Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Ultrathin germanium-on-insulator tunneling field effect transistors D. KAZAZIS, P. JANNATY, A. ZASLAVSKY, Brown University, Div. of Engineering, Providence, RI 02912, C. LE ROYER, C. TABONE, L. CLAVELIER, CEA-LETI, Grenoble, France — As the CMOS downscaling is approaching its limits, there is greater need for alternative and unconventional devices to continue enhancing the performance of electronics. We report on the fabrication and electrical characterization of a CMOS-compatible germanium-on-insulator (GeOI) tunneling field effect transistor (TFET) device that can in principle switch more sharply than a standard FET. The source-drain current in the TFET is based on interband tunneling between an inversion channel and a counterdoped drain electrode. Taking advantage of the narrower bandgap of germanium, the devices are fabricated in ultra-thin GeOI and consist of a heavily p-type doped, epitaxially grown drain, an n-type ion-implanted source and a standard high-κ dielectric gate stack with channel lengths down to 400 nm. The devices exhibit a reasonable on-off current ratio of more than 10^2 and improved on current compared to silicon-on-insulator TFETs. Current-voltage measurements at room and low temperatures will be presented to characterize the behavior of the fabricated transistors.

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Date submitted: 17 Dec 2008 Electronic form version 1.4