

Homework Assignment for Bulk Monte Carlo Lab: Arbitrary Crystallographic Direction

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Login to the Bulk Monte Carlo Lab and choose covalent material (Si). Use the default values for the scattering parameters, the electric field and the simulation time. Vary the orientation of the field ([100], [110] and [111]). Plot:

- Velocity along field for the three field orientations
- Valley population vs. time for the three electric field orientations
- Energy vs. time for the three electric field orientations.

Comment on the results obtained:

- Are the six silicon valleys behaving as equivalent valleys under certain electric field orientation?
- What electric field orientation leads to largest steady state velocity along the field?
- What can you say about the occupation of different pairs of valleys for different orientations of the electric field?