# Germanium-on-insulator as a platform for end-of-roadmap devices

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As the dominant silicon technology is expanding into non-Si materials and nonplanar device architectures, promising new device possibilities open up without abandoning the crucial compatibility with standard CMOS processing. An example is the potential use of Ge as an active material, which was previously precluded by the superiority of the $Si/SiO_2$ interface, but can now be reexamined with the arrival of high-κ dielectrics and germanium-on-insulator (GeOI) substrates.

We will consider the GeOI platform for ultimate scaling and high performance. We first review several options for the fabrication of ultrathin GeOI wafers: Ge condensation, Smart-Cut and bonding using epi or bulk Ge, recrystallization, *etc*. The transport and interface properties of as-synthesized structures will be correlated with the performance of state-of-the-art *p*- and *n*-channel MOSFETs and more advanced devices.

An example of an advanced end-of-roadmap device well-suited for GeOI is the tunneling field effect transistors (TFET), in which the gate-controlled current flows via interband tunneling across the bandgap. To date, several groups have demonstrated attractive switching behavior in SOI TFETs, but with relatively low current drive because of the large bandgap of Si. We will present a GeOI TFET with an epitaxial tunnel junction and an angled geometry that concentrates the gate-induced electric field in the tunneling region.