
DS 14: Invited Zhan

Time: Tuesday 14:15–15:00

Location: GER 38

Invited Talk

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Optimal plasmonic focusing with thin film metrology applications — •QIWEN ZHAN and WEIBIN CHEN — Electro-Optics Graduate Program, University of Dayton, 300 College Park, Dayton Ohio, 45469-0245, USA

Surface plasmon polaritons (SPPs) are collective oscillation of free electrons at metal/dielectric interface. As a wave phenomenon, surface plasmon can be focused using appropriate excitation geometry and metallic structures. This allows the generation of strongly localized SPP in a controllable manner. Combined with its strong field enhancement, focused SPPs are very attractive for near-field optical imaging and sensing with potential applications in high resolution thin

film metrology. The challenges are to optimize the focus shape, size and strength. In this talk, I will present our recent works in the generation and manipulation of spatially engineered optical polarization and show that optimal plasmonic focusing can be achieved through a combination of polarization engineered beams and axially symmetric dielectric/metal plasmonic lens structures. Experimental confirmation of the optimal plasmon focusing with strongly focused radial polarization will be presented. A strongly localized evanescent Bessel focal field is realized. Such a focal field may be used for high resolution dielectric and metal thin film characterization. A near field Raman system using radial polarization illumination as well as specially fabricated probes has been built and tested. Preliminary experimental results for enhancing near field Raman signal will be presented.