

Laser-Based Michelson Interferometer and Interference Fringe Exploration

Abstract



Michelson interferometer is a typical configuration for optical interferometry. Different configurations in the setup may lead to different interference fringes, and therefore it is worth of investigating the relation between them. With the help of non-sequential tracing technology in VirtualLab Fusion, it is easy to set up and to configure a Michelson interferometer, and to visualize the interference fringe in different situations. In this example, several typical situations and the corresponding fringes are demonstrated.

Modeling Task



Result with Equivalent Optical Path



Result with Shifted Movable Mirror



Result with Tilted Movable Mirror



Result with Shifted and Tilted Movable Mirror



Peek into VirtualLab Fusion

flexible channel control for 9: Movable Mirror Tilted by 0.05 Degree non-sequential tracing Chromatic Fields Set Edit Ideal Beam Splitter 3 Interface +/+ +/--/--/+ Geometry Channels 2 nterface #1 (Ideal Beam Splitter) 🔽 🗹 Y [mm] 0 Position / Orientation Function N Edit Ideal Plane Mirror X Basal Positioning Isolated Positioning Position Information (Absolute) ↑ \$ ↓ ↓ \$ ↓ Geometry Position and Orientation 3 Propagation Channels Use Isolated Translation Use Isolated Orientation Channels Order of Steps 1: Translation -> 2: Orientation \sim R Translation Parameters Orientation Parameters Position / Orientation Center Point of Rotations Reference Point to be Center of Mirror Plane \sim Used as Center Point convenient ۶₩ Isolated Orientation Angles positioning Function Orientation Definition Type Sequence of Axis Rotations (:::) \sim ↑ # ↓ ↓ Direction Definition & orientation Fix Axes \$ Angle / Axis Value Propagation Channels 0.05° Y-Axis Rotation settings $\stackrel{\uparrow}{\downarrow}$ + -

Workflow in VirtualLab Fusion

- Set up input Gaussian field
 - Basic Source Models [Tutorial Video]
- Set the position and orientation of components
 - LPD II: Position and Orientation [Tutorial Video]
- Set the non-sequential channels of components
 - <u>Channel Configuration for Surfaces and Grating Regions</u> [Use Case]
- Use Parameter Run to check influence/changes
 - Usage of the Parameter Run Document [Use Case]

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VirtualLab Fusion Technologies





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