

MAR16-2015-002020

Abstract for an Invited Paper
for the MAR16 Meeting of
the American Physical Society

Nanoparticle Lasing Spasers.

TERI ODOM, Northwestern University

Plasmon nanolasers, or spasers (surface plasmon amplification by stimulated emission of radiation) are devices based on plasmonic cavities and gain media that can compensate loss and achieve amplification of nano-localized electromagnetic fields. Several nanocavity architectures have been reported for spasers, such as a metal film-dielectric spacer-semiconductor nanowire configuration or arrays of plasmonic cavities, where the unit cells are nanoparticles or nanoholes. We will discuss two platforms based on nanoparticle arrays that support lattice plasmons for far-field directional emission that can achieve tunable lasing at room temperature. Also, we will describe competing and unique loss mechanisms in nanoparticle cavity arrays as well as the design principles for an optimized unidirectional lasing device by examining different plasmonic materials, unit cell shapes, and gain materials.