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Accession number:20113214215584

Title:Terahertz surface plasmon polaritons on a conductive right circular cone: Analytical description and experimental verification

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Source title: Physical Review A - Atomic, Molecular, and Optical Physics

Abbreviated source title: Phys Rev A

Volume:84

Issue:1

Issue date:July 18, 2011

Publication year:2011

Article number:013816

Language:English

ISSN:10502947

E-ISSN:10941622

CODEN:PLRAAN

Document type: Journal article (JA)

Publisher: American Physical Society, One Physics Ellipse, College Park, MD 20740-3844, United States

Abstract:We report on an analytical solution of Maxwell's equations for the propagation of surface plasmon polaritons on a right circular cone. The problem was solved for THz frequencies in real metals and was therefore derived using the Leontovich approximation, which is valid for media with small surface impedances. The solution also accounts for both surface plasmon polaritons that are axisymmetric and those that have an angular structure in a plane normal to the cone's axis. This was an important consideration since it is crucial for describing surface phenomena such as surface-enhanced absorption, fluorescence, and Raman scattering. Our findings predict a total reflection of surface plasmon polaritons at the cone's apex, which was experimentally verified by an absence of light emitted from a heated cone's tip into the far-field region.

Number of references:22