

Particle swarm optimization of broadband field enhancement with a grating-assisted plasmonic taper nanoantenna

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Abstract

This work is dedicated to the improvement of the near-field enhancement beneath the gold and silver tip apex due to plasmons excitation on a sub-wavelength grating engraved on the tip lateral surface. To study conditions of the maximal enhancement we have performed PSO-based optimization of intensity in search space of two parameters for gold and silver tip with different cone angles. Parameters of search space are period of the grating and its position in respect to the apex. The grating-assisted tip is illuminated with the incident light with wavelengths of 400 to 1000 nm in our model. All the simulations of electromagnetic waves scattering on the nanoantenna are based on the finite difference time domain method.

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