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Suppression of electric field domains in semiconductor superlattices with side shunting layer[1] HUIDONG XU, Duke University, ANDREAS AMANN, Tyndall National Institute, Ireland, ECKEHARD SCHÖLL, Technical University of Berlin, Germany, STEPHEN TEITSWORTH, Duke University — We have numerically studied the electronic transport properties of a weakly-coupled semiconductor superlattice that possesses a conductive side shunting layer, using a model that includes lateral dynamics in each quantum well of the superlattice [1]. Depending on the lateral size of the superlattice quantum wells and the quality of the connection between the shunt layer and the superlattice, the shunt may inhibit the formation of electric field domains in the superlattice under conditions of negative differential resistance (NDR). We determine conditions to achieve a stable spatially-uniform electric field distribution, an important condition for practical NDR devices such as superlattice THz oscillators. For a superlattice with small lateral extent, a high quality shunt stabilizes the uniform field configuration in the entire structure, whereas a lower quality shunt leads to current oscillations and/or static field domains. We characterize the bifurcations associated with the transitions between these different behaviors. [1] A. Amann and E. Schöll, Phys. Rev. B **72**, 165319 (2005).

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