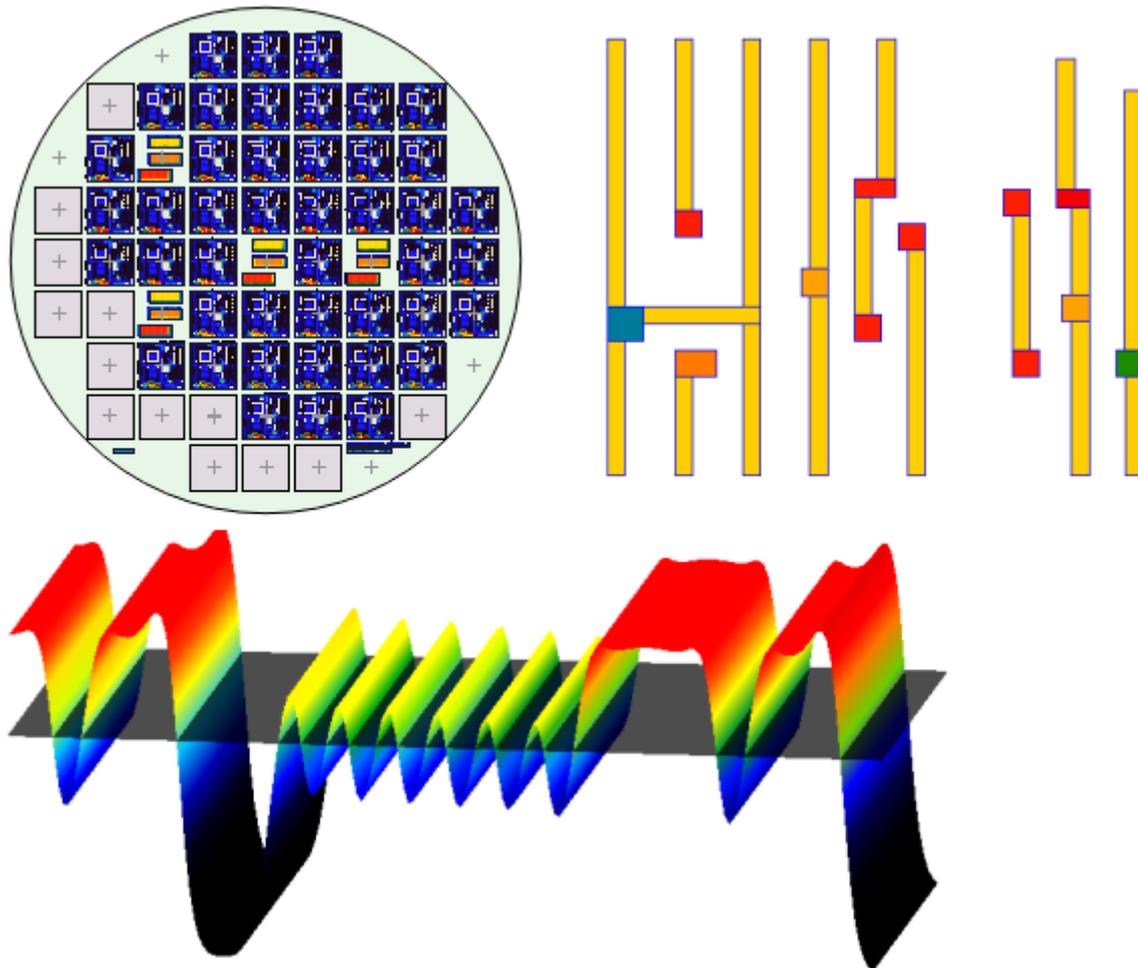


Visualization Tool for Vistec's Shaped Beam Systems



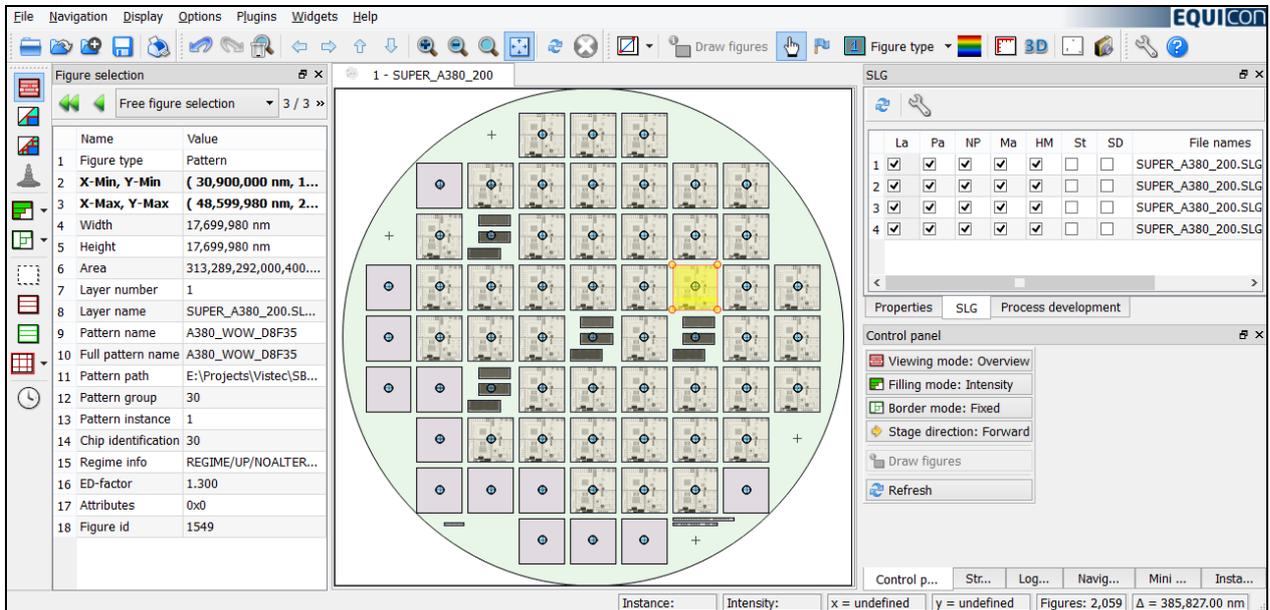
Overview

SBvis is a GUI application and serves for visualization and adequate representation of different raw data formats. It was in particular designed for use with Vistec substrate description data (Substrate Layout Order – SLO) and Vistec layout pattern data (JES data), i.e. for both overview analysis and detailed inspection. The main objectives of SBvis are detailed acquisition and consistent representation of pattern data elements and their multivarious associated properties as well as speed of visualization and ease of use.

Combined with the ePLACE® dataprep software package, SBvis becomes a powerful electron beam simulation tool (optional).

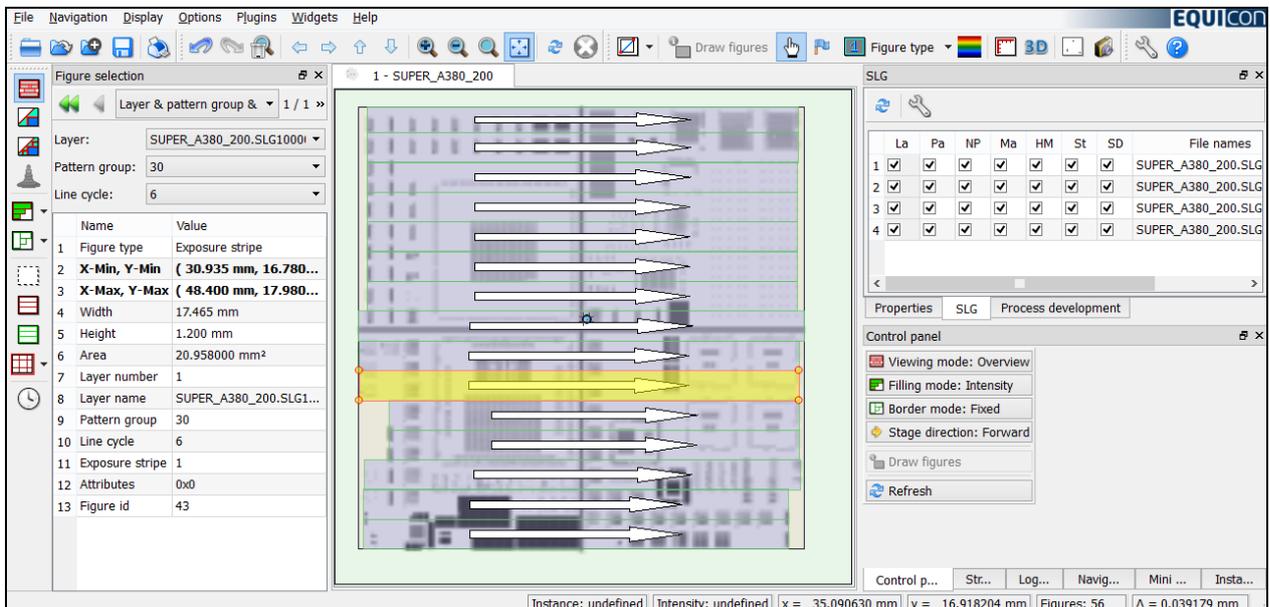
Substrate Visualization

Owing to the substrate (SLO) visualization feature based on SLG files (graphical representation after the SLO compilation), the whole pattern placement on a wafer or mask can be verified. To visualize multiple layers, additional SLG files can be opened and overlaid.



Example: SLG visualization with a comprehensive set of information.

The visibility of all SLG elements (patterns, omitted patterns, stripes, stripe directions, height measurement points and chip marks) can be controlled by a separate SLG widget. This widget allows the SLG elements to be highlighted with respect to such properties like layer, pattern name, pattern group, line cycle, or exposure dose (ED)-factor in an easy manner.



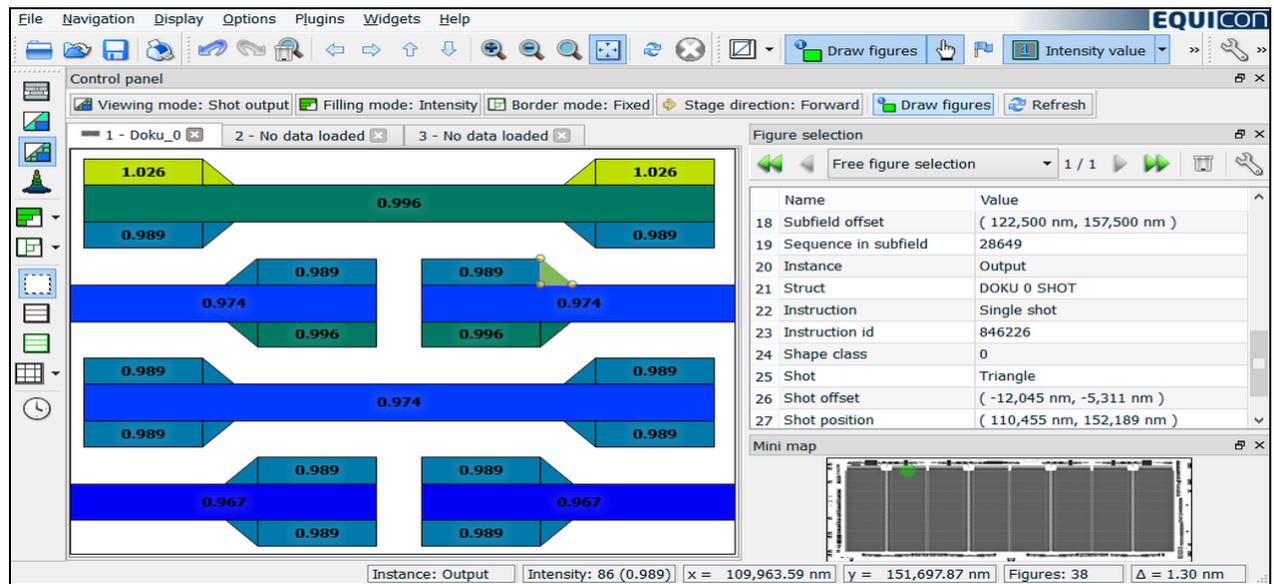
Detail visualization including line cycles and stripe directions.

If available, underlying JES pattern geometry and expected exposure shots can be shown directly within the substrate visualization view.

Pattern Visualization

Pattern visualization operates on JES pattern data. Using the so-called S0 format, primarily fractured and proximity-corrected figures are available. Additionally, utilizing so-called EPREP files, which additionally provide all those exposure tool, technology and processing parameters that are associated with a pattern, SBvis is capable of calculating and visualizing the expected exposure shots.

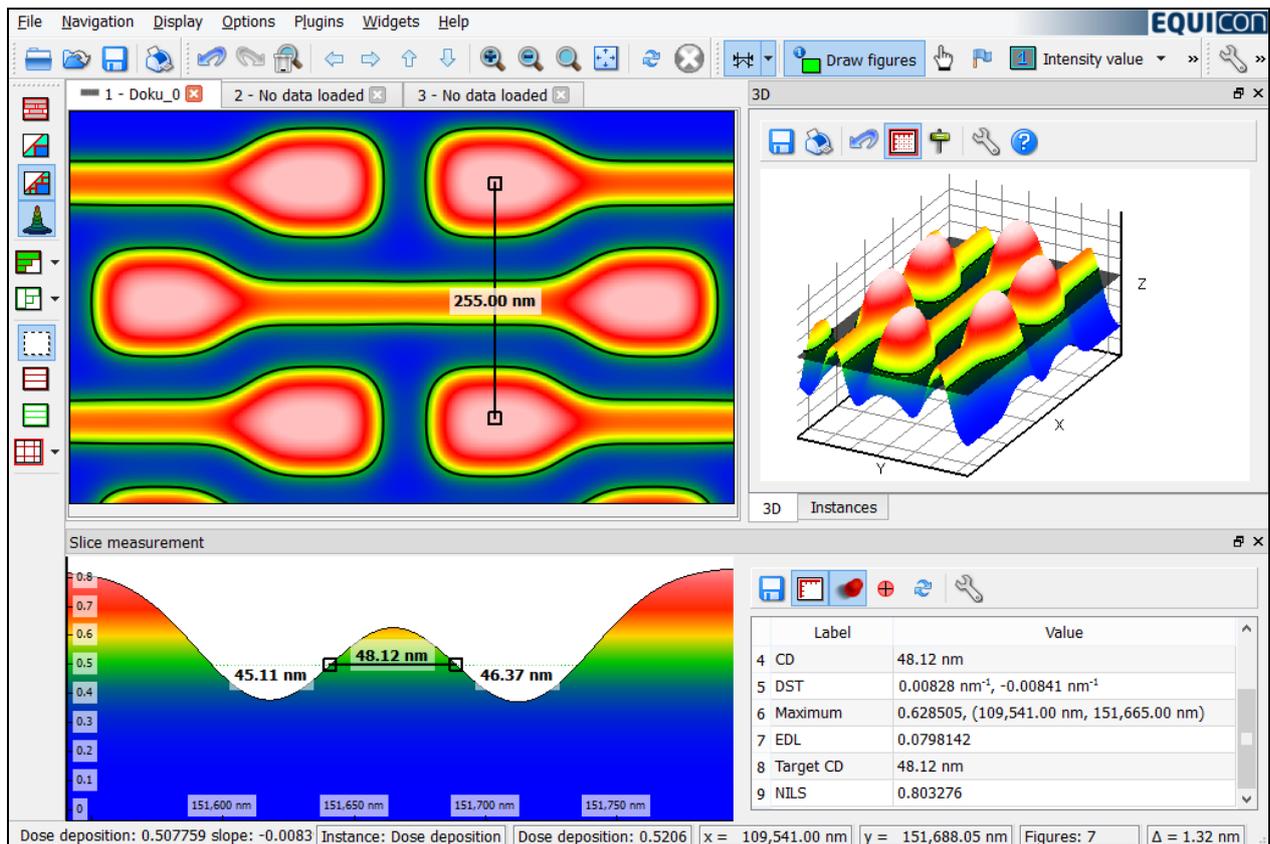
In general, SBvis offers different basic representation modes. In the “Overview” mode, stripe or subfield boundaries are laid over a pattern thumbnail. This mode provides fast pattern overviews. In “Input data” and “Shot output” modes, figures (resp. calculated shots) are drawn. Each of them has a number of different properties which can be shown. These are: stripe number, subfield number, shot sequence numbers, shot type, and dose.



“Shot output” representation mode example with Figure information widget.

Pattern Simulation

The optional SBvis “Simulation” mode, which is available with ePLACE®, implements a powerful exposure simulation tool. Based on either the proximity corrected JES pattern data or the calculated exposure shots, the expected figure contour lines after exposure can be calculated and overlaid over the pattern geometry. Further, a 2D and 3D visualization of the exposure dose distribution is available. The additional slice measurement provides an exposure dose distribution cross section including calculations for CDs, dose slope, and exposure dose latitude.



This figure illustrates the simulation capability of SBvis. Top left: simulated contour over the pattern geometry. Right: 3D visualization. Bottom left: slice measurement.

SBvis Features

- Clear, tree-like representation of patterns and view information in the property widget
- Numerous possibilities for coloring and highlighting of figures depending on figure properties, such as layer, dose, type, size
- Fading in and out of stripes, subfields, axis grids or figure information
- Delayed drawing for exposure sequence visualization
- Several, easy to use measurement modes
- Working and information widgets can be docked or freely positioned
- Support of multiple tabs and image operations (AND, XOR,...) for pattern comparison
- Defining and handling of regions of interest (ROIs) using the comfortable XML file-based SBvis bookmark system
- Export to PNG and (optional) CIF format
- Modern GUI supporting keyboard shortcuts, mouse gestures, drag and drop, zoom history, user profiles, session management
- Available for Windows and Linux systems



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