

Calibrating and correcting direction-dependent effects in radio interferometric observations

O.M. Smirnov (ASTRON)

Radio interferometers are subject to two broad categories of Instrumental effects. Direction-independent effects (DIEs) manifest themselves as per-antenna gain terms in the measured Fourier components, and can be calibrated and corrected for in a straightforward manner. Direction-dependent effects (DDEs) are far more troublesome, since they translate into a convolution of the measured components by a term that is usually not known *a priori*. This makes it rather non-trivial to both calibrate an unknown DDE, and correct for a known (or measured) one. Two common sources of DDEs are (a) ionospheric refraction, and (b) variations in the primary beam response of the antennas due to mis-pointing, mechanical deformation, etc. I will present an overview of the DDE problem, some proposed methods of calibrating these effects and correcting for them, and new observational results that address the primary beam issue in particular.