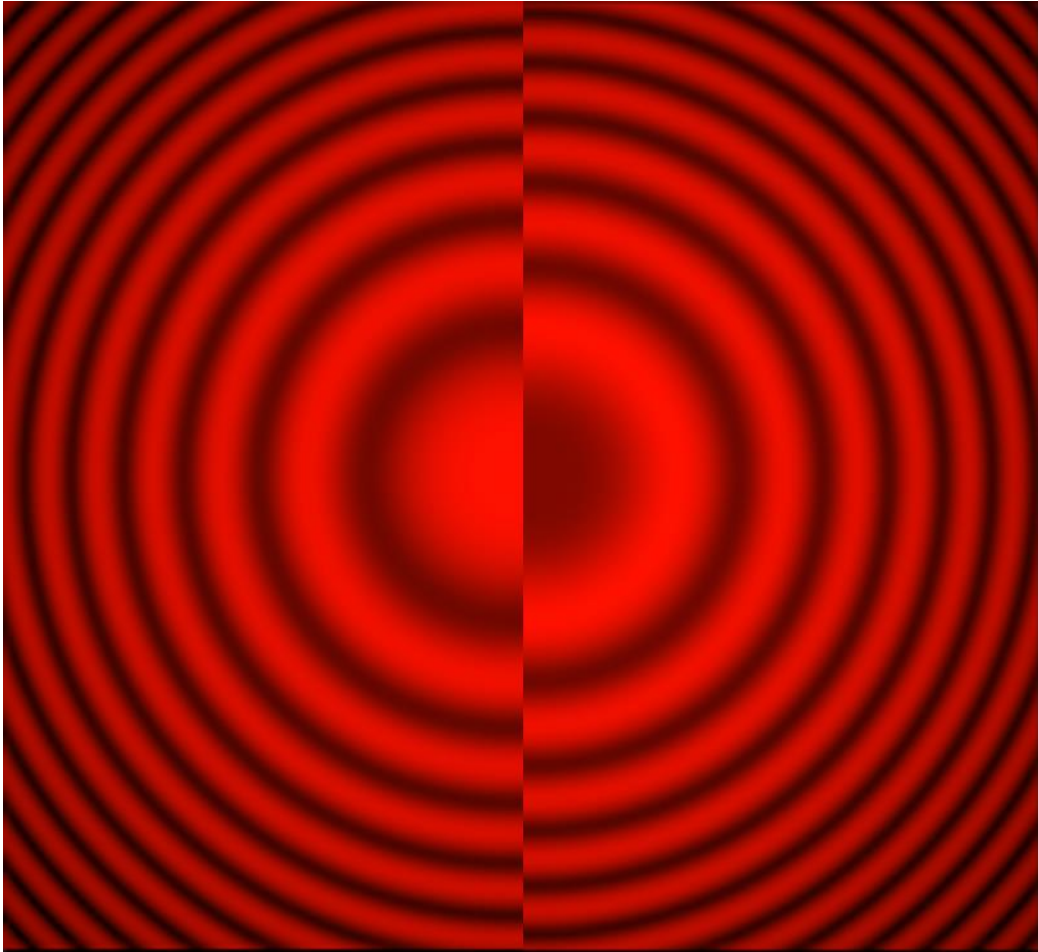


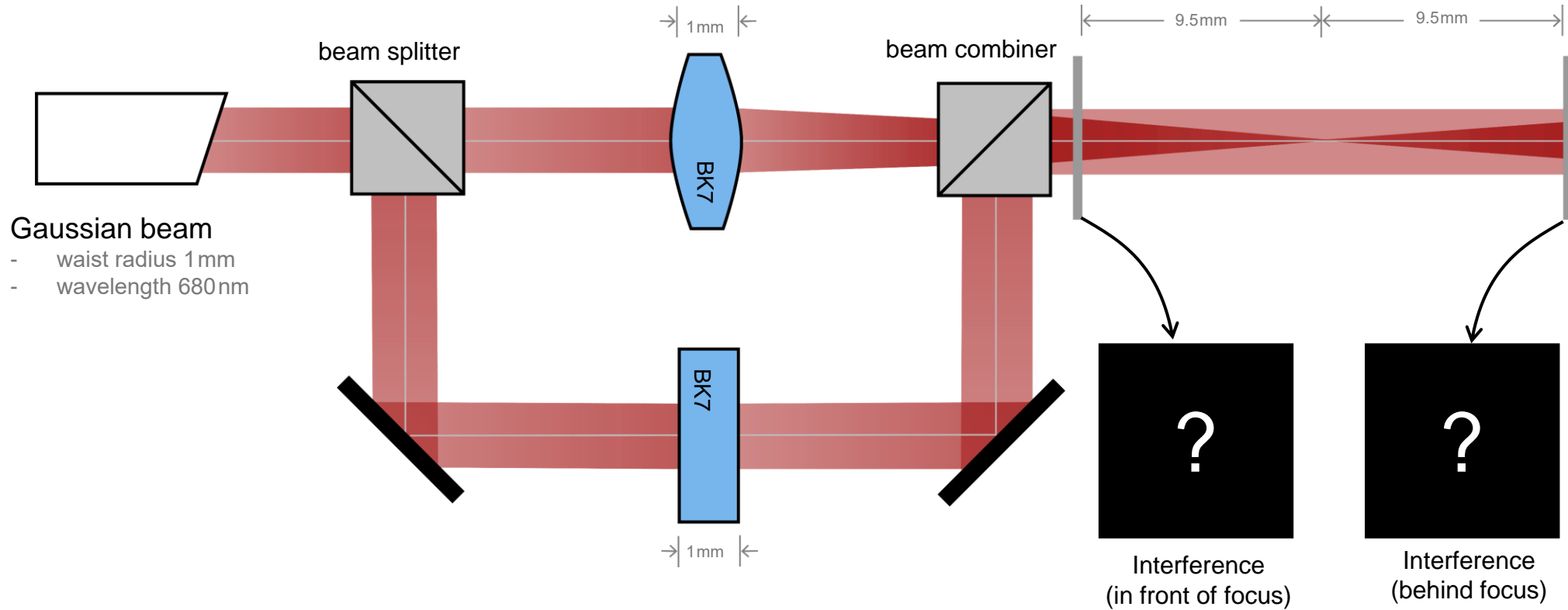
# Observation of Gouy Phase Shift in a Mach-Zehnder Interferometer

# Abstract

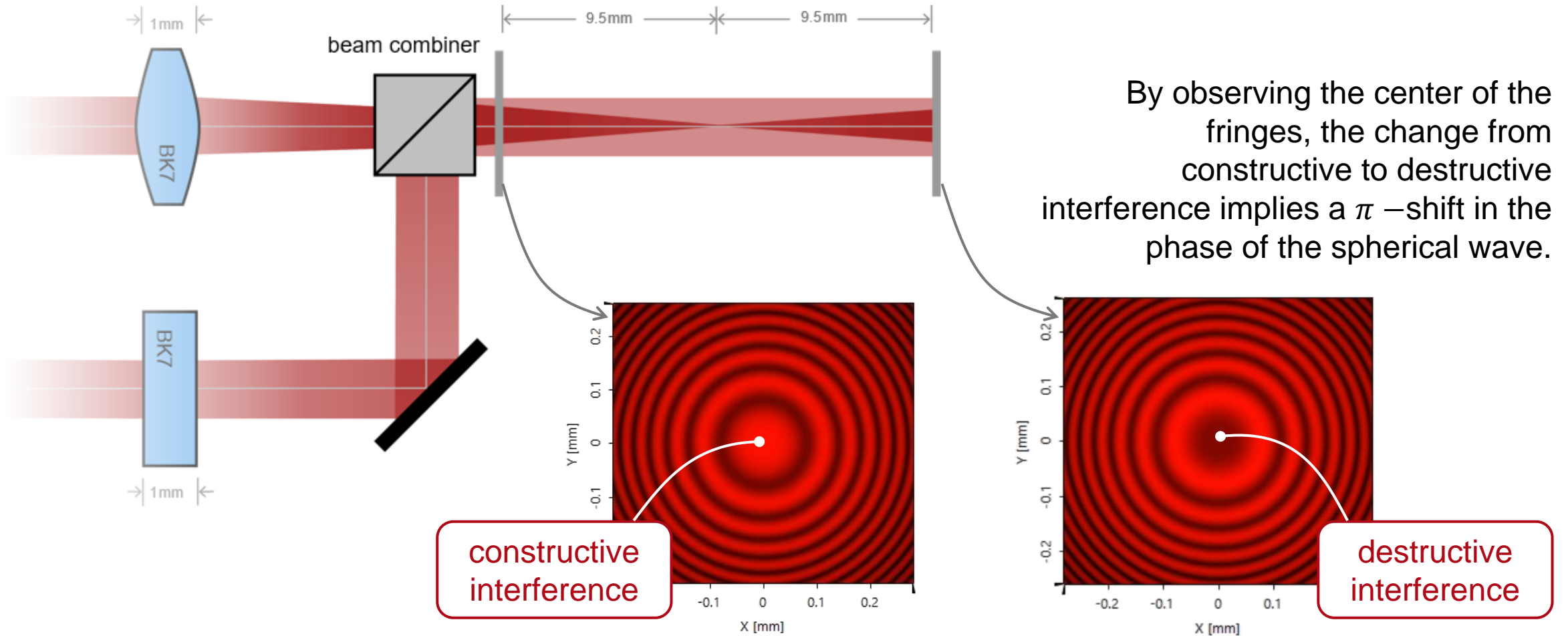


Convergent beams travelling through their focus from minus infinity to plus infinity not only experience the accumulation of the phase corresponding to the traversed optical path length, but also accrue a constant  $\pi$  phase term, known as the Gouy phase shift, discovered by the scientist of the same name at the end of the nineteenth century. When such a beam interferes with a collimated one, the Gouy phase shift is revealed when the interference patterns generated on both sides of the focus are compared: the ring patterns are negatives of each other. This can be observed in a Mach-Zehnder.

# Modeling Task

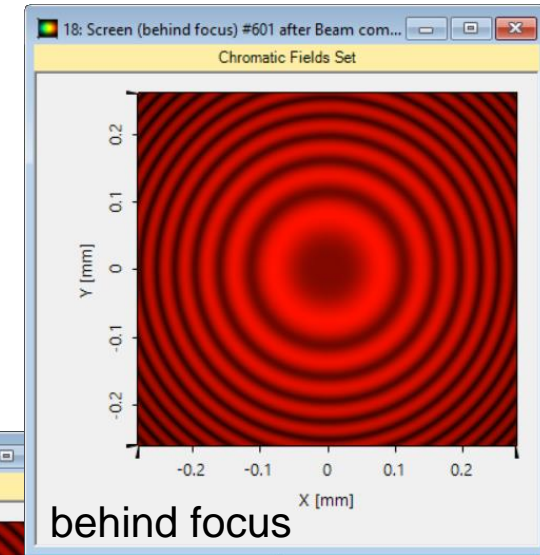
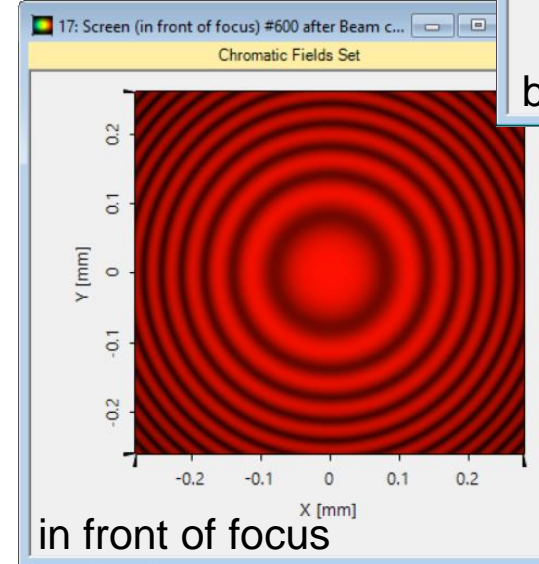
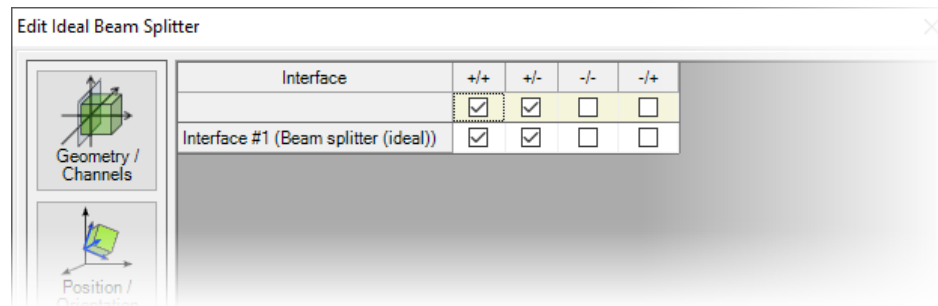
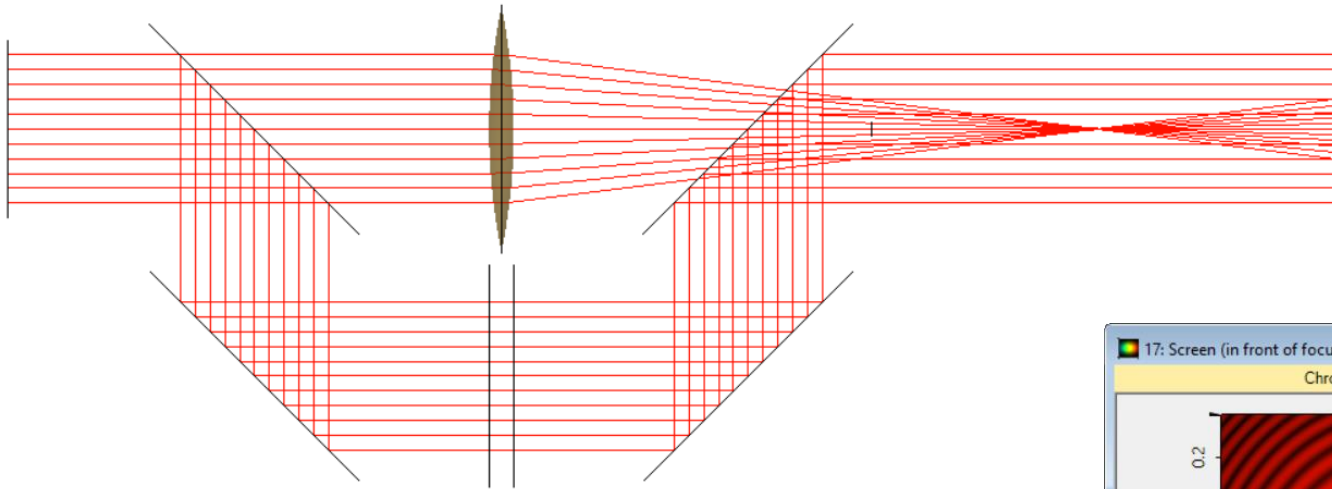


# Interference Pattern



# Peek into VirtualLab Fusion

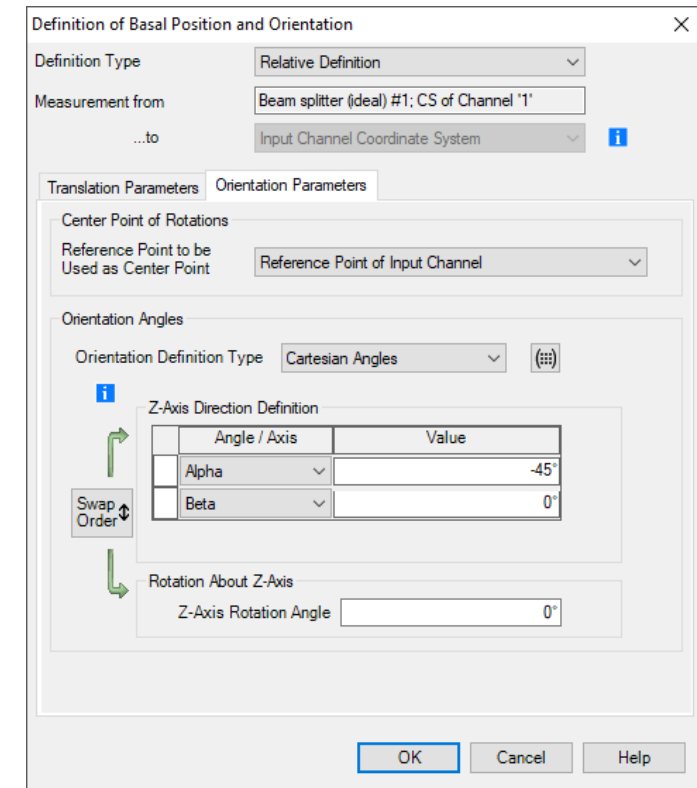
ray tracing through Mach-Zehnder interferometer



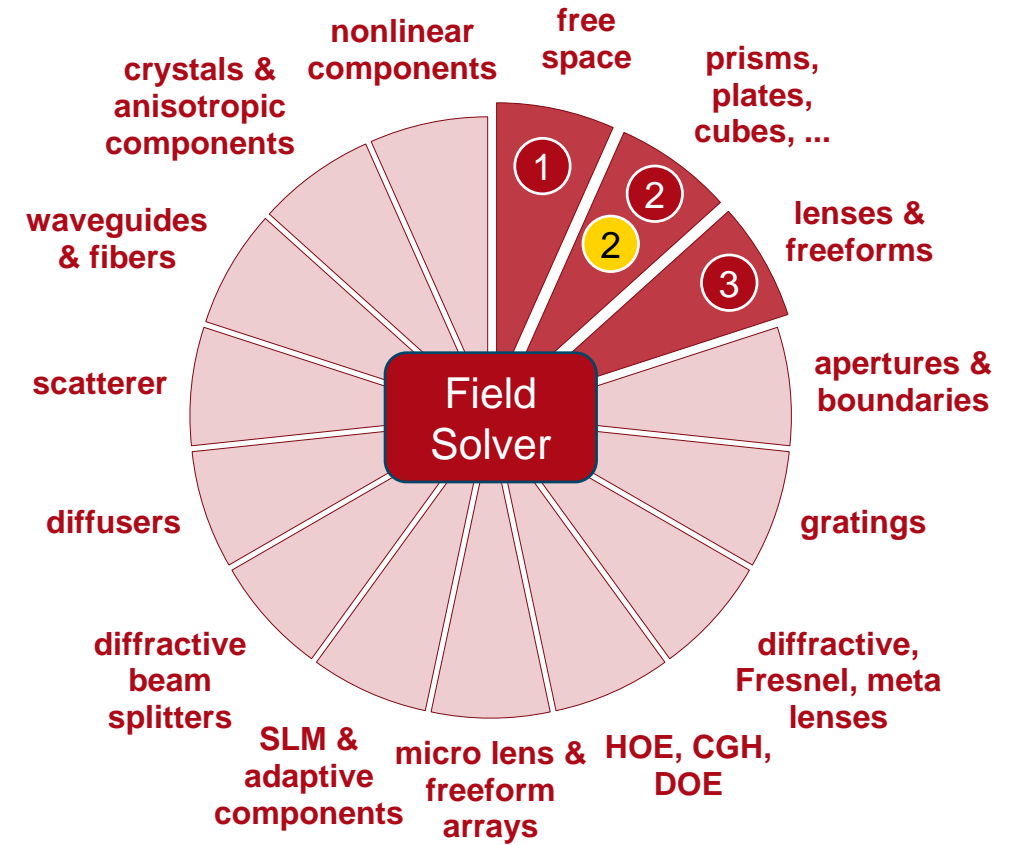
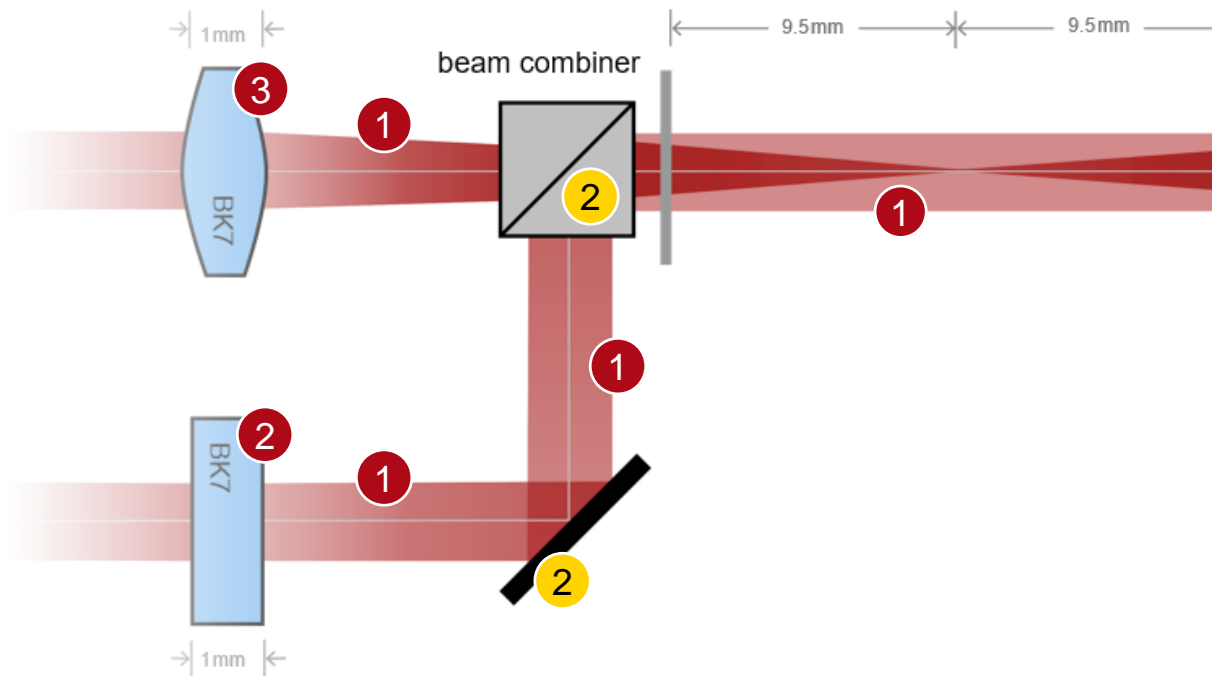
visualization of  
interference fringes at  
selected planes

# 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 Gouy Phase Shift in a Mach-Zehnder Interferometer  |
| document code                   | IFO.0006  |
| version                         | 1.0   |
| toolbox(es)                     | Starter Toolbox (Non-Sequential Extension)  |
| VL version used for simulations | 7.4.0.49  |
| category                        | Application Use Case  |
| further reading                 | <ul style="list-style-type: none"><li>- <a href="#">Mach-Zehnder Interferometer</a></li><li>- <a href="#">Generation of Spatially Varying Polarization by Interference with Polarized Light</a></li></ul> |