Atomistic simulation of phonon and alloy limited hole mobility in SiGe nanowires

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Objective:

- Understanding the role of alloy + phonon limited hole mobility in SiGe nanowires.

Approach:

- Semi empirical $sp^3d^5s^*$-SO to calculate band structure using VCA model (NEMO5).
- Phonon + Alloy hole mobility using linearized Boltzmann formalism (NEMO5).

Result

- SiGe nanowires dominated by phonon scattering.
- Alloy mobility affects the total mobility leading to 'U' shaped hole mobility vs Ge% curve.
- Ge% > 60-70% needed for improving over Si (<100>,<110> & <111> transport orientations).

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