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Transport spectroscopy and modeling of a clean MOS point contact tunnel barrier AMIR SHIRKHORSHIDIAN, Univ of New Mexico, NATHANIEL BISHOP, JASON DOMINGUEZ, ROBERT GRUBBS, JOEL WENDT, MICHAEL LILLY, MALCOLM CARROLL, Sandia National Labs —
We present transport spectroscopy of non-implanted and antimony-implanted tunnel barriers formed in MOS split-gate structures at 4K. The non-implanted barrier shows no signs of resonant behavior while the Sb-implanted barrier shows resonances superimposed on the clean transport. We simulate the transmission through the clean barrier over the entire gate and bias range of the experiment using a phenomenological 1D-tunneling model that includes Fowler-Nordheim tunneling and Schottky barrier lowering to capture effects at high bias. The model is qualitatively similar to experiment when the barrier height has a quadratic dependence in contrast to a linear one, which can be a sign of 2D effects such as confinement perpendicular to the transport direction. This work was performed, in part, at the Center for Integrated Nanotechnologies, a U.S. DOE, Office of Basic Energy Sciences user facility. This work was supported by the Sandia National Laboratories Directed Research and Development Program. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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