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Free-electron induced mode mixing and surface-polariton enhanced reflected THz-field DANHONG HUANG, USAF Research Lab, GODFREY GUMBS, Hunter College of CUNY, PLAU ALSING, DAVE CARDIMONA, USAF Research Lab — The main result of this talk is the prediction of large enhancements at the band edges of a coupled Bloch-surface-plasmon-polariton band in the spectrum of the reflected far electromagnetic field due to anti-crossing gaps induced by the strong coupling between the continuous surface-plasmon-polariton mode and the discrete Bloch-like modes. The existence of these Bloch-like modes is a direct consequence of the nonlocal mixing of specular and diffraction modes of the reflected electromagnetic field by free-electron induced optical polarization and the interference of a pair of surface optical-polarization waves with opposite Bragg order numbers in the presence of a grating. The interference of these two counter-propagating surface waves leads to the formation of a Wannier-like state with associated electromagnetic fields localized within the grating-gap regions. The effects of the sheet density, grating period and absorption loss on the optical enhancements of both transmitted and reflected electromagnetic fields are investigated.

Danhong Huang
USAF Research Lab

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