

DevEdit



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



III-V Material Specification

- Non-Planar Region Specification
 - Recessed Gates
- Generic Region Composition
 - X,Y Mole Fractions
 - Donor/Acceptor Concentrations
 - e.g. $\text{In}_{(1-x)}\text{Ga}_{(x)}\text{As}\text{P}_{(1-y)}$
- 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 autointerface to Atlas
- Application for general mesh adaptations
 - link mesh design between Athena and Atlas
 - general meshing parameters allows Athena process modifications