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Triangulating the Position of Antimony Donors Implanted in Silicon CHLOE BUREAU-OXTON, Université de Sherbrooke, Sandia National Laboratories, ERIK NIELSEN, DWIGHT LUHMAN, GREGORY TEN EYCK, TAMMY PLUYM, JOEL WENDT, Sandia National Laboratories, MICHEL PIORO-LADRIÈRE, Université de Sherbrooke, MICHAEL LILLY, MALCOLM CARROLL, Sandia National Laboratories — A potential candidate for a quantum bit is a single Sb atom implanted in silicon. A single-electron-transistor (SET) situated close to an Sb donor can be used to measure the occupancy and spin of the electron on the donor while the lithographically patterned poly-silicon gates defining the SET can be used to control donor occupancy. In our samples two clusters of Sb donors have been implanted adjacent to opposite sides of the SET through a self-aligned process. In this talk, we will present experimental results that allow us to determine the approximate position of different donors by determining their relative capacitance to pairs of the SET's poly-silicon gates. We will present the results of capacitive-based modeling calculations that allow us to further locate the position of the donors. This work was performed, in part, at the Center for Integrated Nanotechnologies, a U.S. DOE Office of Basic Energy Sciences user facility. 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.

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