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Tuning the Nanooptics of Metallic Nanorods: End Effects GARNETT BRYANT, NIST, JAVIER AIZPURUA, Donostia International Physics Center — Understanding the nanooptics of metallic nanoparticles is critical for developing their use as sensors and nanohighways for directed excitation transport. End effects provide a new means to tailor nanorod response. We calculate the optical response of nanorods focusing on end effects and show that rod termination critically determines the position and width of plasmon resonances. Rods with hemispherical ends exhibit broad response typical for dipolar plasmonic charge oscillation along the rod. Rods with inverted, concave ends exhibit much narrower, cavity-like resonances unlike typical plasmon resonances. However, near-field enhancement is not dramatic for rods with two concave ends. Large near-field enhancement and narrow resonances can be achieved simultaneously for the near-field at the concave end of a rod with one concave end and one hemispherical end. Multiple narrow resonances can occur for large rods and deep cavities at the rod ends. These sharp resonances are seen both in the far-field and the near-field response.

Garnett Bryant
NIST

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