



MaxMode: Mask Module



Crosslight MaxMode

- ▶ MaxMode is an upcoming addition to Crosslight simulation toolset
- ▶ MaxMode is a stand-alone full vectorial electromagnetic simulation package, which contains three main solvers:
 - Waveguide solver (1.5D and 2.5D solver)
 - Designed for analyzing optical waveguide structures (such as; Rib waveguide and channel waveguide).
 - Two variants of the solver
 - 1.5D designed for the cylindrical symmetry waveguide
 - 2.5D designed for arbitrary cross-sectional waveguide
 - Cavity Solver (2.5D and 3D solver)
 - Designed for analyzing optical cavity structures
 - Two variants of the solver
 - 2.5D solver: for the cylindrical cross-sectional cavity
 - 3D Solver: for arbitrary structured cavity (rectangular cavity, PC cavity)
 - Scattering/Propagation Solver (2D and 3D solver)
 - Designed for analyzing light propagation (such as coupler / mask scattering)



Scattering/Propagation Solver

Vectorial Solver

- Based on Maxwell's equations
- Includes all the field polarizations

Based on the Finite Difference Frequency Domain (FDFD) method

$$\nabla \times E = -j\omega\mu H$$

$$\nabla \times H = +j\omega\epsilon E$$

$$\nabla \cdot D = 0$$

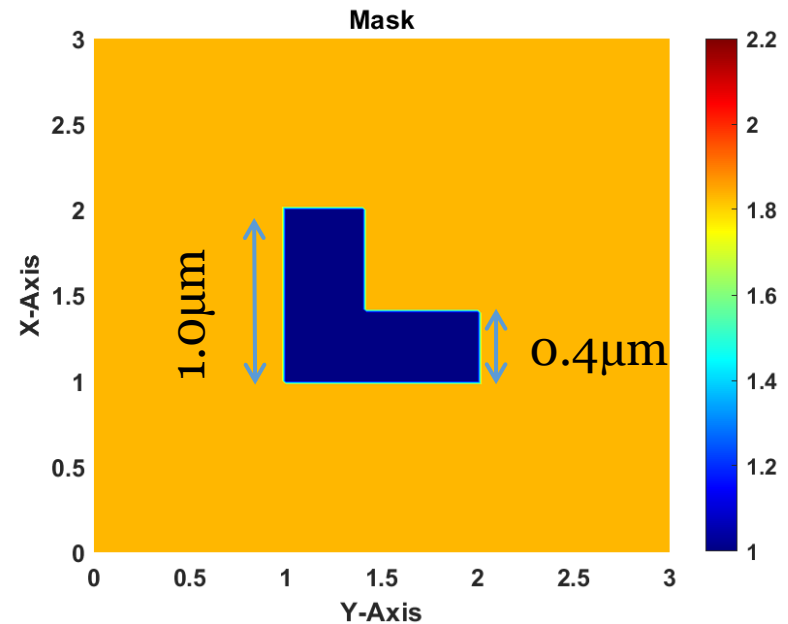
$$\nabla \cdot B = 0$$



Scattering/Propagation Solver

Mask Design

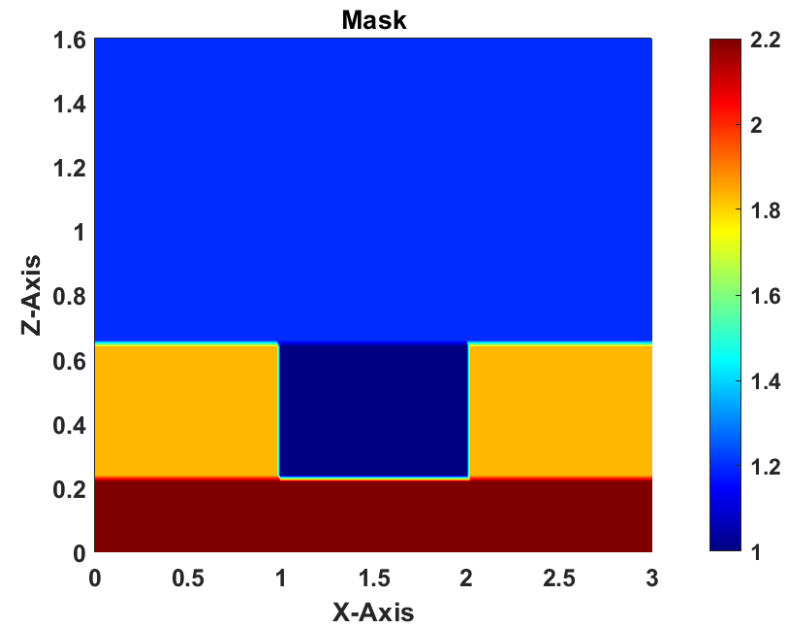
- A simple layout
 - Cross-section view



Scattering/Propagation Solver

Mask Design

- A simple layout
 - Cross-section view
 - Side View
- Light illumination
 - On axis illumination
 - Light wavelength:
 $\lambda=0.4\mu\text{m}$



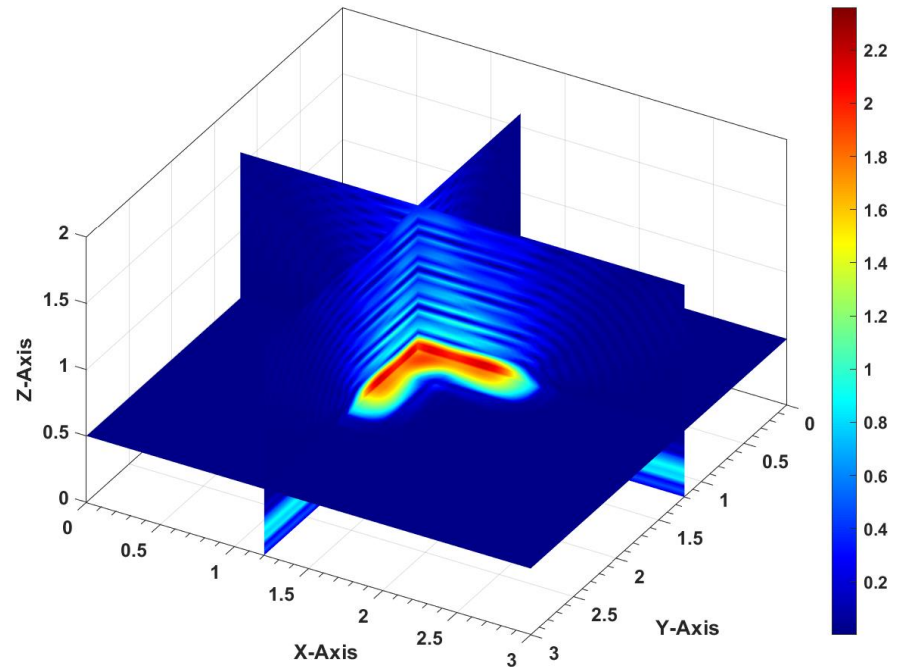
Light: $\lambda=0.4\mu\text{m}$



Scattering/Propagation Solver

Field Analysis

- 3D Field
 - 3D field picture after the mask

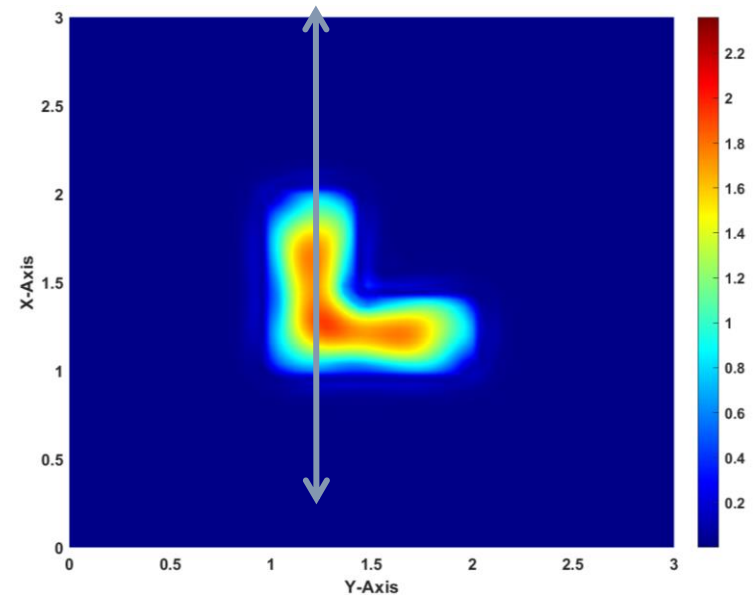


Scattering/Propagation Solver

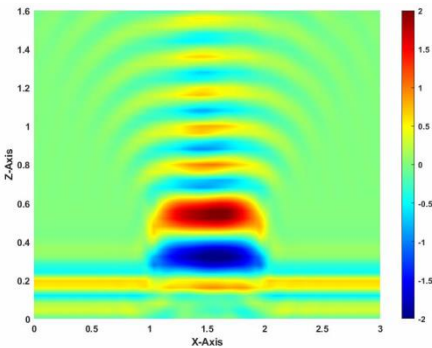
Field Analysis

- 3D Field
 - Cross-sectional Field

Side View plane



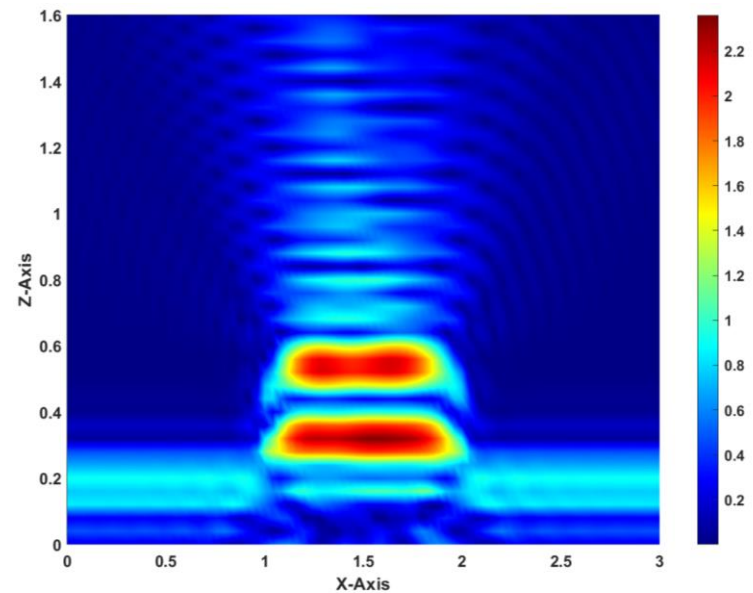
Cross sectional field



Scattering/Propagation Solver

Field Analysis

- 3D Field
 - Cross-sectional Field
 - Side view



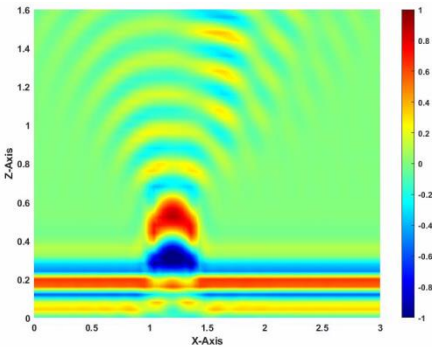
Side View field



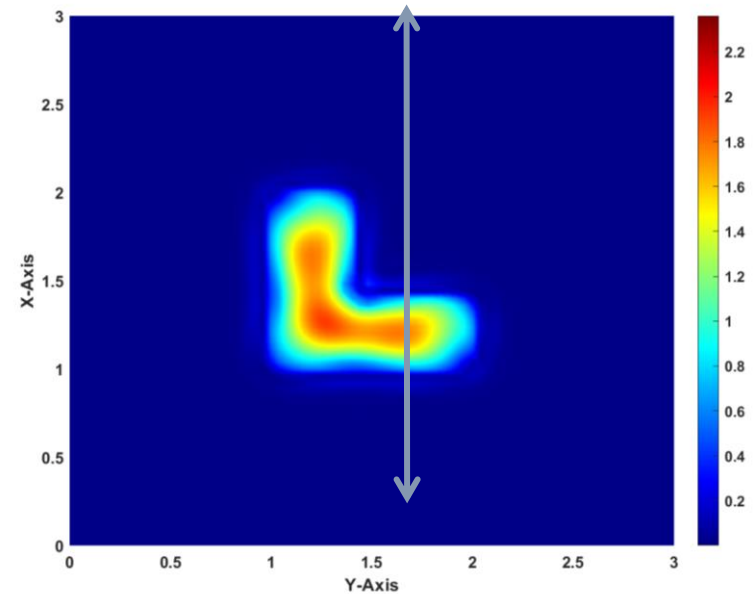
Scattering/Propagation Solver

Field Analysis

- 3D Field
 - Cross-sectional Field



Side View plane



Cross sectional field



Scattering/Propagation Solver

Field Analysis

- 3D Field
 - Cross-sectional Field
 - Side view

