zapraszam,
Agnieszka Majczyna