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**Quantum Dots on Silicon Nanowires**[1] HYUK JU RYU, JEREMY HIGGINS, PINRAY HUANG, JEREMY STREIFER, ROBERT HAMERS, SONG JIN, MARK ERIKSSON, University of Wisconsin-Madison — Silicon nanowires have single-crystal structure, well-controlled doping, and can be integrated into devices using either directed assembly and dielectrophoresis or electron-beam lithography and lift-off. Such nanowires, with nanometer size in two dimensions, provide advantages for the fabrication of ultra-small silicon quantum dots with potentially long spin coherence times. We present methods for the fabrication of silicon nanowire-based single electron transistors, and we show results of both room temperature and low temperature transport measurements. The metal electrode structure and annealing process have been intensively investigated to obtain the necessary contact properties. Either metal/nanowire contacts or electrostatically depleted regions have been used for tunneling barriers for quantum dots. Coulomb blockade has been demonstrated successfully, showing 1.3 aF and 1.1 meV for the gate capacitance and the charging energy respectively. Studies of double quantum dots and spin-dependent effects are ongoing.

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