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Modeling split gate tunnel barriers in lateral double top gated Si-MOS nanostructures AMIR SHIRKHORSHIDIAN, University of New Mexico, NATHANIEL BISHOP, RALPH YOUNG, JOEL WENDT, MICHAEL LILLY, MALCOLM CARROLL, Sandia National Labs — Reliable interpretation of quantum dot and donor transport experiments depends critically on understanding the tunnel barriers separating the localized electron state from the 2DEG regions which serve as source and drain. We analyze transport measurements through split gate point contacts, defined in a double gate enhancement mode Si-MOS device structure. We use a square barrier WKB model which accounts for barrier height dependence on applied voltage. This constant interaction model is found to produce a self-consistent characterization of barrier height and width over a wide range of applied source-drain and gate bias. The model produces similar results for many different split gate structures. We discuss this models potential for mapping between experiment and barrier simulations. This work was performed, in part, at the Center for Integrated Nanotechnologies, a U.S. DOE, Office of Basic Energy Sciences user facility. The work was supported by the Sandia National Laboratories Directed Research and Development Program. Sandia National Laboratories is a multiprogram laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. DOE's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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