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Accession number:20122915258851

Title:Modelling of surface waves on a THz antenna detected by a near-field probe

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Source title:Optics Express

Abbreviated source title:Opt. Express

Volume:20

Issue:14

Issue date:July 2, 2012

Publication year:2012

Pages:16023-16032

Language:English

E-ISSN:10944087

Document type:Journal article (JA)

Publisher:Optical Society of America, 2010 Massachusetts Avenue NW, Washington, DC 20036-1023, United States

Abstract:We have modelled the experimental system based on the subwavelength aperture probe employed in our previous work for terahertz (THz) surface plasmon wave imaging on a bowtie antenna. For the first time we demonstrate the accuracy of the proposed interpretation of the images mapped by the probe. The very good agreement between numerical and experimental results proves that the physical quantity detected by the probe is the spatial derivative of the electric field normal component. The achieved understanding of the near-field probe response allows now a correct interpretation of the images and the distribution of the electric field to be extracted. We have also carried out the first assessment of the probe invasiveness and found that the pattern of the surface plasmon wave on the antenna is not modified significantly by the proximity of the probe. This makes the experimental system an effective tool for near-field imaging of THz antennas and other metallic structures. © 2012 Optical Society of America.

Number of references:20

Main heading:Antennas

Controlled terms:Electric fields - Plasmons - Probes - Surface waves - Terahertz waves

Uncontrolled terms:Bow-tie antennas - Effective tool - Experimental system - Invasiveness - Metallic structures - Near field imaging - Near field probes - Normal component - Physical quantities - Spatial derivatives - Subwavelength apertures - Surface plasmon waves - Terahertz - THz antenna

Classification code:943 Mechanical and Miscellaneous Measuring Instruments - 942 Electric and Electronic Measuring Instruments - 941 Acoustical and Optical Measuring Instruments - 944 Moisture, Pressure and Temperature, and Radiation Measuring Instruments - 716 Telecommunication; Radar, Radio and Television - 711 Electromagnetic Waves - 701.1 Electricity: Basic Concepts and Phenomena - 712.1 Semiconducting Materials

DOI:10.1364/OE.20.016023

Database:Compendex

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