Near-field characterization of bound plasmonic modes in metal strip waveguides - DTU Orbit (09/11/2017)

Near-field characterization of bound plasmonic modes in metal strip waveguides

Propagation of bound plasmon-polariton modes along 30-nm-thin gold strips on a silica substrate at the free-space wavelength of 1500 nm is investigated both theoretically and experimentally when decreasing the strip width from 1500 nm down to the aspect-ratio limited width of 30 nm, which ensures deep subwavelength mode confinement. The main mode characteristics (effective mode index, propagation length, and mode profile) are determined from the experimental amplitude-and phase-resolved near-field images for various strip widths (from 30 to 1500 nm), and compared to numerical simulations. The mode supported by the narrowest strip is found to be laterally confined within similar to 100 nm at the air side, indicating that the realistic limit for radiation nanofocusing in air using tapered metal strips is lambda/15. (C) 2016 Optical Society of America

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