UseCase.0047 (1.0)

Settings and Result Displays of the Ray Tracing Engine

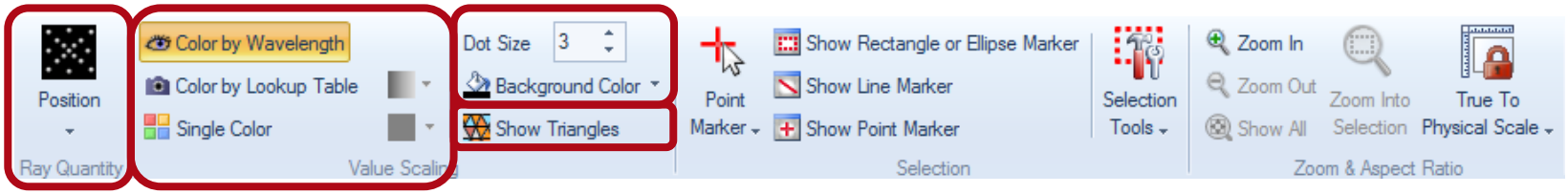
Keywords: Ray tracing, dot diagram, position, direction, optical path length, absorption, triangle option, ray selection

Description

- This use case explains the configuration options and the result displays of the ray tracing engine.
- The ray tracing engine can be used to evaluate the 2D ray information for each detector plane.
- The output of the virtual screen is a 2D dot diagram which allows the user access to information on
  - Positions
  - Directions
  - Optical Path Length
  - Absorption

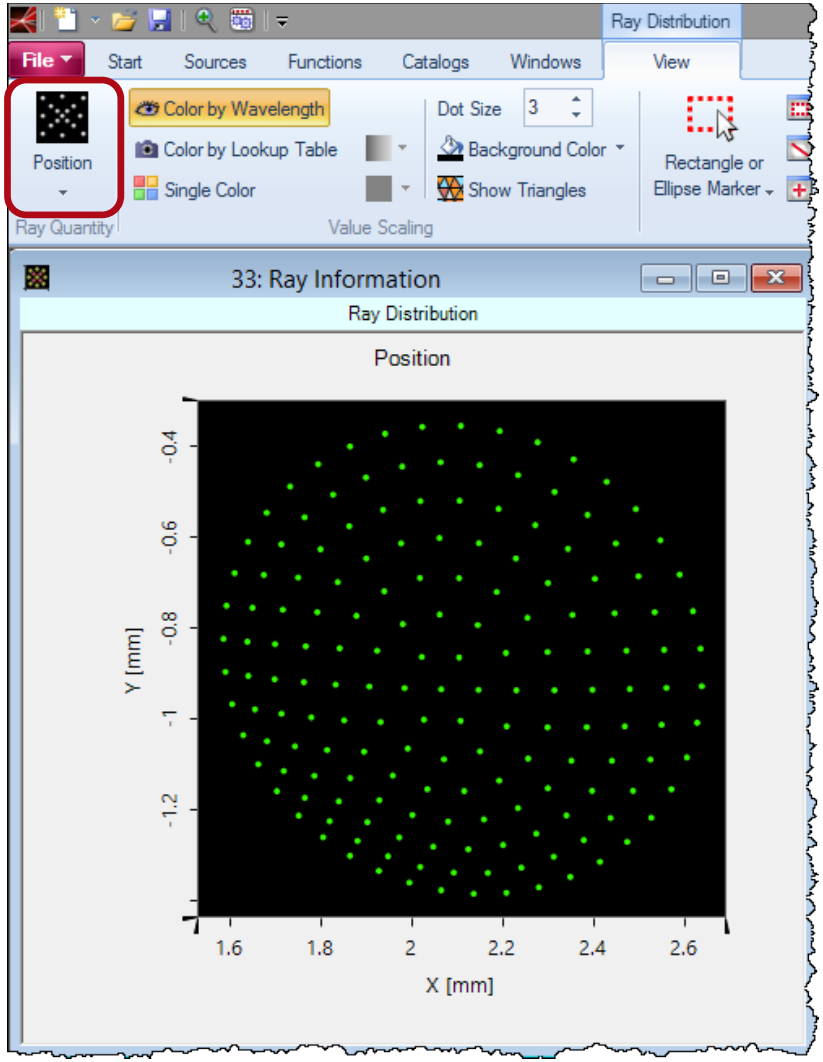
Ray Tracing Engine – Result

- The settings of the 2D ray tracing result can be customized by the property browser, the ribbon or the context menu.



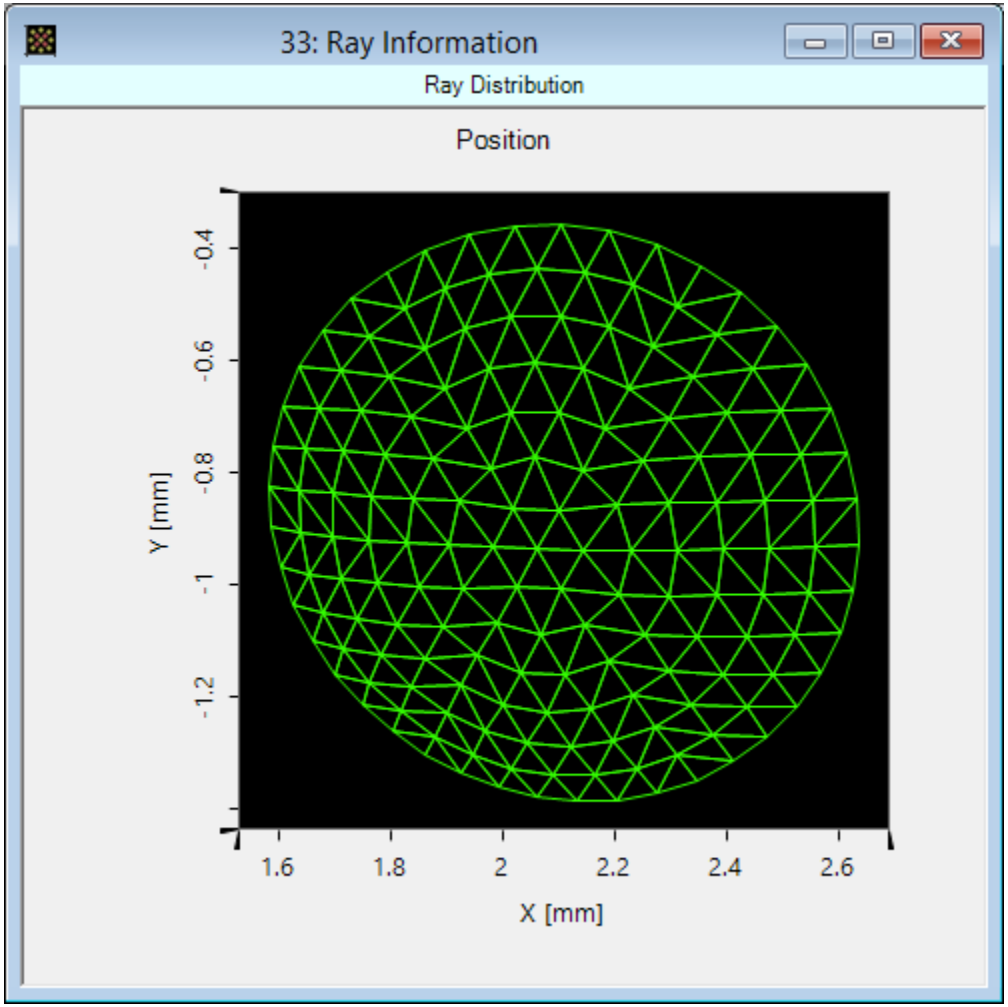
- The user can select the ray quantity to show.
- Additionally the user can specify the coloring and the ray visualization that shall be used.
- VirtualLab always assigns mesh information to the rays. The mesh information can be viewed by means of the button *Show Triangles*.

Ray Tracing Engine – Positions

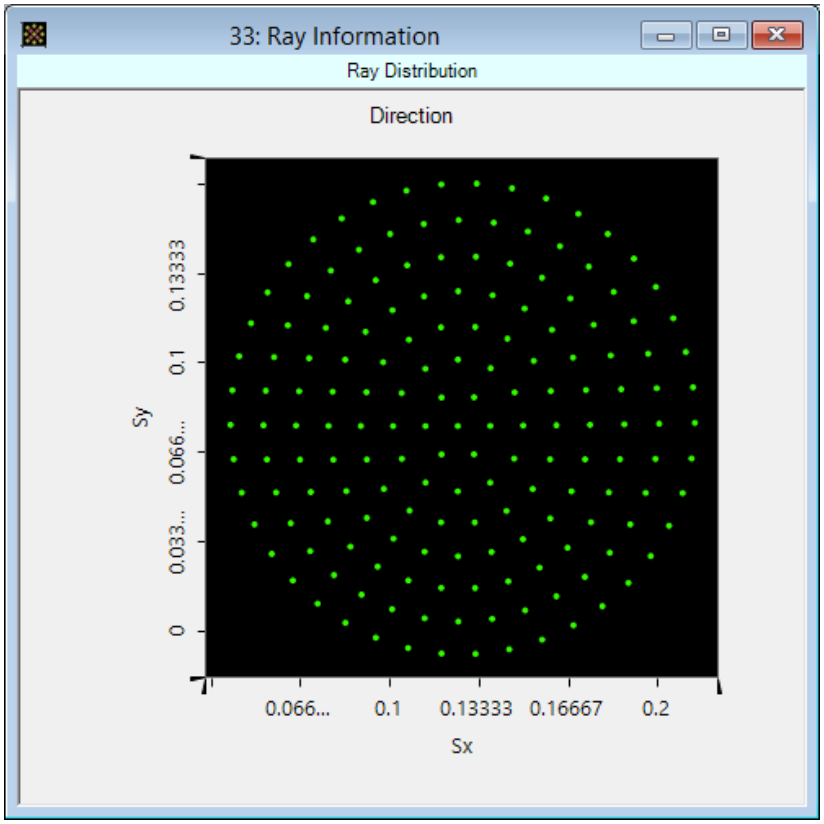


- By selecting *Position* as *Ray Quantity* in the ribbon the positions will be displayed.
- By pressing the *Show Triangles* button the mesh information will be shown (see next page).

Ray Tracing Engine – Positions (Mesh)

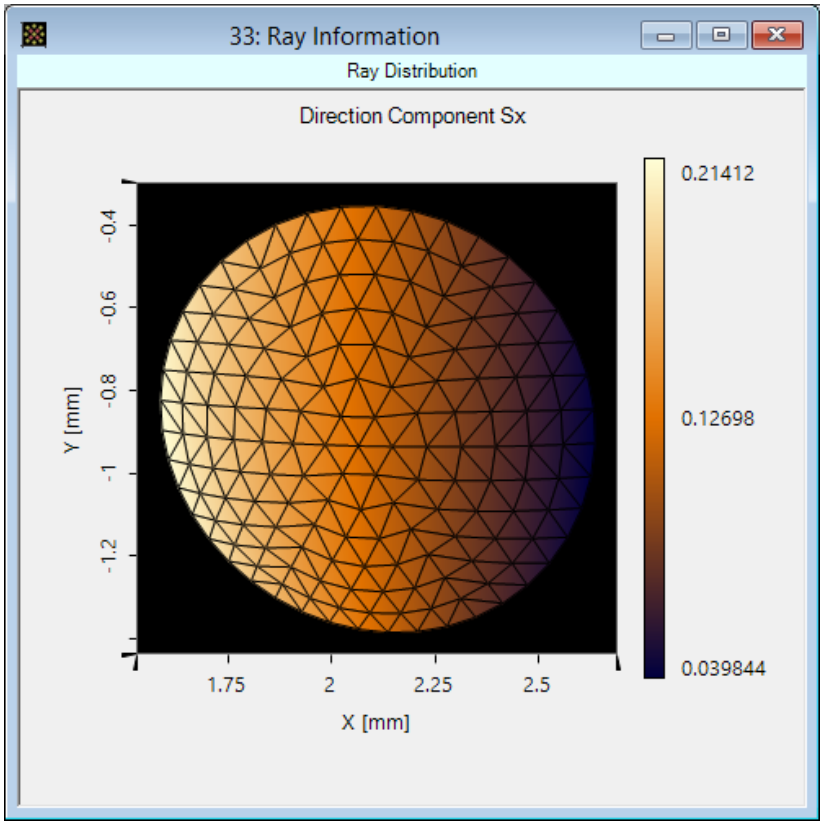


Ray Tracing Engine – Directions

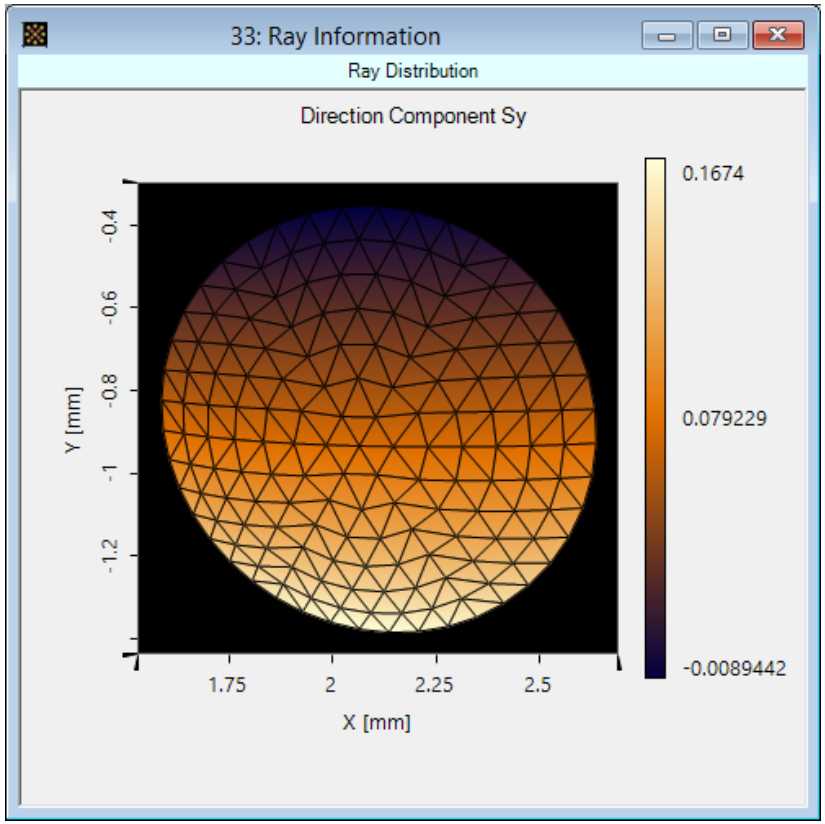


- VirtualLab allows the visualization of the positions within the view.
- The positions can be shown in different modes:
  - F(Sx, Sy)
  - Sx(x, y)
  - Sy(x, y)
  - Sz(x, y)
- For each ray **S**=(Sx,Sy,Sz) represents the normalized direction vector.
- The mode can be changed via the property browser.
- For the Sx, Sy, Sz modes triangle visualization is also available.

Ray Tracing Engine – Directions

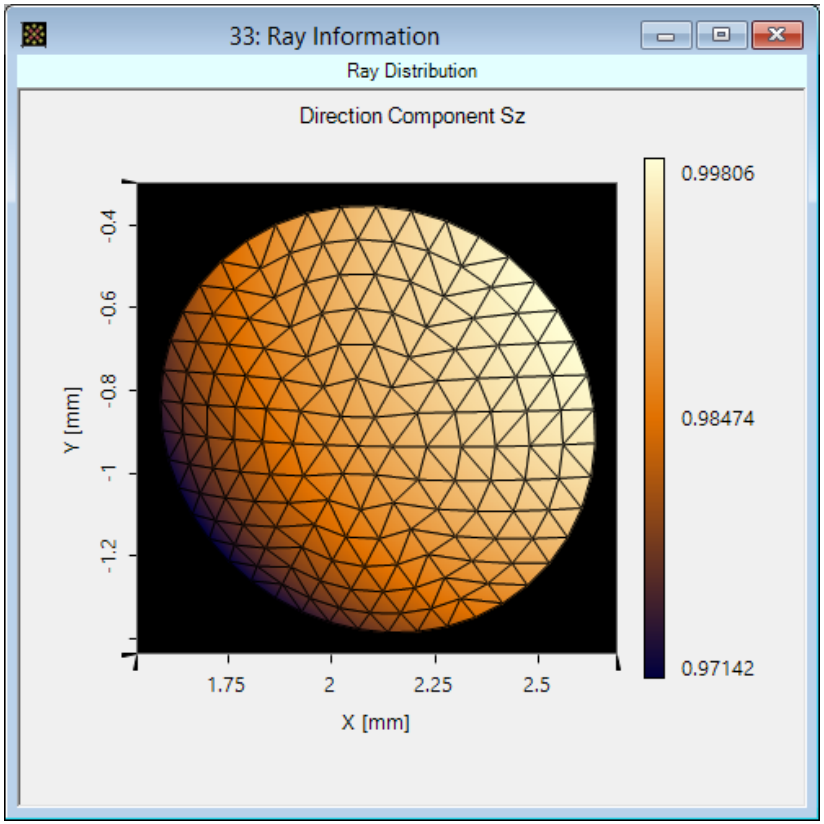


Sx(x,y)
with triangles visible
(within the triangles a
linear interpolation is done)

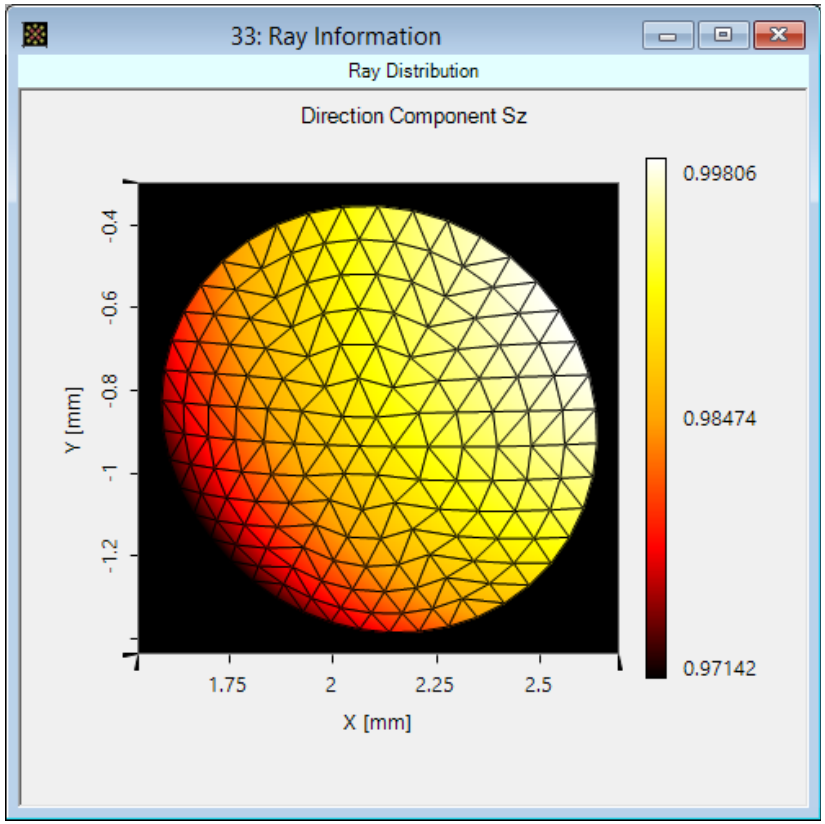


Sy(x,y)
with triangles visible

Ray Tracing Engine – Directions

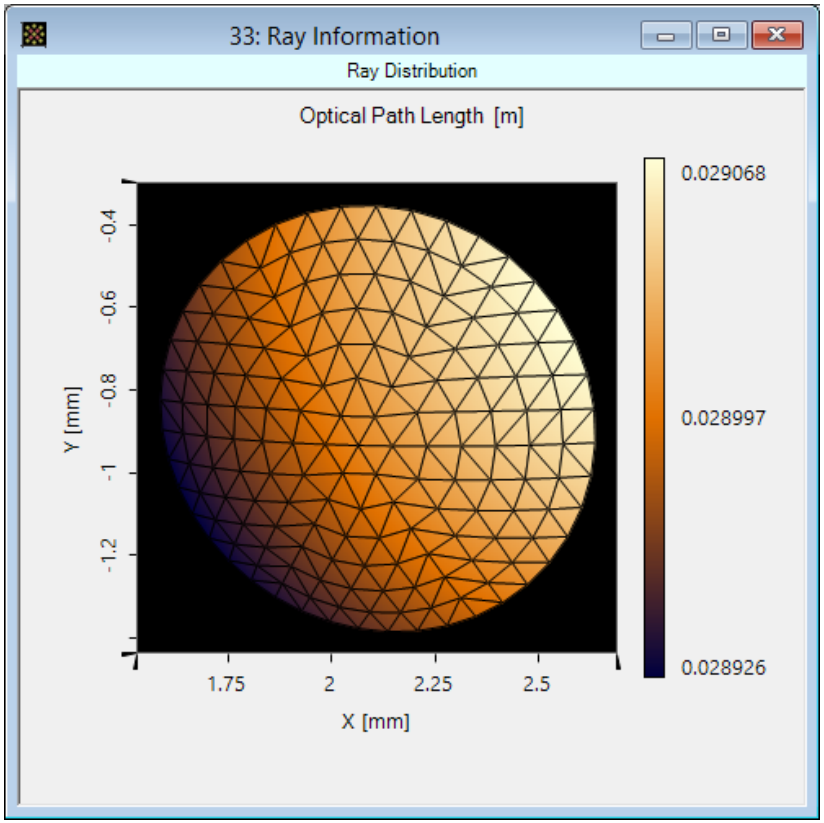


Sz(x,y)
with triangles visible



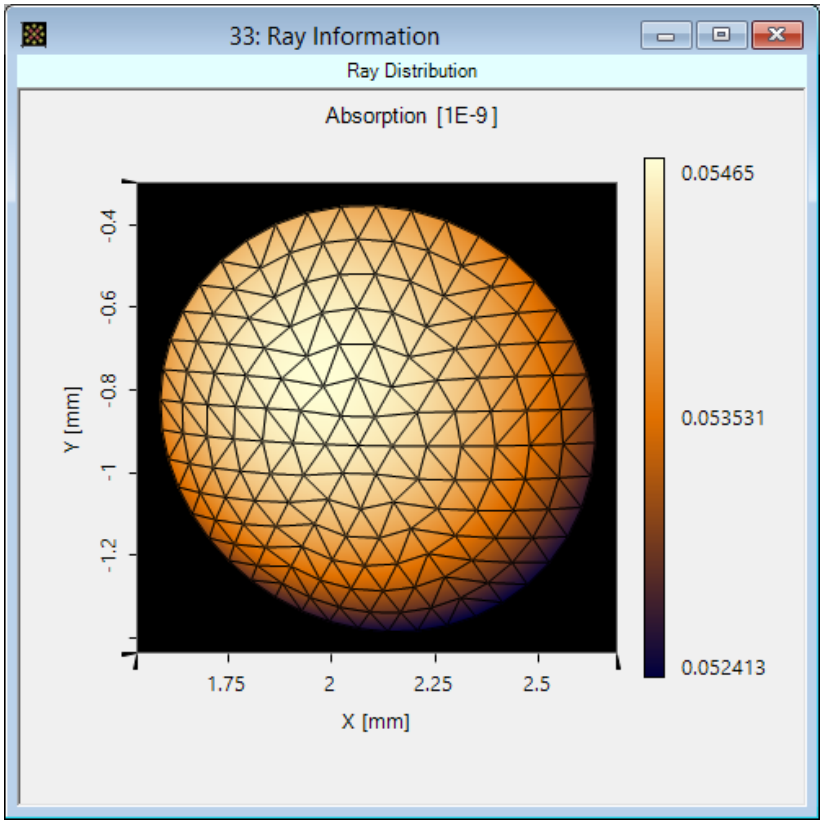
Sz(x,y)
with triangles visible
(different color palette!)

Ray Tracing Engine – Optical Path Length



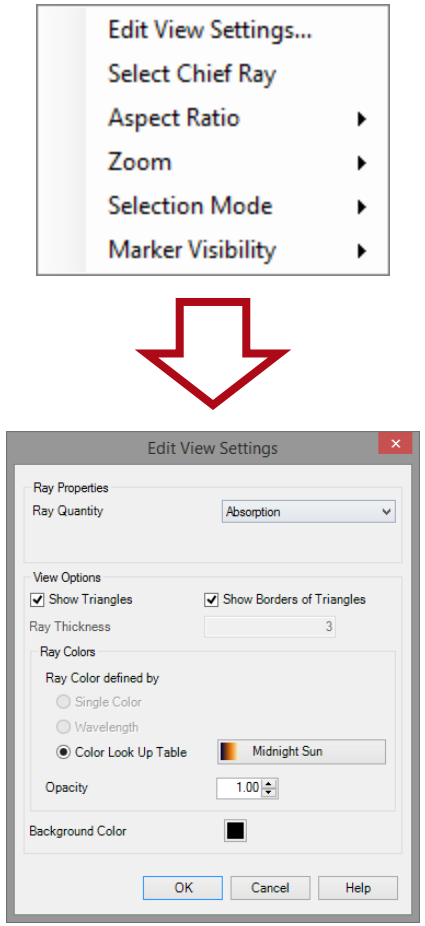
- The optical path length is also calculated by the ray tracing engine.
- The user can select whether to show the triangles or not.
- The optical path length and the direction information are correlated.

Ray Tracing Engine – Absorption



- The ray tracing engine also delivers information on the absorption per ray.
- Using the mesh information the absorption can be also interpreted continuously.

Ray Tracing Engine – Edit View Settings



- View settings for the ray visualization can be edited within the view ribbon on top of VirtualLab, via the property browser (tab View) or via the edit dialog for edit options.
- The dialog for a compact modification of the view properties can be accessed through the context menu.

Ray Tracing Result – Selection Tools

- The ray tracing result view also allows the use of markers.
- The following markers are available:
  - Point Marker
    The point marker can be used to select a ray and get detailed information on the ray within the property browser.
  - Line Marker
    The line marker can be used to measure the distance between two rays. The distance as well as start and end position are given in the property browser.
  - Rectangle Marker
    The rectangle marker can be used to measure sizes within the view. The rectangle marker does not snap on the positions defined by the rays but can be freely specified.

Summary

- The ray tracing engine of VirtualLab allows access to all the available information determined by ray tracing, including positions, directions, optical path length and absorption.

- In addition also mesh information can be visualized.

- This enables the user to get a quick overview about the performance of his optical setup.