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Enhancement-mode buried strained-silicon channel double quantum dot T.M. LU, N.C. BISHOP, T. PLUYM, J. MEANS, P.G. KOTULA, J. CEDERBERG, L.A. TRACY, J. DOMINGUEZ, M.P. LILLY, M.S. CARROLL, Sandia National Laboratories — We demonstrate a relaxed-SiGe/strained-Si enhancement-mode gate stack for quantum dots. The devices were fabricated within a 150 mm Si foundry setting that uses implanted ohmics and chemical-vapor-deposited dielectrics. Thermal budget was minimized to prevent Ge/Si interdiffusion and strain relaxation. A mobility of $1.6\text{x}10^5$ cm^2/Vs at $5.8\text{x}10^{11}/cm^2$ is measured in Hall bars that witness the same device process flow as the quantum dot. Periodic Coulomb blockade measured in a double-top-gated lateral quantum dot nanostructure terminates with open diamonds up to +/- 10 mV of dc voltage across the device. Charge sensing indicates a lithographically defined double quantum dot with tunable coupling. 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 the Sandia National Laboratories Directed Research and Development Program. 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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