A new strategy for array optimization applied to Brazilian Decimetric Array

C. Faria (1,2), S. Stephany (2), **H. S. Sawant** (3)

(1) PUCMINAS, Poços de Caldas, MG, Brasil, (2) LAC/INPE, São José dos Campos, SP, Brasil, (3) DAS/INPE, São José dos Campos, SP, Brasil

Radio interferometric arrays measure the Fourier transform of the sky brightness distribution in a finite set of points that are determined by the cross-correlation of different pairs of antennas of the array. The sky brightness distribution is reconstructed by the inverse Fourier transform of the sampled visibilities. The quality of the reconstructed images strongly depends on the array configuration, since it determines the sampling function and therefore the points in the Fourier Plane. This work proposes a new optimization strategy for the array configuration that is based on the entropy of the distribution of the samples points in the Fourier plane. A stochastic optimizer, the Ant Colony Optimization, employs entropy of the point distribution in the Fourier plane to iteratively refine the candidate solutions. The proposed strategy was developed for the Brazilian Decimetric Array (BDA), a radio interferometric array that is currently being developed for solar observations at the Brazilian Institute for Space Research. Configurations results corresponding to the Fourier plane coverage, synthesized beam and side lobes levels are shown for an optimized BDA configuration obtained with the proposed strategy and, compared to the results for a standard “T” array configuration that was originally proposed.