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GDSII Export Automation

The GDSII file format is commonly used to store 2-dimensional geometric data. In this topic, we will walk you through the steps, format, and best practices for exporting your component design to a GDSII file. We will also show a simple but real GDSII example in silicon photonics.

See also

- Importing and exporting GDSII files
- Layer builder - Simulation object

References

[1] Lukas Chrostowski, Xu Wang, Jonas Flueckiger, Yichen Wu, Yun Wang, Sahba Talebi Fard, "Impact of Fabrication Non-Uniformity on Chip-Scale Silicon Photonic Integrated Circuits", Optical Fiber Communication Conference, pp. Th2A.37, 03/2014.

[2] Yun Wang, Xu Wang, Jonas Flueckiger, Han Yun, Wei Shi, Richard Bojko, Nicolas A. F. Jaeger, and Lukas Chrostowski, "Focusing sub-wavelength grating couplers with low back reflections for rapid prototyping of silicon photonic circuits," Opt. Express 22, 20652-20662 (2014) https://doi.org/10.1364/OE.22.020652

GDSII Export Automation

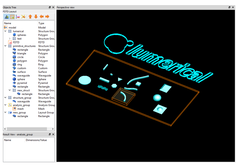
We can export structures to GDSII using some scripting commands. However, the basic GDSII export script commands have limited capabilities in an automated manner to export structures from Lumerical tools. Here, in the video, we have demonstrations using some advanced scripts that can automate the GDSII export process.

Step 1:

Download the associated files, *gds_automation_script.zip* , unzip the folder and put all the files in the same directory.

Step 2:

Open the simulation file *GDS_auto_export_test.fsp*. We will export all of the structures, except the surface, sphere, pyramid objects. Disabled objects will be ignored during the auto export process.

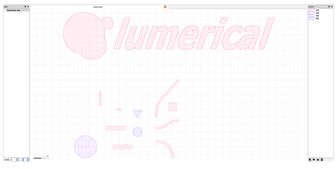


Step 3:

Open and run the script file *GDS_auto_export.lsf* within the same instance. The scripts will create and export structures to a GDSII file, in which the top cell has the same name as the structure group and contains a list of subcells corresponding to each of the objects within the structure group. See the instructions in the first section in the *GDS_auto_export.lsf* file.

Step 4:

Check the generated GDSII file using your layout tools (e.g., KLayout) or Lumerical CAD tools.



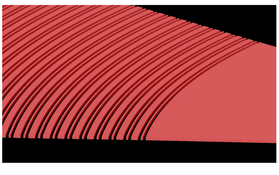
Note:

1. Unzip the folder and put all the files in the same working directory.
2. The elements from the simulation file that belong to a layer are identified by the z min and z max coordinates. Therefore, **a layer corresponds to a unique set of z min and z max**.
3. For more info, see the instructions in the first section in the *GDS_auto_export.lsf* file.

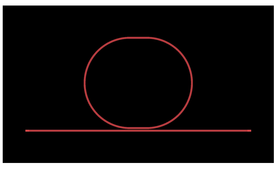
Real GDSII Example

The circuit in the associated file, GDS_GC_Ring.GDS 80, includes one racetrack ring resonator [1], two grating couplers [2], and routing waveguides. Users can import the whole circuit, or the individual cells, into the simulation layout using GUI, or using script commands such as the associated *GDS_GC_Ring.lsf* file.

The pictures below show a focusing sub-wavelength grating coupler with low back reflections for rapid prototyping of silicon photonic circuits



and a ring resonator used to study the impact of fabrication non-uniformity on silicon photonic chips (Courtesy of the L. Chrostowski group at UBC).



Associated files

GDS_GC_Ring.GDS
GDS_GC_Ring.lsf
GDS_auto_export.zip

Related articles

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