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**Modulation of two-dimensional electrons in Si/SiGe heterostructures using atomic-layer-deposited gate dielectric** T. M. LU, K. LAI, Princeton University, P. D. YE, Purdue Univeristy, W. PAN, Sandia National Lab, D. C. TSUI, S. LYON, Princeton University, M. MUHLBERGER, F. SCHAFFLER, Univ. Linz — Field effect transistors (FETs) have been fabricated using Atomic-Layer-Deposited (ALD) $Al_2O_3$ as gate dielectric on the Si/SiGe heterostructures to modulate the density of the two-dimensional (2D) electrons in the strained silicon channel [1]. Magnetotransport measurements taken at 0.3K show that the 2D density (n) can be uniformly tuned by the gate voltage (VG) with virtually no leakage current and negligible gate hysteresis. The characteristic of modulation using ALD $Al_2O_3$ as gate dielectric is shown to be better than that using Pd Schottky barrier or the PECVD $SiO_2$ dielectric. We also performed a numerical simulation that solves the one-dimensional Poisson-Schrodinger equations self-consistently for different $V_G$s. The measured n vs. $V_G$ relation can be reproduced in our calculation by assuming a density of $0.6\times10^{13}\mathrm{eV}^{-1}\mathrm{cm}^{-2}$ of the surface states. [1] K. Lai *etal.*, Appl. Phys. Lett. 87, 142103 (2005)

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