

Plasmonics with gain: from loss reduction to stimulated emission

M. A. Noginov

Center for Materials Research, Norfolk State University, Norfolk, VA

We show that optical gain added to plasmonic systems can conquer absorption loss and lead to a laser effect. The latter includes stimulated emission of localized surface plasmons (spaser) as well as propagating surface plasmon polaritons (with different types of feedback). We will also look into nonlinear optical phenomena and discuss advantages and disadvantages of parametric amplification as an alternative to optical gain created via population inversion in molecules or quantum dots.