Tight Binding Model Uniaxial <110> Strained-Si

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Motivation:

- Uniaxial <110> strained Si increases mobility
- Lack of good tight-binding(TB) model

Objective:

- Developing a tight binding model for uniaxial strained Si in <110>

Approach:

- Achieving affected on-site energies and coupling between different on-site orbitals
- Optimization method for fitting parameters (Genetic Algorithm with Least Square)
- Van de Walle's model for band edges energies and VASP for effective masses
- Considering model behavior in real device

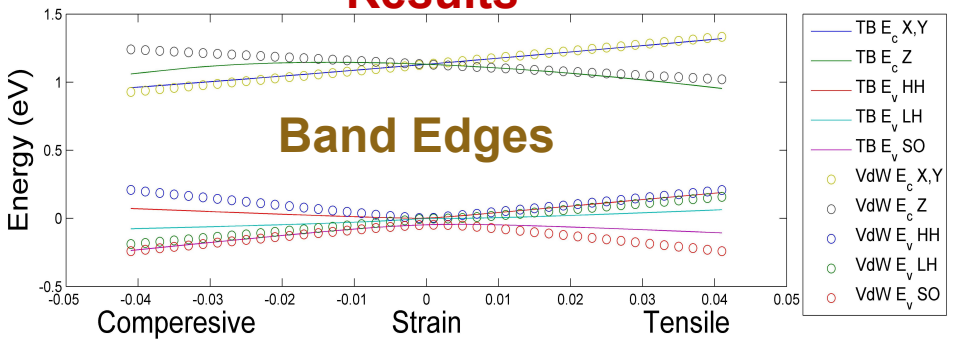
Result:

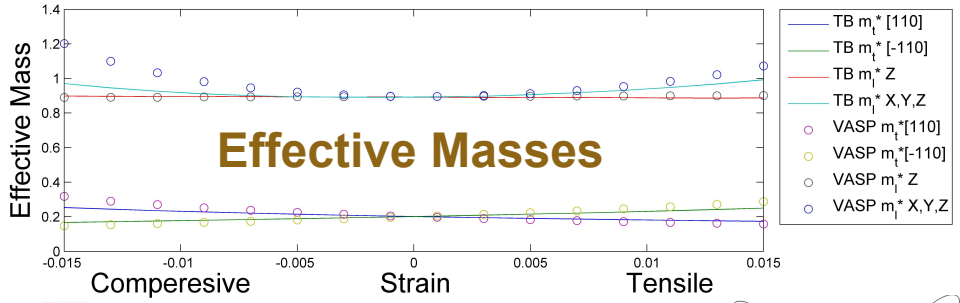
- less than 5% disagreement with experimental results in wanted range (±1.5% strain)

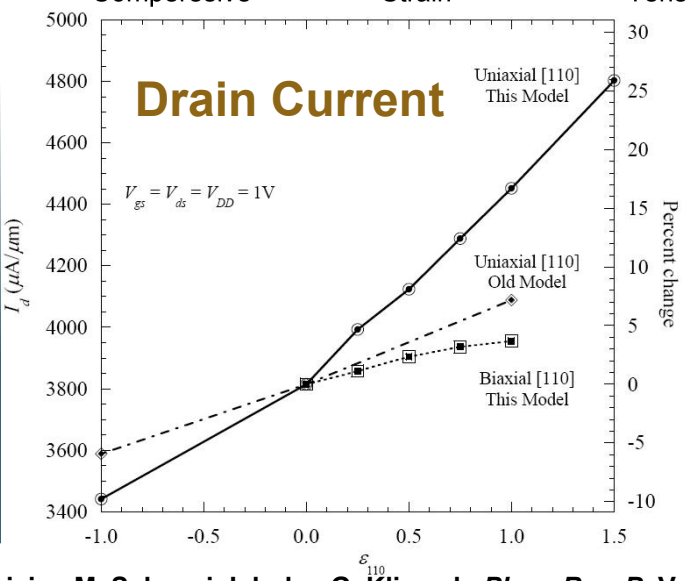
Impact:

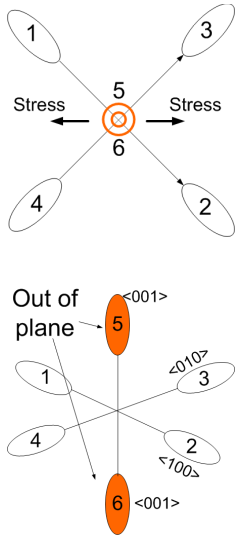
- Working well for uniaxial <110> and <001> and hydrostatic strain

Results









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