COMSOL Multiphysics Super Resolution Analysis of a Spherical Geodesic Waveguide Suitable for Manufacturing

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Abstract

Recently it has been proved theoretically (Miñano et al, 2011) that the super-resolution up to λ /500 can be achieved using an ideal metallic Spherical Geodesic Waveguide (SGW). This SGW is as a theoretical design, in which the conductive walls are considered to be lossless conductors with zero thickness. In this paper, we study some key parameters that might influence the super resolution properties reported in (Miñano et al, 2011), such as losses, metal type, the thickness of conductive walls and the deformation from perfect sphere. We implement an realistic SGW in COMSOL Multiphysics and analyze its super resolution properties The realistic model is designed in accordance with the manufacturing requirements and technological limitations. Here we present the results for models, the ideal and the realistic SGW.

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