CALIBRATION OF A LARGE DISTRIBUTED LOW FREQUENCY RADIO ASTRONOMICAL ARRAY (LOFAR) (WedPmOR3)

Author(s) :

Sebastiaan Van der Tol (Delft University of Technology, Netherlands)
Brian D. Jeffs (Brigham Young University, United States)
Alle−Jan Van der Veen (Delft University of Technology, Netherlands)

Abstract :

Several low frequency radio astronomy arrays are currently under development. For example the LOFAR array (with 13,000 dipole elements) will operate in the frequency range of 20MHz−240Mhz. At these frequencies the effect of the ionosphere cannot be ignored. Due to the fact that the size of the array is larger than the size of the irregularities in the ionosphere the calibration problem is direction dependent and time varying. The most general form of this problem does not have a unique solution given a single sample covariance estimate. In this paper we explore several constraints derived from the physics of the problem which make the problem solvable.

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