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Direct Near-field Imaging of UV Surface Plasmon of a Bowtie Optical Nano-antenna LIANGCHENG ZHOU, Department of Physics, Lehigh University, QIAOQIANG GAN, Department of Electrical and Computer Engineering, Lehigh University, VOLKMAR DIEROLF, Department of Physics, Lehigh University, FILBERT BARTOLI, Department of Electrical and Computer Engineering, Lehigh University — Study of Ultraviolet Surface Plasmon Polariton (SPP) is of special interest because of UV light's wide applications. Near-field Scanning Microscopy (NSOM) has been proven to be one of the most effective ways of characterizing SPP modes thanks to its highly localized signal collection from surface with a sub-wavelength resolution. A resolution of 60nm is achieved on our NSOM which is capable of working with deep-UV (down to 244nm) light. By utilizing this NSOM working under collection mode, we directly imaged the UV SPP modes on various nanostructures on an Al/Al2O3 thin film, among which a bowtie antenna structure showed extraordinary quality of both confining UV light field to a sub-wavelength size and enhancing the optical intensity as well. Numerical simulation of said structure is also reported and discussed, revealing that a bowtie antenna is a promising candidate for many uses such as a novel NSOM tip, optical sensors and optical nano-trap etc.

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