The Effect of Metal Frame Structure on EM Scattering Characteristics of Radome

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Abstract:
The structure of metal space frame (MSF) has a significant influence on the electromagnetic properties of radome once the mechanical parameters are determined. In this paper different frame structures along with the effect on their scattering characteristics are studied from the perspective of topological structure. Through building the regular and irregular MSFs based on the same mechanical parameters, the method of induced current ratio is employed to calculate the induced current distributing on the different positions of frame, and the effect which the different structures have on the scattered field is studied. The result proves that the scattering energy of irregular MSF in far field is dispersed to the side lobe area which is far from the radiation direction because of the quasi-random arrangement of struts on the radome surface, which results in a much smaller influence on the radiation filed near the radiation direction. The performance of radome can be improved with the employment of metal frame which is designed in the method of irregular division.

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