Abstract

Title: Controlling the Propagation of Spoof-Surface Plasmon Polaritons through Structured Metal

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I. Abstract

This talk is dedicated to the manipulation of Spoof-Surface Plasmon Polaritons (SPPs) in structured metals in microwave (MW) and terahertz (THz) regimes. Nowadays high-end electronics systems and devices face the key challenges of high gain, broad bandwidth, miniaturization, transmission losses, and most importantly the signal integrity. They are self-sustaining and propagating electromagnetic waves which are created when light is incident on metal and combines to collective oscillations of electrons (called surface plasmons) at optical frequencies. Once created, SPPs propagate alongside the metal-dielectric interface whereas decay exponentially along the perpendicular direction to the metal-dielectric interface. They exist temporarily and have much smaller wavelengths in contrast to the incident photons. Because a metal works as a perfect electric conductor at low frequencies, therefore, SPPs may not be provoked naturally. By engineering decorations in the form of grooves, blocks, cavities and slits on metal surfaces on subwavelength scale, the realization of spoof-SPPs (SSPPs) with the idea of employing metamaterials is possible at MW and THz frequencies. SSPPs mimic the striking characteristics of SPPs, and their dispersion performance and spatial field confinement can be designed at will by adjusting the geometrical parameters of the structure. We will explore different planar designs that have been proposed to manipulate and control the propagation of SSPPs in filter applications. This will include SPP filters having periodic metallic corrugations with single microstrip(MS) line, double MS lines, flexible plasmonic structures, free-standing planar plasmonic structures, closely-packed plasmonic waveguides (differential pair), time-domain SSPPs for high speed communications, straight and curved Hybrid waveguides. We will review how the carefully designed geometry of textured structures affects the dispersion characteristics of SSPPs and provide the scenarios how the cutoff frequency, field confinement ability and insertion loss are directly related to the inclusion's shape and related geometric parameters.

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III. Biography:

Rana Sadaf Anwar received a B.E degree in 2001 from the University of Engineering and Technology Taxila, Pakistan and M.S degree in 2008 from the University of Sheffield, England, UK. She has been engaged as General Manager to a Research and Development organization in Pakistan since 2002. She is currently working toward the Ph.D. degree in electronics engineering from the School of Computer and Communication Engineering, University of Science and Technology, Beijing, China. She focuses on the high frequency design and reducing electromagnetic interference in the systems. Her research interests include planar structure designs, electromagnetic compatibility, noise reduction, signal integrity and power integrity analysis.

Lingfeng Mao is a professor in School of computer and communication Engineering, University of Science and Technology Beijing, China. He has been engaged in integrated circuit research for many years. His current research interests include new generation of Electronic devices and Systems, Electronic thin film technology, semiconductor device reliability physics. He has published more than 90 papers in well-known academic journals and academic conferences at home and abroad. He has been a member of the Peking University -Motorola Joint Project. He has participated in major national basic research projects (973 G2000036503), military pre-research projects, key laboratory funds and doctoral program. He presided over two natural base projects and participated in one national base project.

Huansheng Ning received a B.S. degree from Anhui University in 1996 and Ph.D. degree in Beihang University in 2001. Now, he is a professor and vice dean of School of computer and communication Engineering, University of Science and Technology Beijing, China. His current research focuses on Electromagnetic sensing and identification, Internet of Things, cyber-physical modeling. He is the founder of Cyberspace and Cybermatics and Cyberspace International Science and Technology Cooperation Base. He serves as an associate editor of IEEE System Journal and IEEE Internet of Things Journal. He is the Co-Chair of IEEE Systems, Man, and Cybernetics Society Technical Committee on Cybermatics. He has hosted the 2013 World Cybermatics Congress, and the 2015 Smart World Congress as the joint executive chair. He

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Publications

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