



Antenna design for Chinese IPS telescope

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A new telescope for the IPS observation including cylinder antennas with large collecting area at one main station, dishes with smaller collecting areas at sub-stations was proposed in China. As a part of the Phase-II Meridian Space Weather Monitoring Project, this new IPS telescope will be constructed in near future.

There are three cylinder antennas placed side by side, with a large reflector size for each cylinder of 140m in N-S direction and 40m in E-W direction at the main station. At each of the two sub-station, there is a 16m parabolic dish with cryogenically cooled receiver. Several types of cylinder antennas were considered to design for meeting requirement of IPS observation. The finite-element model was built to analyze mechanic performance, to evaluate sensitivity loss due to deformation caused by gravity weight of itself, snow and wind load for these designs. Meanwhile, the study of the dynamic properties of antennas in the frequency domain, which is model analysis, was carried out. Resonant frequency of these antennas was simulated with model analysis. About mechanical structure, some performance parameters were compared for example rotation axis, rotational inertia, balance weight, power of driving system, total weight and total cost. About feed design, besides dipole, which used as feed in Ooty telescope and ISEE IPS telescope, two other types of feed were considered to obtain better aperture efficiency than dipole.

In this paper, some specifications, basic technical considerations and some simulations of these antennas are described, a preliminary design of this IPS telescope was proposed.

1. Yihua Yan, Wei Wang, Linjie Chen, Fei Liu, Lihong Geng, Zhijun Chen, "New Interplanetary Scintillation Array in China for Space Weather," *ISWI 2017*, under review.