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Dependence of current switching dynamics on contact conductivity in semiconductor superlattices STEPHEN W. TEITSWORTH, HUIDONG XU, Duke University — Numerical simulation results are presented for a discrete drift-diffusion electronic transport model appropriate to weakly-coupled semiconductor superlattices [1]. Sequential resonant tunneling between adjacent quantum wells is the primary conduction mechanism for this model which also incorporates an effective contact conductivity σ_c. We study the dependence on σ_c of time-averaged current-voltage characteristics and transient current response to abrupt steps in applied voltage. For intermediate values of σ_c, three qualitatively distinct transient responses – each associated with a different mechanism for the *relocation* of a static charge accumulation layer [1] - are observed for different values of voltage step V_{step}; these involve, respectively, 1) the motion of a single charge accumulation layer, 2) the simultaneous motion of one depletion and two accumulation layers [2], and 3) the simultaneous motion of two accumulation layers. The range of V_{step} values for each mechanism and the relocation times associated with each are studied as a function of σ_c; a critical value of σ_c is identified above which the second relocation mechanism is not observed for any value of V_{step}. Relocation times are found to depend sensitively on specific values of σ_c and V_{step}. [1] L. L. Bonilla and H. T. Grahn, Rep. Prog. Phys. **68**, pp. 577-683 (2005), and refs. therein. [2] A. Amann, A. Wacker, L. L. Bonilla, and E. Schoell, Phys. Rev. E **63**, 066207 (2001).

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