

## Scattering by a Quarter-Sphere Located Inside a Dihedral Reflector

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The scattering of a plane wave of arbitrary polarization that is obliquely incident on a quarter-sphere whose center is located on the intersection of the two faces of a dihedral reflector is considered. The analysis is conducted in the phasor domain, with a time-dependence factor  $\exp(+j\omega t)$  that is omitted throughout.

The analysis is performed in three steps. The first step consists in obtaining the scattering by a full sphere immersed in free space when the incident plane wave is not propagating in a direction parallel to one of the axes of a rectangular coordinate system, by employing coordinate rotation. The second step consists in inserting a metallic plane through the center of the sphere, and utilizing the method of images to obtain the field scattered by a hemisphere on a metal plane. Results from these two steps were presented recently at a conference (S. Singh, M.D. Poort, and P.L.E. Uslenghi, "Scattering by a hemisphere on a metallic plate", *Digest of the USNC-URSI National Radio Science Meeting*, Boulder, CO, Jan. 2018). The third step consists in inserting a second metallic plane perpendicular to the first plane and containing the center of the sphere, then using the method of images to obtain the exact solution to the scattering by a quarter-sphere inside a dihedral reflector.

The material of the quarter-sphere may be either a perfect electric or a perfect magnetic conductor, or be a linear, homogeneous and isotropic material characterized by arbitrary values of its scalar permittivity and permeability. Particular attention is paid to the scattered far field and to the electric current density on the metallic portions of the structure. Numerical results are presented and discussed.