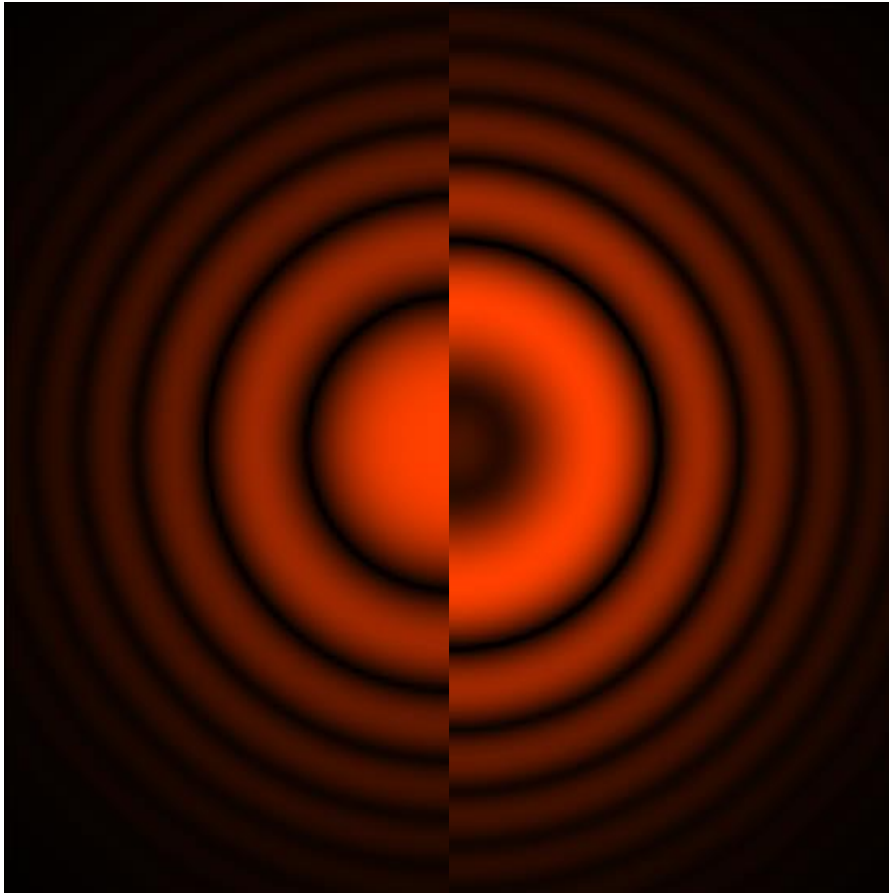


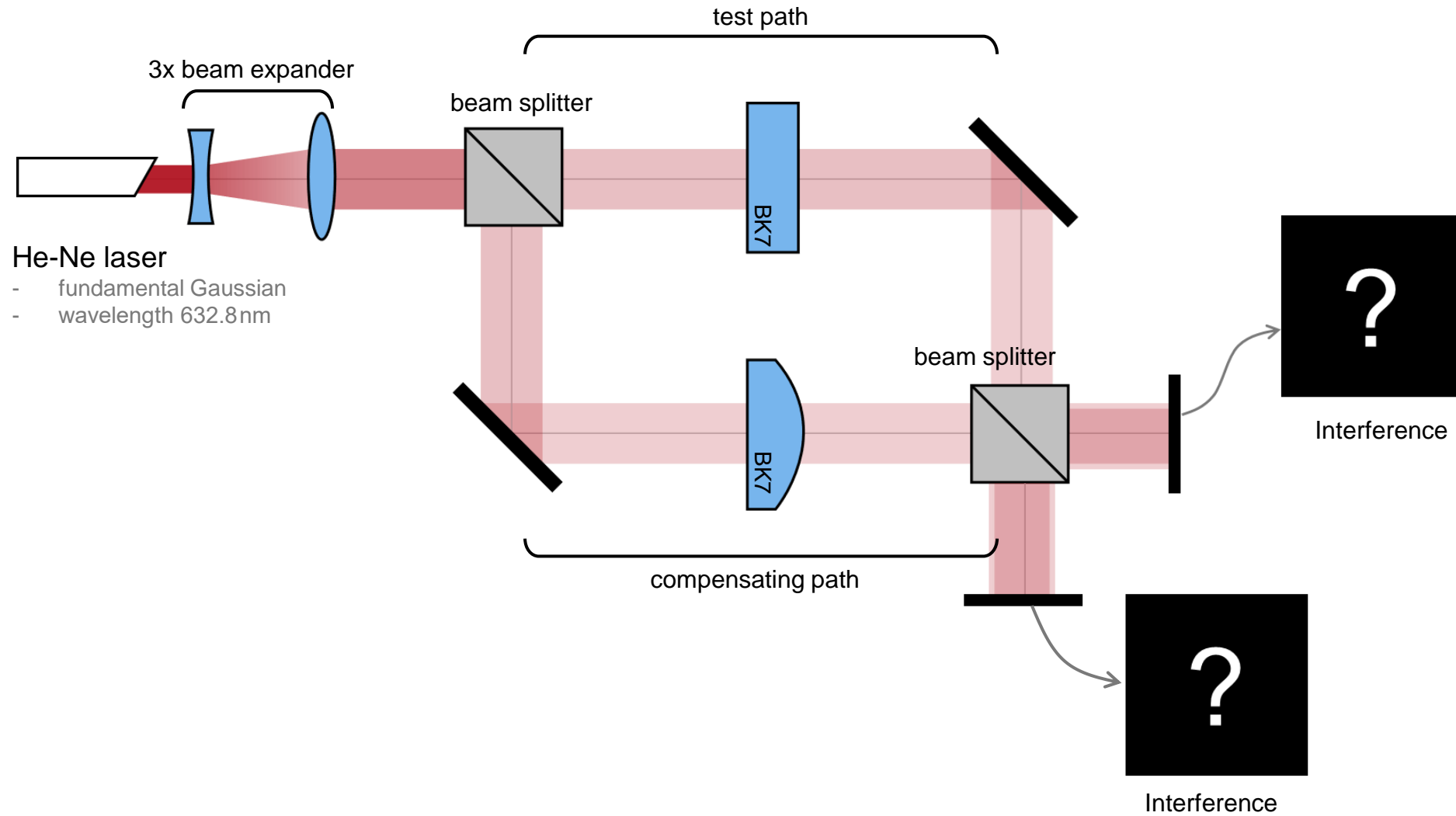
Observation of Complementary Interference Pattern in a Mach-Zehnder Interferometer with Prism Beam Splitter

Abstract

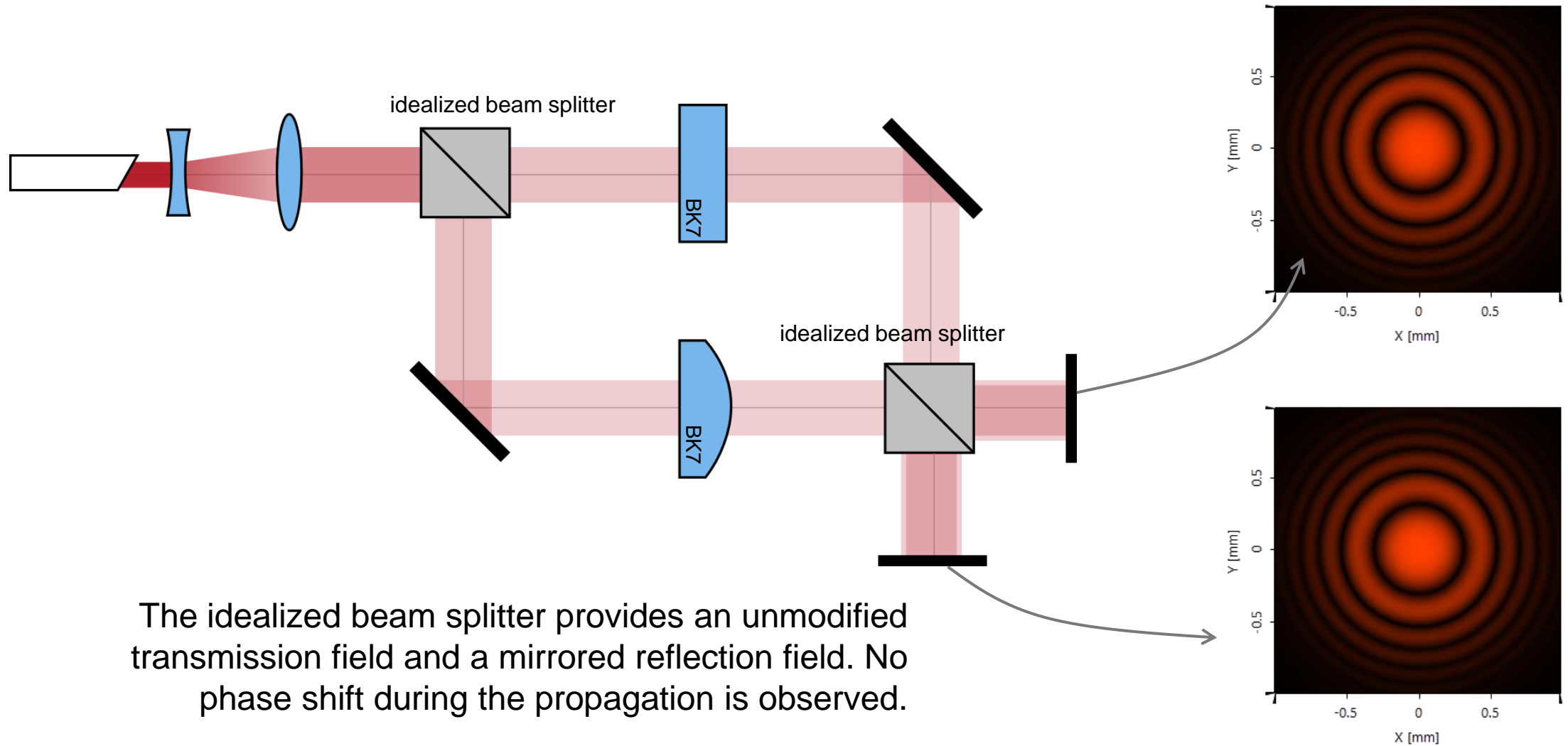


A beam splitter is an important optical element that splits a light beam in two, which is a crucial part of many optical experimental and measurement systems, such as interferometers. As a typical example, a Mach-Zehnder interferometer with a coherent laser source is build up in VirtualLab Fusion and analyzed by using the non-sequential field tracing. The different behavior of the idealized and the real structured beam splitter is investigated, and the complementary interference pattern caused by the relative phase shift variations are demonstrated.

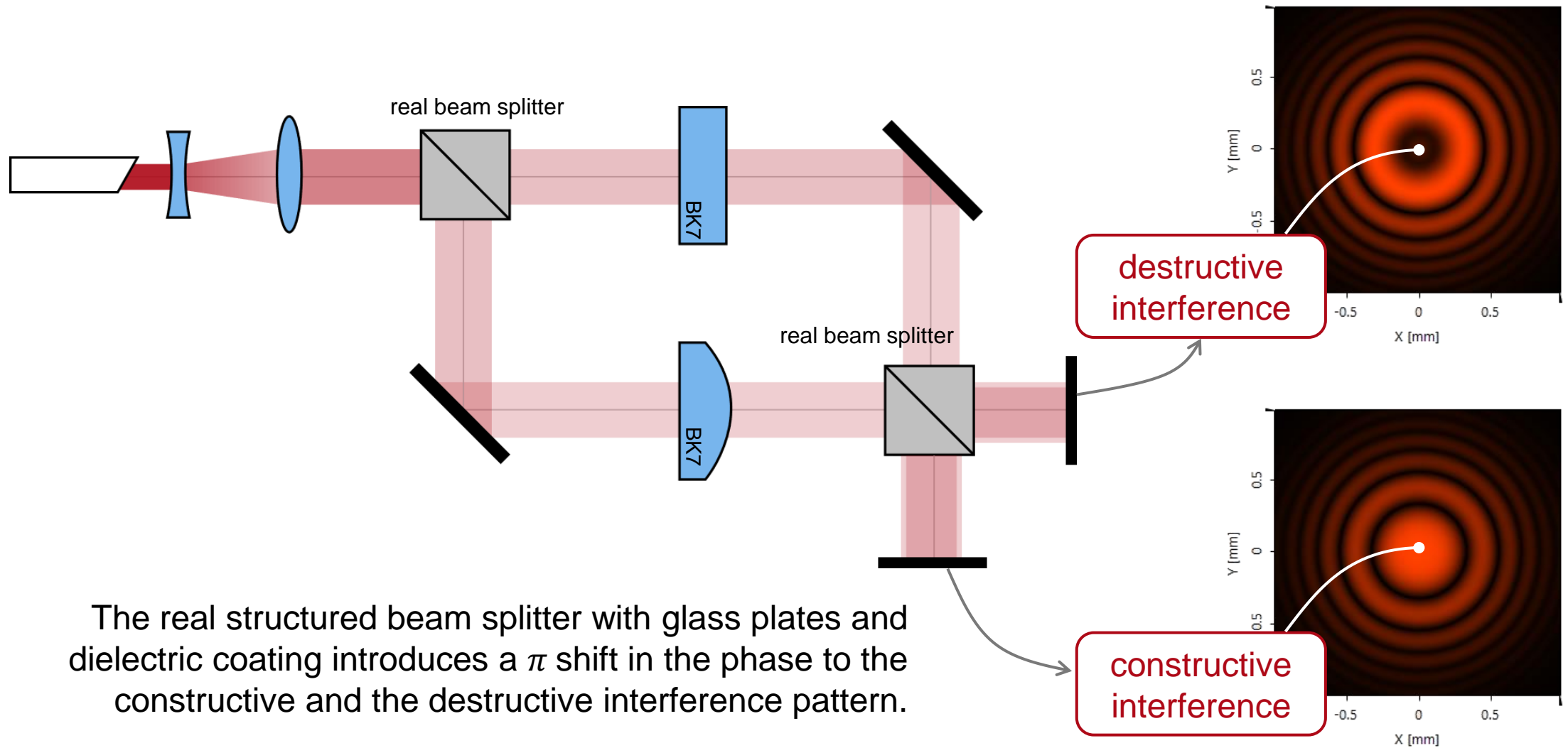
Modeling Task



Interference Pattern with Idealized Beam Splitter

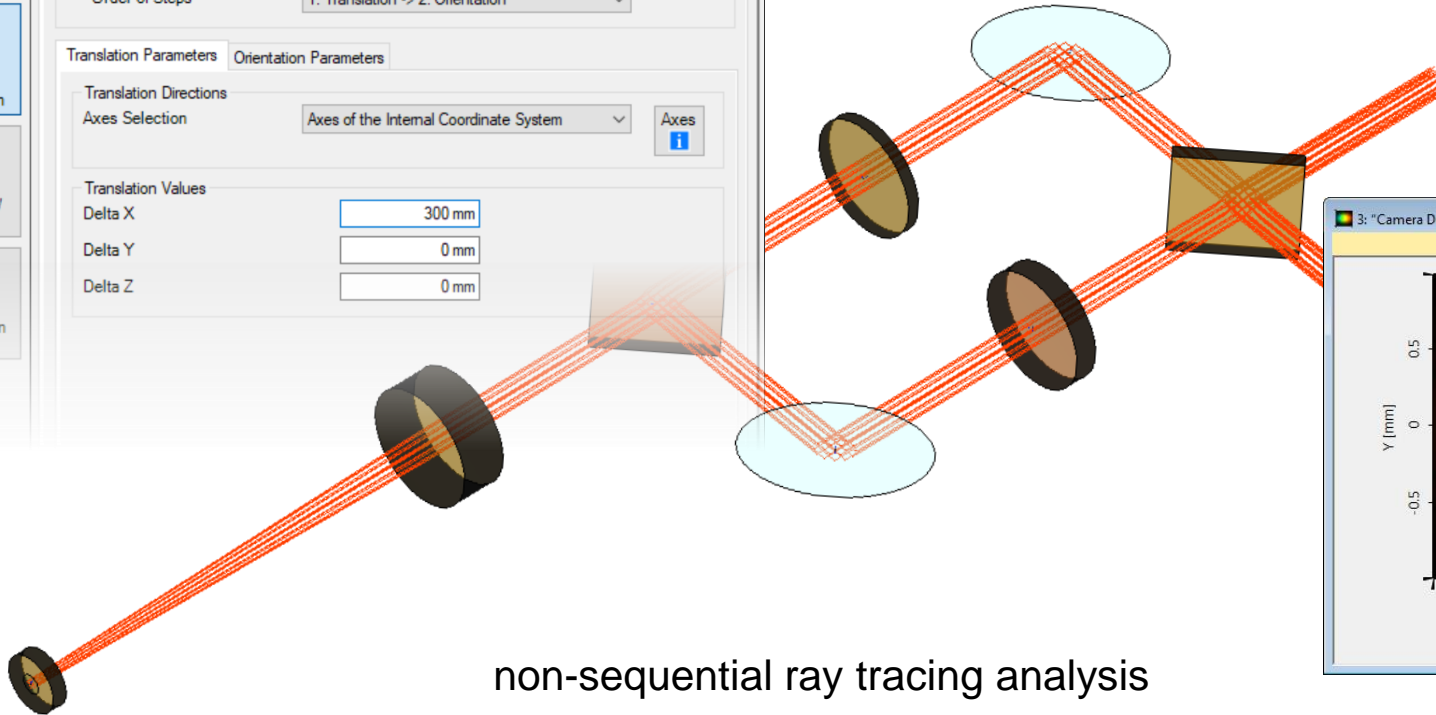
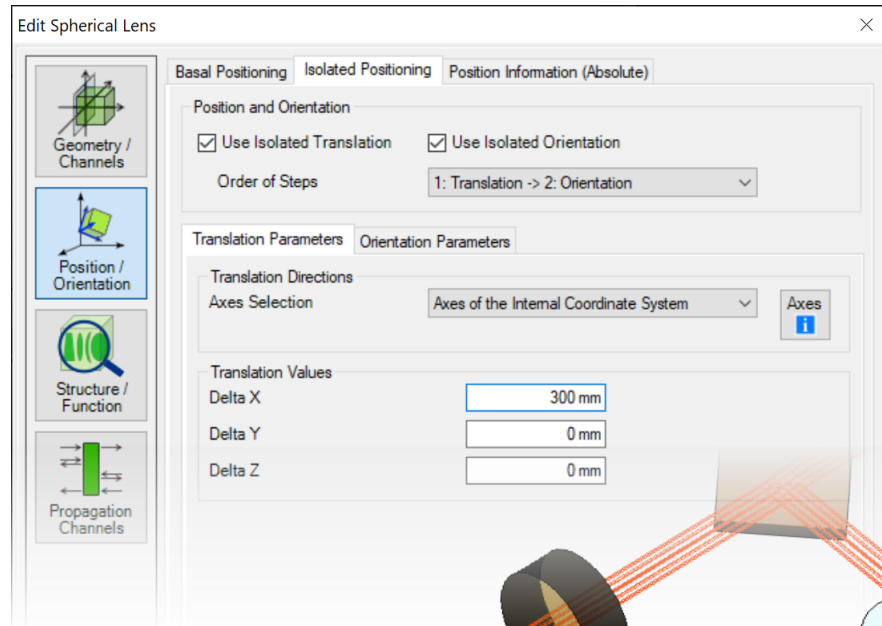


Interference Pattern with Real Beam Splitter

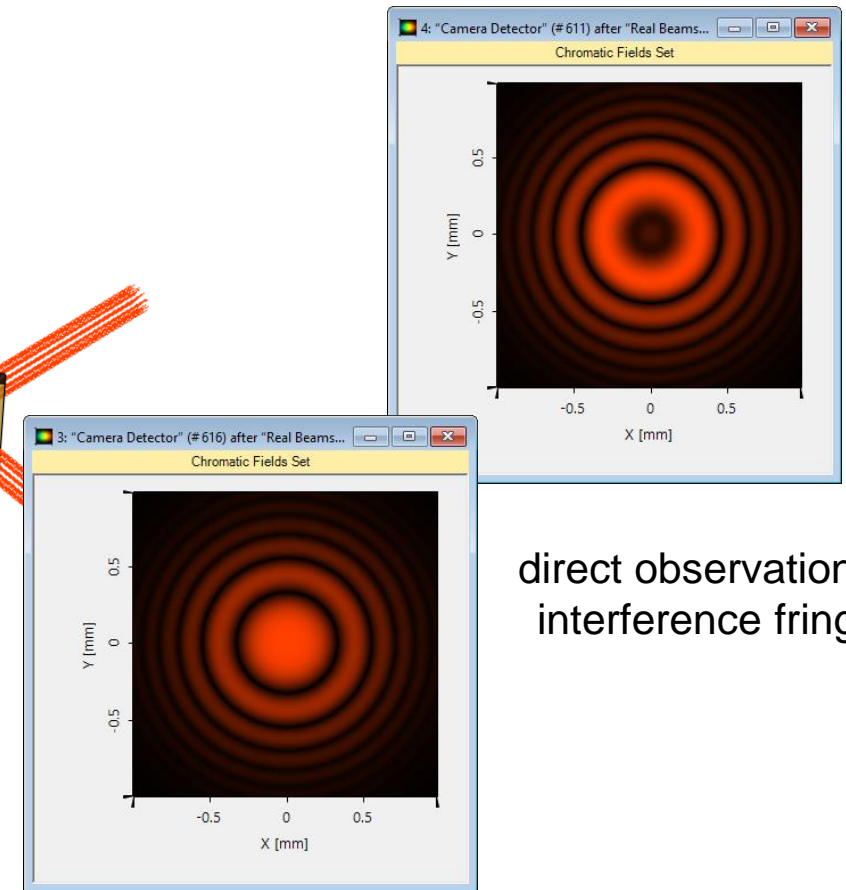


Peek into VirtualLab Fusion

flexible position and orientation settings



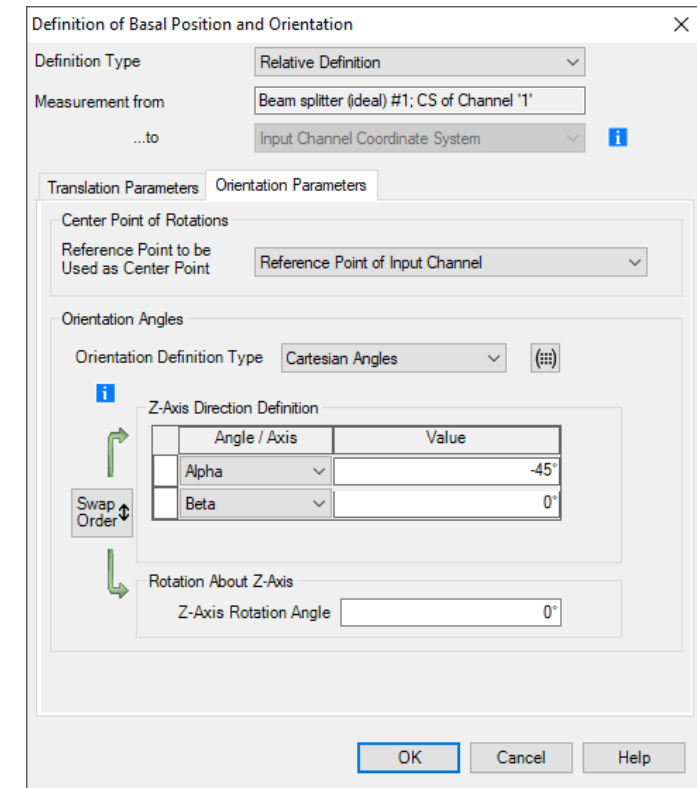
non-sequential ray tracing analysis



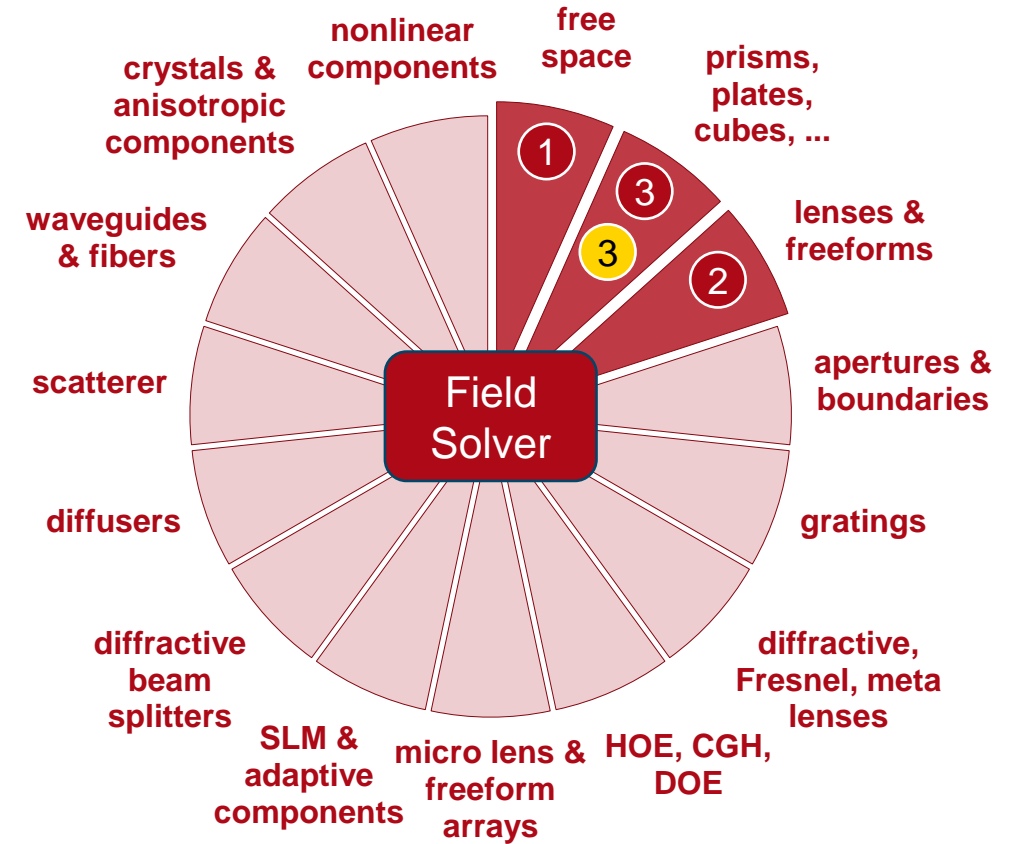
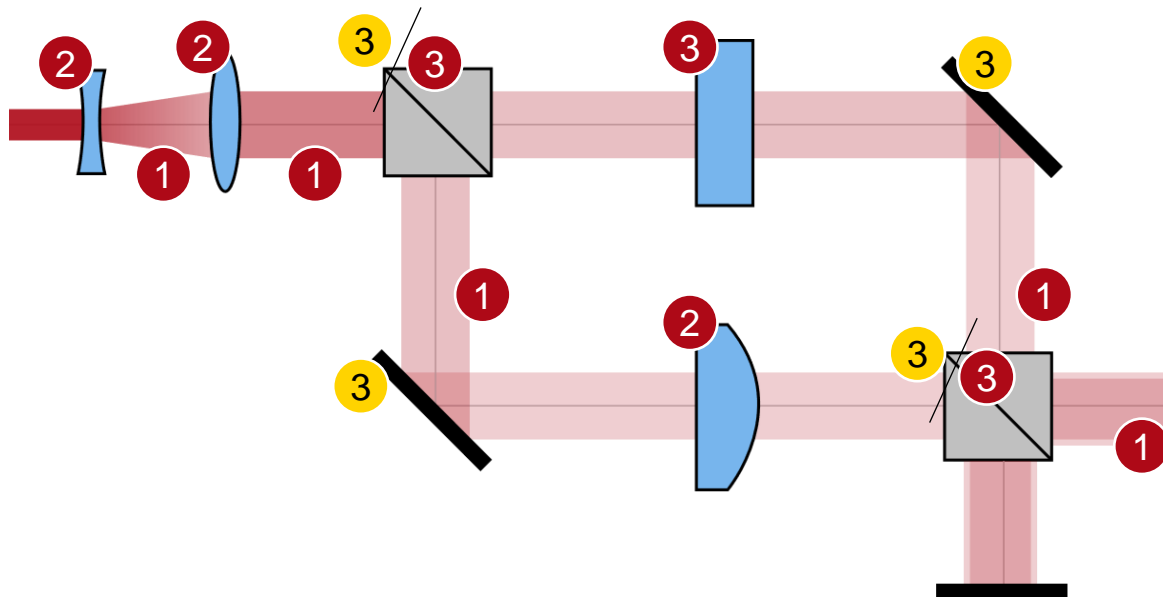
direct observation of
interference fringes

Workflow in VirtualLab Fusion

- Set up input field
 - [Basic Source Models](#) [Tutorial Video]
- Construct real components using surfaces
- Define position and orientation of components
 - [LPD II: Position and Orientation](#) [Tutorial Video]
- Set channels properly for non-sequential tracing
 - [Channel Setting for Non-Sequential Tracing](#) [Use Case]



VirtualLab Fusion Technologies



idealized component

Document Information

title	Observation of Complementary Interference Pattern in a Mach-Zehnder Interferometer with Prism Beam Splitter
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version	
edition	VirtualLab Fusion Basic
software version	2020.2 (Build 1.116)
category	Application Use Case
further reading	- <u>Mach-Zehnder Interferometer</u>