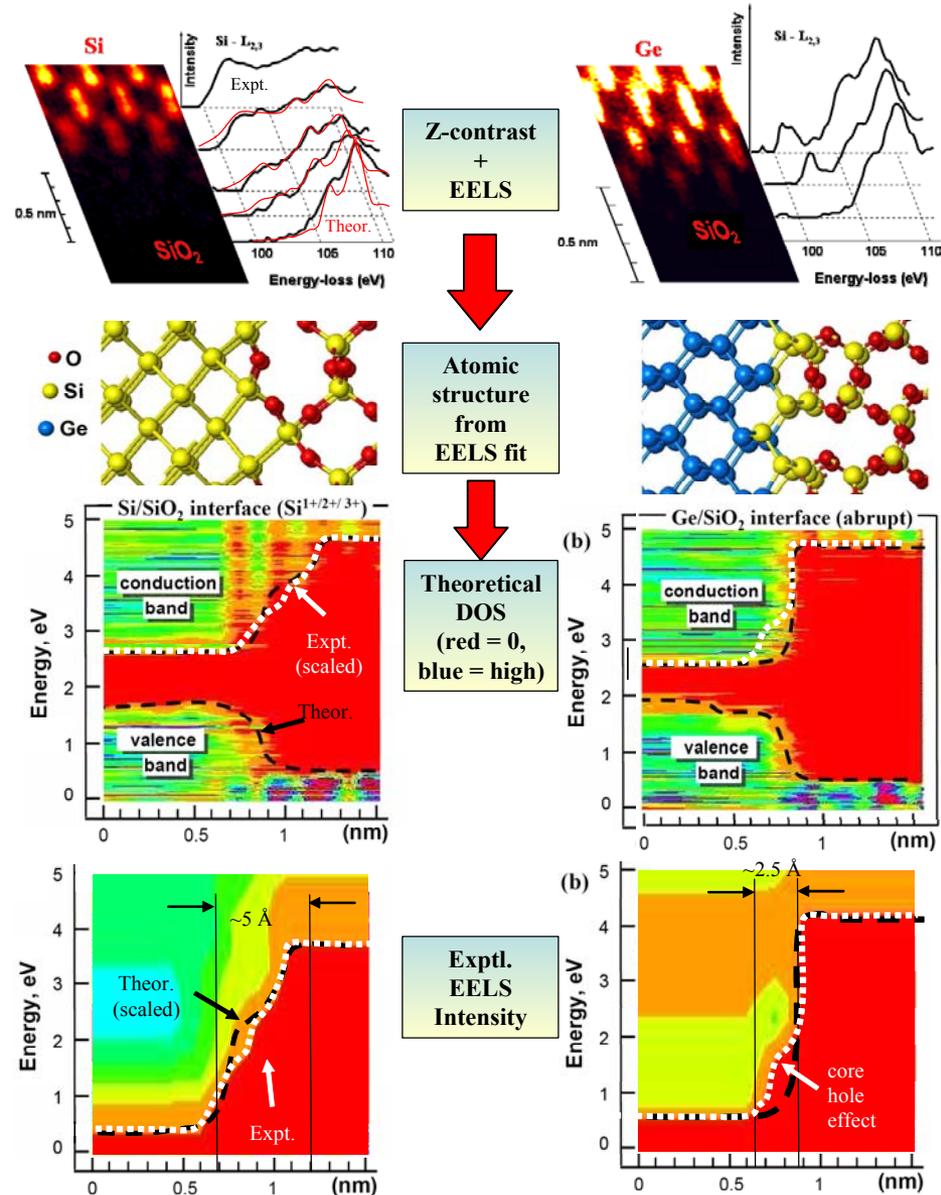


Atomically Sharp “Perfect” Interface for Semiconductor Devices

Gerd Duscher, NCSU, and Wolfgang Windl, OSU, DMR 0244724

- We examined the interfaces between Si and SiO₂ and between Ge and SiO₂ for the first time with atomic-resolution EELS in comparison to theoretical spectra.
- Our kinetic-Monte Carlo simulations of high-temperature oxidized Ge-implanted Si shows that the repulsive interaction between Ge and O leads to the previously reported “snowplowing” effect, where the oxidation front compacts the Ge into a compact Ge-only layer and oxide and Ge do not mix.
- We find that the interface between oxide and Ge is atomically sharp, never observed for the Si/SiO₂ interface. The electronic properties of the sharp interface are also atomically sharp and thus superior to those of the graded Si/SiO₂ interface, potentially enabling strongly improved electronic devices.



AIDA TEM

Gerd Duscher, NCSU, and Wolfgang Windl, OSU, DMR 0244724

Education + Outreach:

Duscher teaches the course:

The World of Atoms at “Encore” the live long learning branch at NCSU to seniors 55 years and older.

There are 28 student

With various level of College degrees between 56 and 78 years.

Duscher also teaches the **nano-characterization** part of the lecture “Thin Films” at A&T university a traditionally African American university at Greensboroh, NC.



Windl and Duscher received the
Nano Technology Industrial Impact Award 2004