

Contribution submission to the conference Dresden 2026

Plasmonic Effects in a honeycomb metasurface of Ag Nanotriangles and Nanoholes —

•PAUL-G. NITSCH¹, PAUL OLEYNIK¹, MARKUS RATZKE¹, DAVID STOLAREK², JON SCHLIPF², OLIVER SKIBITZKI², RUDI TSCHAMMER³, CARLOS MORALES³, JAN I. FLEGE³, CHRISTIAN WENGER², and INGA A. FISCHER¹ —

¹Experimentalphysik und funktionale Materialien, BTU-CS, Cottbus, Germany — ²IHP - Leibniz- Institut für innovative Mikroelektronik, Frankfurt (Oder), Germany — ³Angewandte Physik und Halbleiterspektroskopie, BTU-CS, Cottbus, Germany

Coupled lattices of metal nanoparticle and nanohole arrays can support spectrally narrow plasmonic resonances with potential applications, e.g., in biosensing. In nanohole arrays, the interplay of surface plasmon polaritons at metal-dielectric interfaces and Rayleigh anomalies can lead to Fano resonances, whose spectral positions are well described by Bragg coupling conditions. For nanoparticle arrays with small interparticle distances, the coupling of neighboring particles via their overlapping evanescent fields leads to resonances, whose dispersion relation has been described by tight-binding models. Here, we investigate resonances in coupled nanoparticle and nanohole lattices both experimentally and in simulation. We show that a variation in angle of incidence can be used to tune mode coupling and present results on the detection of near-surface refractive index changes with high sensitivities and figures-of-merit in our samples.

Part: O
Type: Vortrag; Talk
Topic: Plasmonics and nanooptics: Applications and other aspects
Keywords: Plasmonics; Hybrid Metasurface
Email: Paul-Gregor.Nitsch@b-tu.de