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Multi-electron double quantum dot spin qubits ERIK NIELSEN, Sandia National Laboratories, JASON KESTNER, University of Maryland, Baltimore County, EDWIN BARNES, SANKAR DAS SARMA, University of Maryland — Double quantum dot (DQD) spin quits in a solid state environment typically consist of two electron spins confined to a DQD potential. We analyze the viability and potential advantages of DQD qubits which use greater then two electrons, and present results for six-electron qubits using full configuration interaction methods. The principal results of this work are that such six electron DQDs can retain an isolated low-energy qubit space that is more robust to charge noise due to screening. 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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