

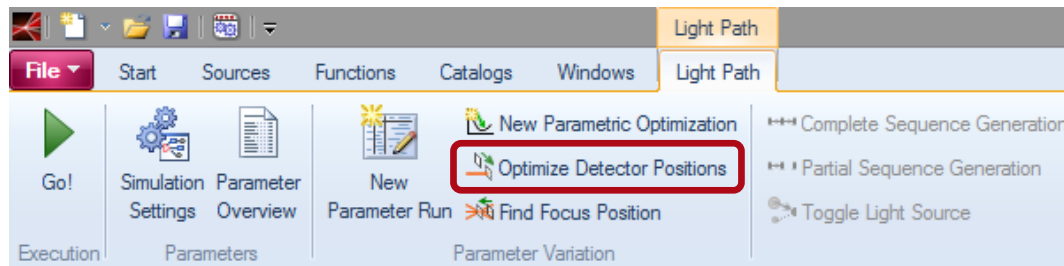
UseCase.0062 (1.0)

Optimize Detector Position

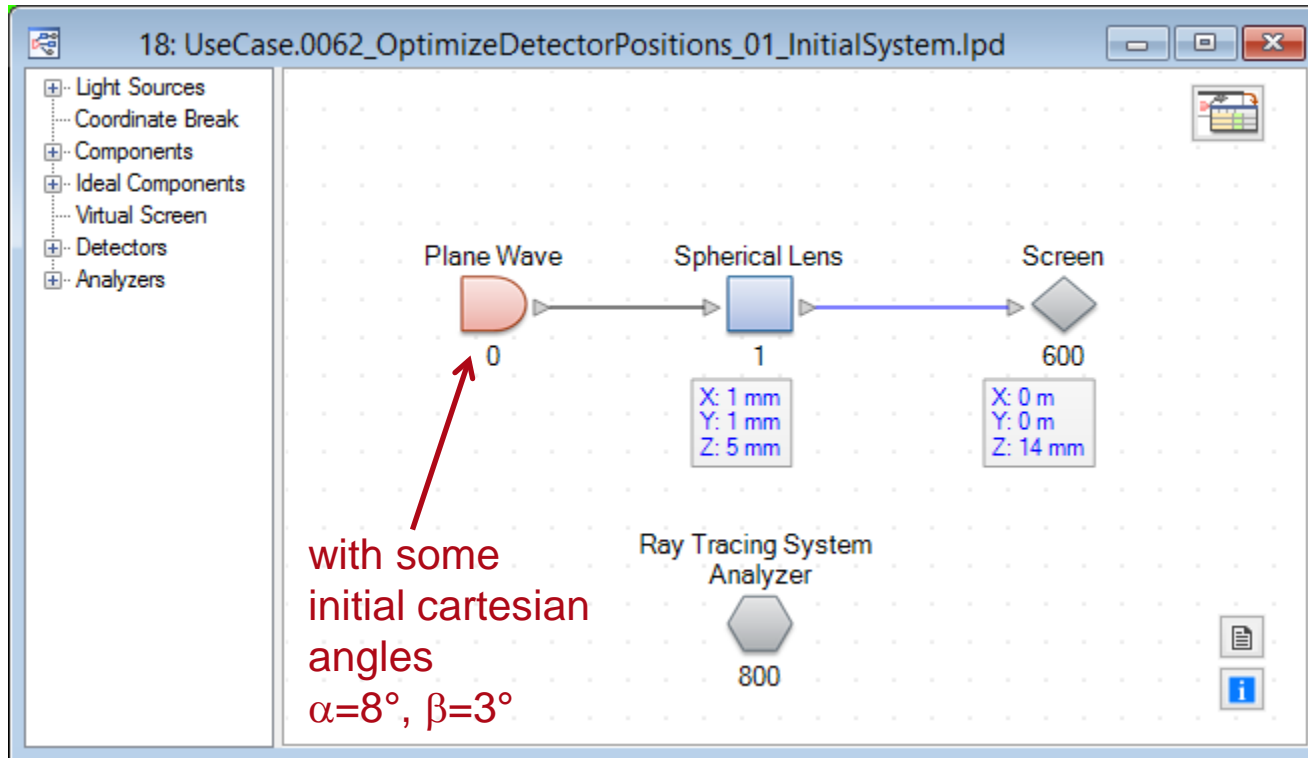
Keywords: ray tracing, detector, position, pilot ray, bundle, tool

Description

- This use case demonstrates a very convenient tool for finding an optimized position of detectors.
- VirtualLab traces a bundle of rays through the optical setup and determines from the resulting ray information the optimal position information.
- The tool to optimize the positions for detector can be started by the corresponding Light Path ribbon entry.



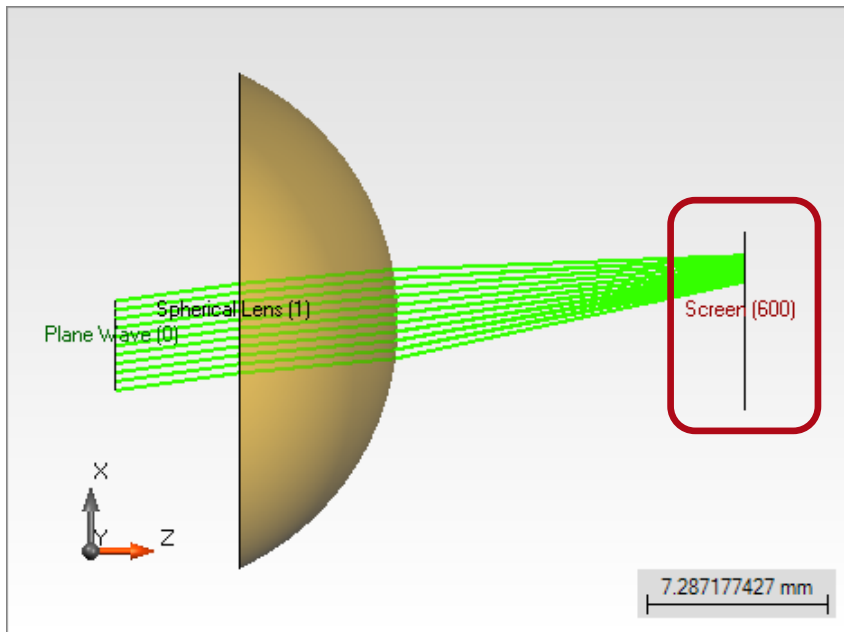
Sample System



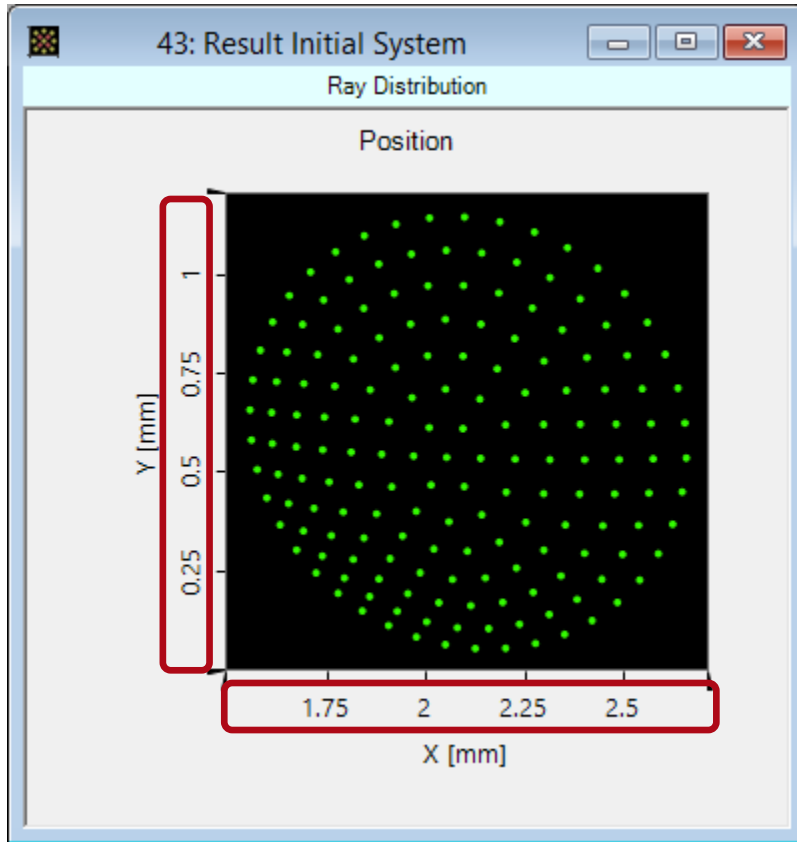
Filename: UseCase.0062_OptimizeDetectorPositions_01_InitialSystem.lpd

3D Ray Tracing View of Inital System

Adjacent 3D ray tracing illustration shows non-centered screen in zx-plane.

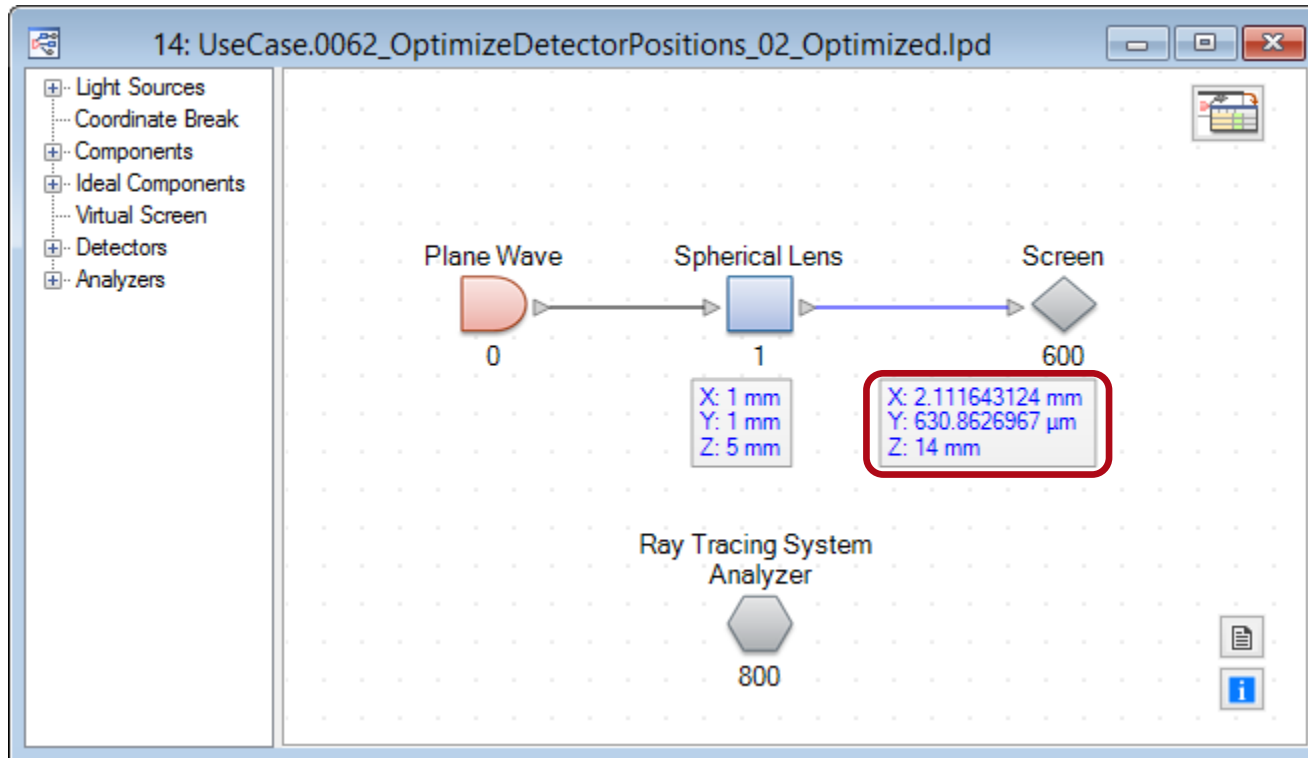


Result Initial System



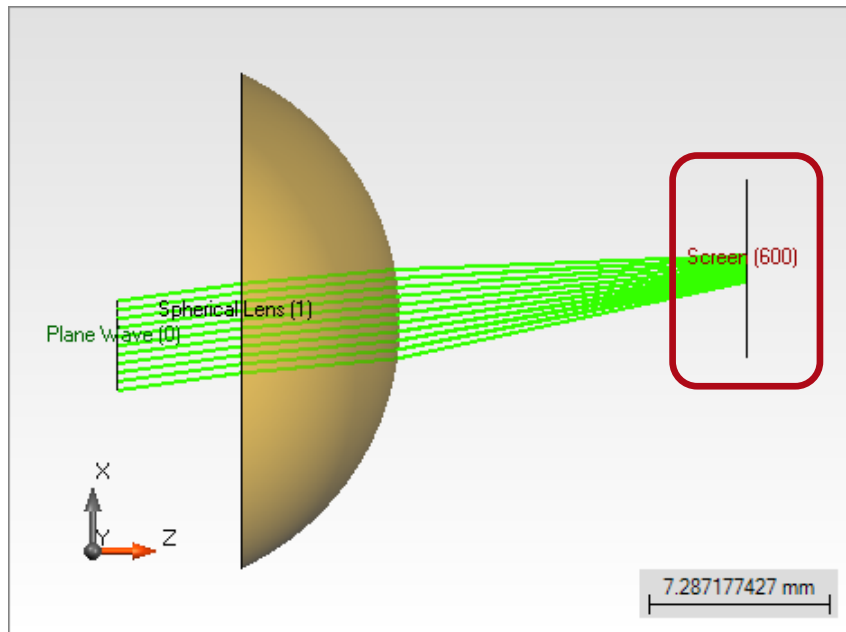
- By performing the ray tracing engine of VirtualLab we get the spot diagram, shown on the left side.
- The rays are not centered around the optical axis of the detector.
- By applying the position optimization tool, a new light path diagram is created.

System with Optimized Detector Position



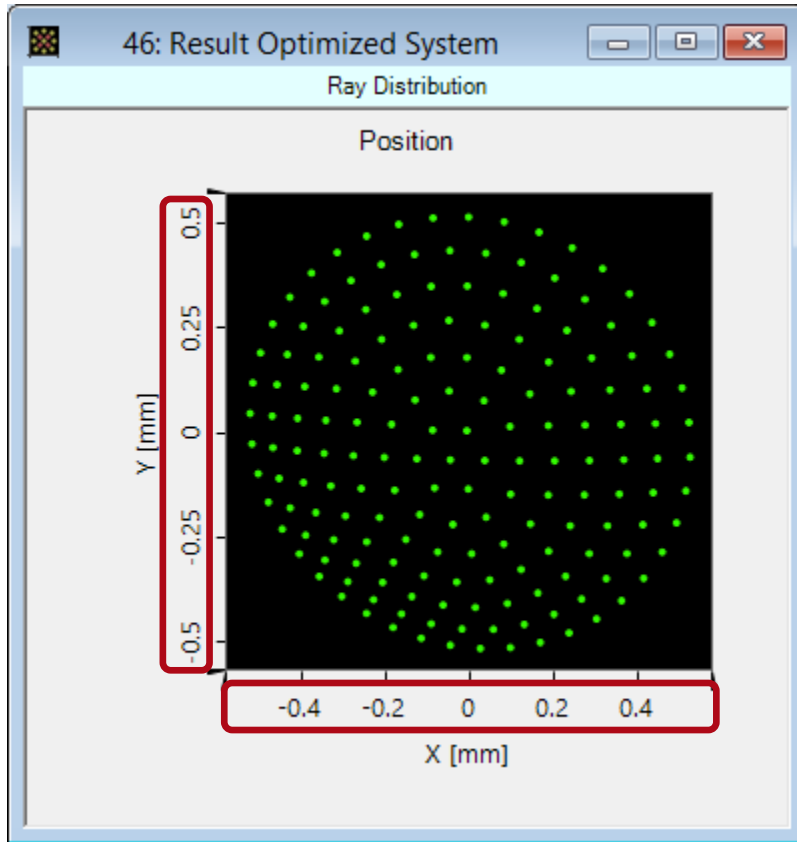
Filename: UseCase.0062_OptimizeDetectorPositions_02_Optimized.lpd

3D Ray Tracing View of Optimized System



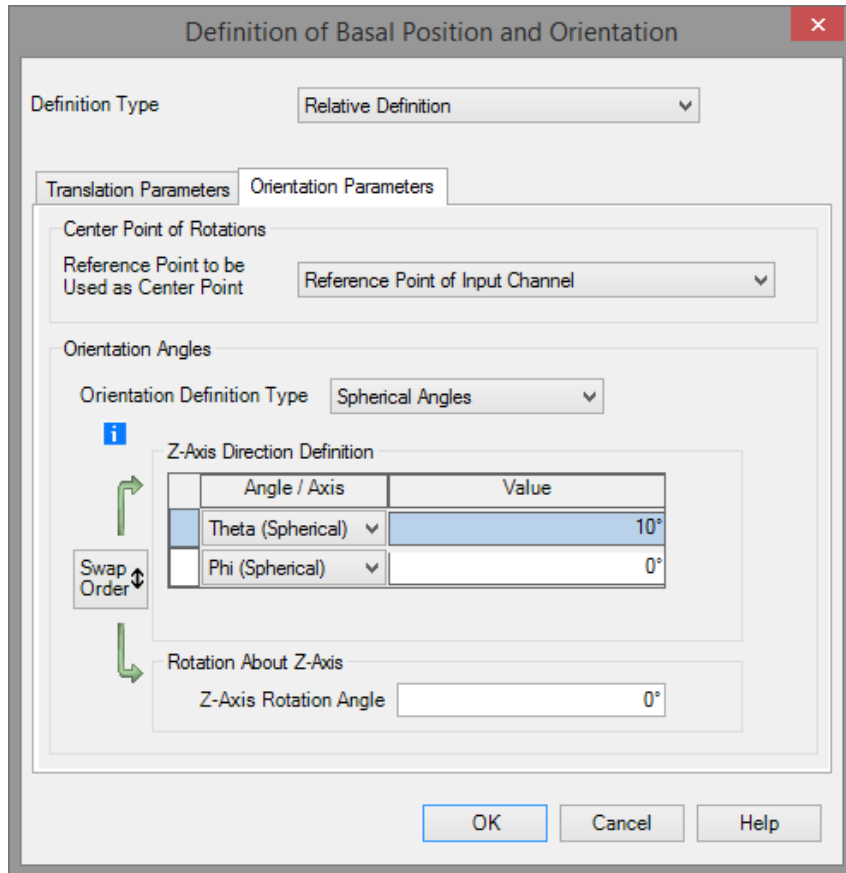
Adjacent 3D ray tracing illustration shows adjusted centered detector (screen) position in zx-plane.

Result Optimized System



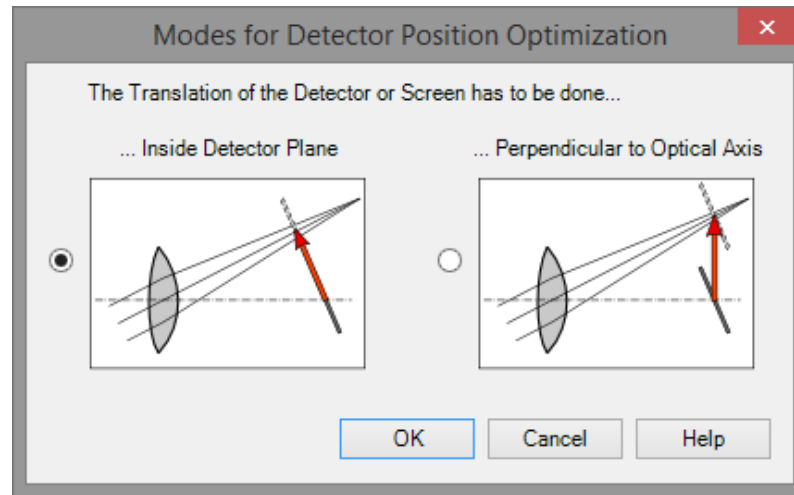
- By performing a simulation with the ray tracing engine for the optimized system a new dot diagram is created.
- The detector has now a new position where the spots are centered around the optical axis of the detector.

Optional Setting for the Optimization Tool



- If the detector is tilted relatively to its input channel, the optimization tool allow to specify additional optimization parameters.
- After triggering the optimization tool for a system with tilted detectors an option dialog is shown, where the user can adapt the optimization strategy.

Setting Dialog for the Optimization Tool



- The user can specify whether the translation of the detector shall be done parallel to the detector plane or perpendicular to the optical axis (input channel).
- The dialog visualizes the two different options and their meaning.

Summary

- VirtualLab provides a very helpful tool for the evaluation of optimized detector positions.
- This tool is based on a ray tracing approach.
- In case of tilted detectors VirtualLab offeres different options from which the user can select the ideal one.
- The ray tracing engine and the 3D ray tracing system analyzer engine can be used for an easy check of the positions and optimizations within the system.