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Interplay between plasmon and current due to terahertz radiation DANHONG HUANG, USAF Research Lab (VSSS), CASEY RHODES, The Johns Hopkins University, PAUL ALSING, DAVE CARDIMONA, USAF Research Lab (VSSS) — A unique structure composed of a half-space of air and a semi- infinite n-doped bulk GaAs covered by a heavily-n-doped InAs conducting interface sheet is proposed to explore the physics behind the interplay between a transverse sheet current, evanescent modes, and a longitudinal field in the bulk. The presence of the 3D and 2D plasma waves and the sheet current enables the longitudinal and transverse electromagnetic oscillations to couple in directions both perpendicular and parallel to the conducting sheet. We derive a spatially- nonlocal dynamic theory in order to determine the effects of the longitudinal 3D plasma-wave excitation, transverse sheet current and 2D plasma waves, and evanescent modes on the enhancement of a transmitted near-E-field with an electromagnetic wave incident on our proposed structure. For p- polarized incident field, we find one sharp dip and a broad peak in the transmitted near-E-field due to absorption by the longitudinal 3D plasma wave and its coupling to the transverse sheet current.

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