

Abstract Submitted  
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**Counted Sb donors in Si quantum dots** MEENAKSHI SINGH, JOSE PACHECO, EDWARD BIELEJEC, DANIEL PERRY, GREGORY TEN EYCK, NATHANIEL BISHOP, JOEL WENDT, DWIGHT LUHMAN, MALCOLM CARROLL, MICHAEL LILLY, Sandia National Laboratories — Deterministic control over the location and number of donors is critical for donor spin qubits in semiconductor based quantum computing. We have developed techniques using a focused ion beam and a diode detector integrated next to a silicon MOS single electron transistor to gain such control. With the diode detector operating in linear mode, the numbers of ions implanted have been counted and single ion implants have been detected. Poisson statistics in the number of ions implanted have been observed. Transport measurements performed on samples with counted number of implants have been performed and regular coulomb blockade and charge offsets observed. The capacitances to various gates are found to be in agreement with QCAD simulations for an electrostatically defined dot. 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.

Meenakshi Singh  
Sandia National Laboratories

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