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Transport Measurements on Si Nanostructures with Counted Sb Donors MEENAKSHI SINGH, EDWARD BIELEJEC, ELIAS GARRATT, GREGORY TEN EYCK, NATHANIEL BISHOP, JOEL WENDT, DWIGHT LUHMAN, MALCOLM CARROLL, MICHAEL LILLY, Sandia National Laboratories — Donor based spin qubits are a promising platform for quantum computing. Single qubits using timed implant of donors have been demonstrated.[1] Extending this to multiple qubits requires precise control over the placement and number of donors. Such control can be achieved by using a combination of low-energy heavy-ion implants (to reduce depth straggle), electron-beam lithography (to define position), focused ion beam (to localize implants to one lithographic site) and counting the number of implants with a single ion detector.[2] We report transport measurements on MOS quantum dots implanted with 5, 10 and 20 Sb donors using the approach described above. A donor charge transition is identified by a charge offset in the transport characteristics. Correlation between the number of donors and the charge offsets is studied. These results are necessary first steps towards fabricating donor nanostructures for two qubit interactions. 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 Sandia National Laboratories Directed Research and Development Program. Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a Lockheed-Martin Company, for the U. S. Department of Energy under Contract No. DE-AC04-94AL85000. [1]J. J. Pla et al., Nature **496**, 334 (2013) [2]J. A. Seamons et al., APL **93**, 043124 (2008).

Meenakshi Singh
Sandia National Laboratories

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