



Structure Generator and Mesher

SemiVi LLC, Switzerland.

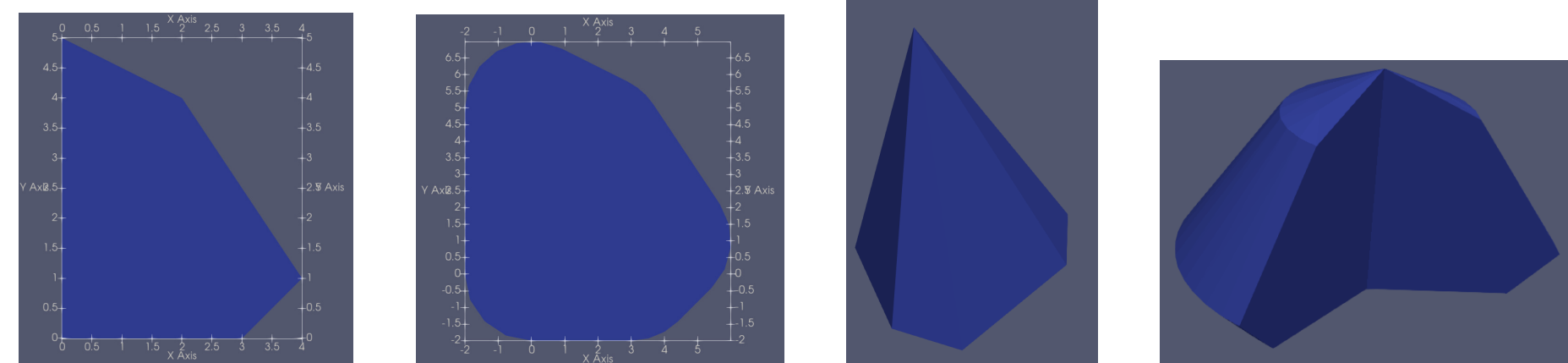
Salient features - Structure Generator

- Creates a 2D or 3D device composed of many (possibly intersecting) *regions* of shapes –
 - Axis-aligned rectangle or cuboid,
 - 2D Polygon or 3D polyhedron from vertices,
 - Special shapes – ellipse, ellipsoid, cylinder, cone, pyramid, prism, wedge, convex-hull.
- Shape operations –
 - Boolean – add, clip, subtract shapes
 - Transform – translate, rotate, scale, mirror shapes,
 - Shape rounding, chamfering, offsetting, stretching,
 - 2D Shape sweep to create prisms, pyramids, pipes, revolutions
- Create doping profiles e.g. Gaussian, exponential, linear, or user-defined analytic profile.
- Specifies refinements global, regions-wise, or in specific areas.
- Python interface enables convenient scripting and integration.
- Import **GDS layout file** to create shapes, doping masks.

Python Interface

- Python-interface enables scripting and Parametrization of the structure generation task.

```
import mesher as m
win1 = tm.refwin("RefCyl1", "Polygon", poly, {}, {})
win1.offsetRefWin(2)
win1.makePyramid2DRefWin(...)
win1.revolve2DRefWin(..., 230)
```

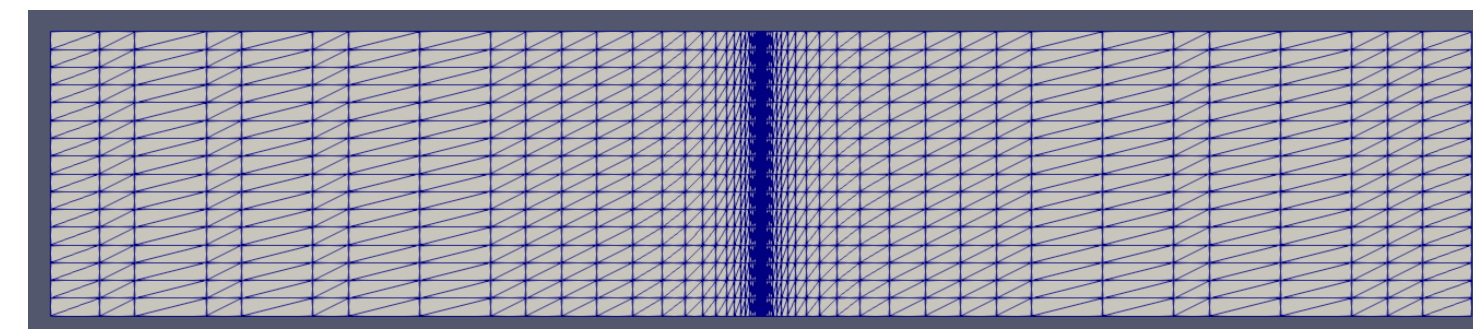


(a) shape of "win1" (b) offset (c) make pyramid (d) revolve 230°

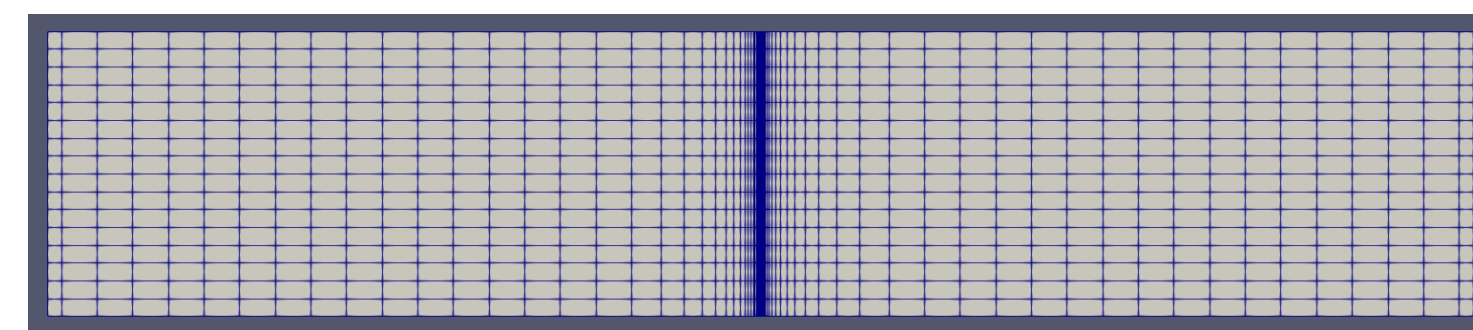
Mesher support

The mesher tool creates mesh using the user-defined mesh refinements. Following mesh are supported.

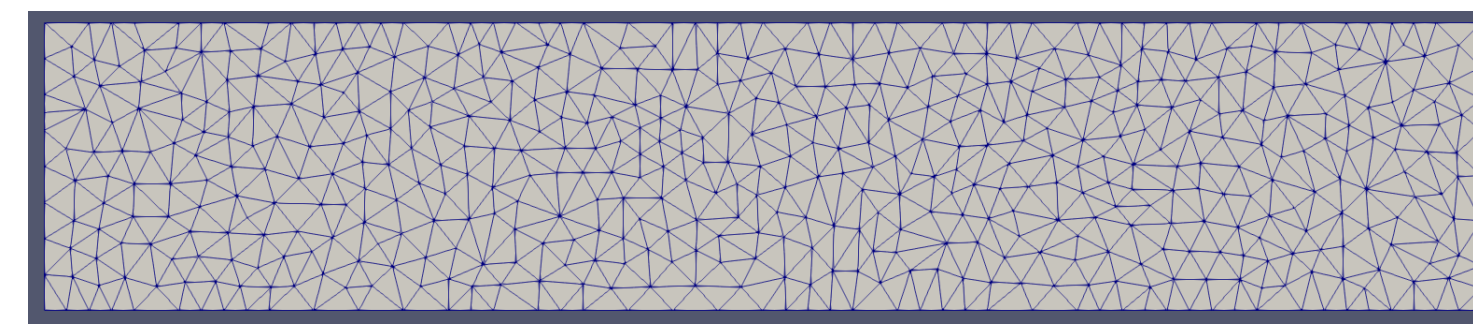
- FEM-mesh: Quad-tree (2D) or oct-tree (3D) based.
- Tensor-mesh: A rectangular (2D) or cubic (3D) mesh.
- *Triangle* mesh: Uses external 2D FEM mesh generator.
- *TetGen* mesh: Uses external 3D FEM mesh generator.



(e) FEM



(f) Tensor

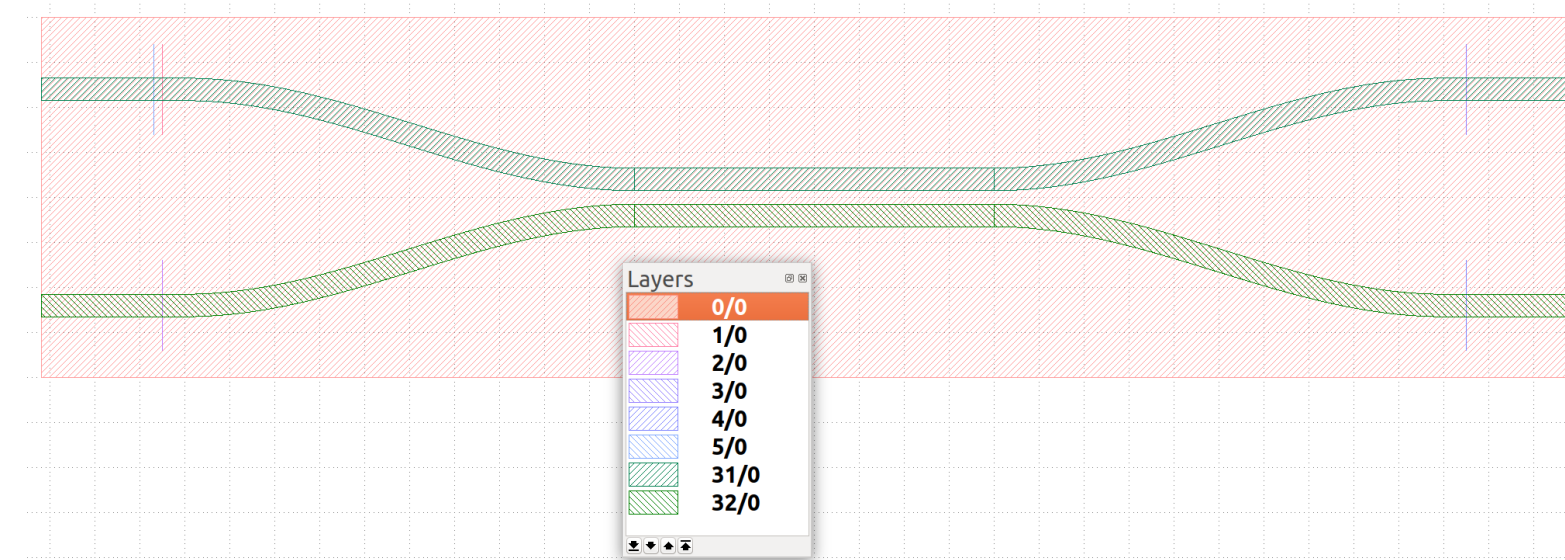


(g) TetMesh

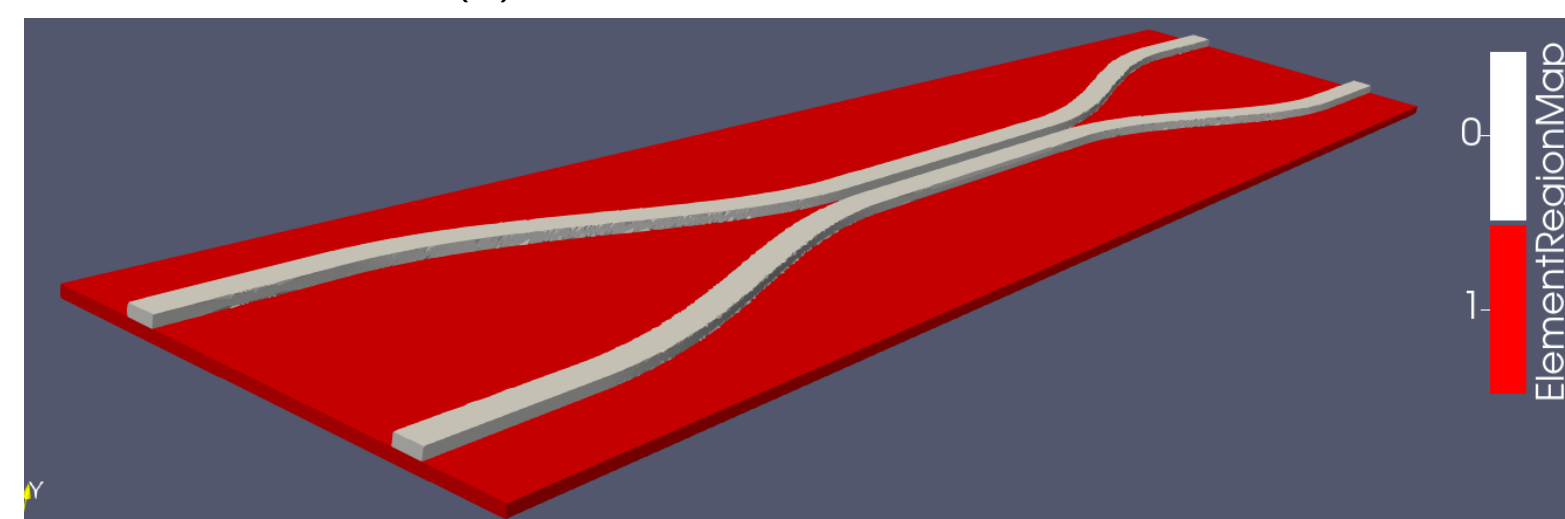
Structure from GDS Layouts

GDS Layout import can generate –

- regions by sweeping masks vertically.
- doping distribution using GDS mask.

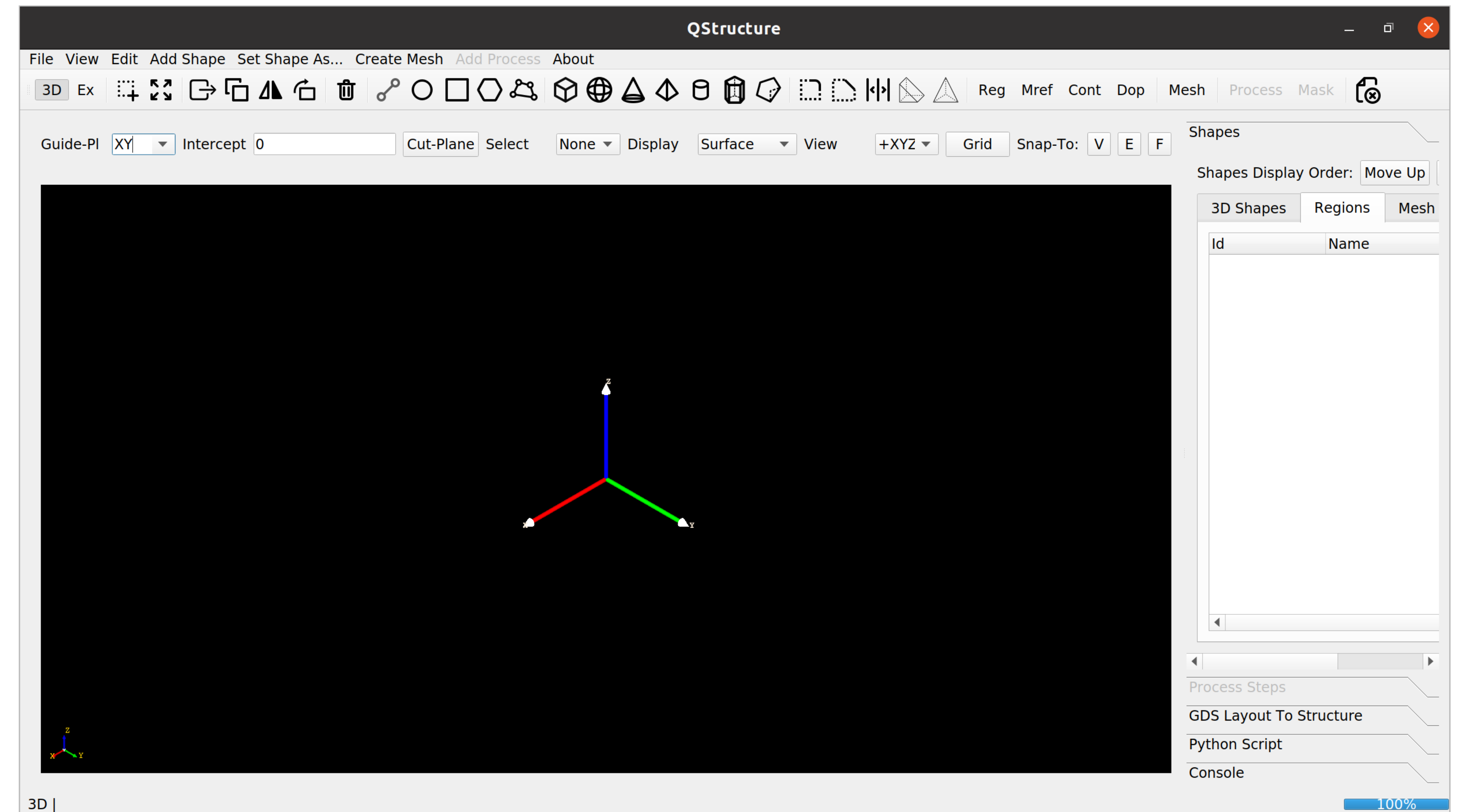


(h) GDS file of Silicon wave-guide



(i) Silicon wave-guide structure

Structure Generator - GUI



Structure Generator GUI

Structure generator provides a user-friendly GUI for –

- Drawing RefWins,
- Shape editing and transformations,
- GDS layout import and structure gen,
- Setting Region, MeshDef, DopingDef, and ContactDef,
- Mesh generation and viewing.

License Purchase

Send the organization details along with –

- Node-locked licenses: mac-id of the machine.
- Server licenses: mac-id of the server.

User-manual and examples

A detailed user-manual describes –

- Various config file arguments,
- Python functions and desired input arguments,
- Usage of GUI for structure generation,

Contact Information

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