Do We Understand the Cosmic Dipole?

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The dipole of the cosmic microwave background (CMB) defines a reference frame for cosmology. It is assumed since its discovery that the CMB dipole is caused by the proper motion of the Solar system. This hypothesis leads to the prediction that the corresponding Doppler shifts and aberration effects are universal to all frequencies. Thus the CMB frame is assumed to be the comoving frame of freely falling Friedmann observers, which is essential in the analysis of many cosmological observables such as the Hubble diagram. As any fundamental hypothesis, also the proper motion hypothesis must be tested.

We present results from a suite of cosmic radio dipole measurements based on radio continuum catalogues across frequencies. We find that the cosmic radio dipole agrees with the direction of the CMB dipole within errors but has an excess in amplitude which increases with wavelength. The limitations and consequences of our finding are discussed.

Figure: Surface density of radio sources on the sky at a frequency of 1.4 GHz and fluxes densities above 15 mJy. Shown are data from the NVSS catalogue in galactic coordinates and in Mollweide projection. Unobserved and the most noisy regions, as well as the galactic plane are masked.

Einführung: Prof. Dr. R.-J. Dettmar

Die Fakultät lädt alle Interessierten herzlich ein.

Ab 11.45 Uhr Kaffee/Tee im Hörsaal