DevEdit

Structure and Mesh Editor

SILVACO
Applications

- Device Specification
- Device Editor
- Remeshing Tool
- Interactive and Batch-mode operation
Device Specification

- Add, Modify & Delete Regions
- Deposition of Layers
- Region Numbering
- Electrode Specification
- 2D and 3D Regions
- Circular/Cylindrical Regions
Device Specification

- Region Definition
  - specific (cm⁻³) Sb, As, B, Ph
  - generic (III-V option)
  - net (cm⁻³)

- Impurity Definition
  - define impurity from list
  - user-specified box
  - x, y roll-off function (Gaussian, ERFC)
  - define ID profiles from Suprem3, Suprem4 and SPDB
  - 10 profiles added to x, y roll-off functions

Note: Mesh must be generated before saving structure.
Device Editor

- Reads structures from Athena or Atlas
- Writes structures to Athena or Atlas
- Stretch/Squeeze Function
- Join Function
- Possible to modify regions/impurities of any structures
- Extrude 2D structures to 3D
Meshing Features

- Remesh without obtuse triangle
- Base Mesh Parameters
- Mesh Constraints by region or XY limits
  - min/max triangle size
  - max triangle ratio
  - max angle in a triangle (default=90)
- Refinement on any node based quantity (eg. doping, potential)
- Refinement by XY coordinates.
- Z plane specification for 3D meshing
• Non-Planar Region Specification
  • Recessed Gates

• Generic Region Composition
  • X,Y Mole Fractions
  • Donor/Acceptor Concentrations
  • e.g. Ln\(_{(1-x)}\) Ga\(_{(x)}\) As P\(_{(1-y)}\)

• Graded Region Composition
  • Add Impurity as x, y composition
  • Define x, y Roll-off
  • Draw region

• Doping specification - Standard Generation
Saving Designed Structures

- DevEdit design saved in command line syntax
  - Special DevEdit syntax
  - Defines geometries and dopings
  - Contains generated mesh parameters
  - Can be ran in DeckBuild

- DevEdit design saved as structure file
  - Only for final design
  - Silvaco’s master file syntax
  - Can be loaded by Athena, Atlas, TonyPlot
Applications of Command Files

- Regenerates design in DevEdit
- Allows further design modifications in DevEdit
- Execution in DeckBuild for auto interface to Atlas
- Application for general mesh adaptations
  - link mesh design between Athena and Atlas
  - general meshing parameters allows Athena process modifications