5.3 IA

Brazilian decimetric array antenna configuration

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The Brazilian Decimetric Array (BDA) is being developed at INPE as an international collaborative program. In the first phase of the project, named PBDA (Prototype of BDA), a five-element interferometer was developed and installed at INPE using a 4-meter diameter parabolic dish with alt-azimuth mount and complete tracking capability. PBDA operates in the frequency range of 1.2-1.7 GHz. This array will be transferred to Cachoeira Paulista (latitude: -22^{o}41'19" S and longitude: 45^{o}00'22" W), in 2004. In the second phase, 21 antennas will be laid out over the distance of 256 meters in the east-west direction and 11 antennas will be laid out over a distance of 144 meters in the southern direction, in a "T" shape. The frequency range will be increased from 1.2-1.7 to 2.7 and 5.0 GHz. Finally, in the third phase, four more antennas will be added in the east-west direction and two antennas will be added in the south direction, then the baselines will be increased in both directions to 2.5 km and 1.25 km, respectively, to increase the spatial resolution of the array up to approximately 5 arcsec at 5 GHz. Any array of the antennas measures the Fourier transform of the radio brightness distribution known as visibility functions. The sampling of the visibility function is determined by the cross-correlation function of the antennas locations in the array. Inverse Fourier Transform provides the image of the source. Various geometries have been suggested in literature to optimize the response of the array to image quality, increased signal to noise ratio and cost of the construction. Since we intend to have images of the radio sources in snap shot mode, a "T" configuration is most suitable with less complexity of the data processing with sufficient redundancy and easy to calibrate. Here, we are reporting various geometries/configuration investigated for above mentioned three phases of the project. Simulations of the solar images at 1.4 GHz have been carried out for various array configurations, using Nobeyama data at 17 GHz. The results are presented, with central "T" of 400 x 188 meters with randomly spaced antennas.

Keywords: **radio-interferometry**, **decimetric array**, **antenna configuration**

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