

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Employing conserved quantities to control plasmonic fields

MATTHEW LEPAIN, Georgia Southern University, SOHEILA MASHHADI, NATALIA NOGINOVA, Norfolk State University, MAXIM DURACH, Georgia Southern University — Recently there has been a strong interest in characterization of surface plasmons polaritons (SPPs) using their conserved quantities, such as energy, orbital and spin momenta in plasmonic fields. Absorption of linear momentum of SPPs is proportional to energy absorption and absorption of spin angular momentum, which can be revealed through plasmon drag effect spectroscopy [1]. We use our recently developed semi-analytical method of finding response of square-profile plasmonic structures [2] to study the conserved quantities of plasmonic fields and how they explain the spectroscopic properties of gold square gratings deposited upon thin gold film. This structure supports two types of plasmons on the front and the back side of the grating. Presence of the metal film on the back side produces strong interference of plasmonic fields at the back of the structure and modulation of optical properties related to the back-side plasmons, in particular the reflection from the structure. The strong reflection, intermittent with no reflection, can be explained by formation of new type of angular resonances in the unit cell of the structure. [1] M. Durach, N. Noginova, *Phys. Rev. B* 93, 161406 (2016). [2] M. LePain, M. Durach, *J. of Comp. Sci. Edu.* 7, 39 (2016).

Matthew LePain
Georgia Southern University

Date submitted: 11 Nov 2016

Electronic form version 1.4