Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Effects of capture, escape and confinement on SAW-dragged photocurrents in a single QW GODFREY GUMBS, Hunter College of CUNY, DANHONG HUANG, USAF Research Lab, MICHAEL PEPPER, Cavendish Lab of Univ. Cambridge, UK — A dual-plasma model is developed for studying the steady-state transport of SAW-dragged photocurrents of 1D confined-state carriers. This model includes the effects of the quantum confinement and the tunneling escape of SAW-dragged 1D carriers, as well as the effects of the inelastic capture of 2D continuous-state carriers and the space-charge field. The numerical results uncover a high photocurrent gain due to suppressed recombination of 1D carriers in a crossover region of the sample between an absorption strip and a surface gate. Based on a discrete model, responsivities for the SAW-dragged photocurrents in a quantum well are calculated as functions of the gate voltage, photon flux, SAW power and frequency and temperature, respectively.

Danhong Huang
USAF Research Lab

Date submitted: 26 Nov 2007 Electronic form version 1.4