



P&S COMSOL® Design Tool

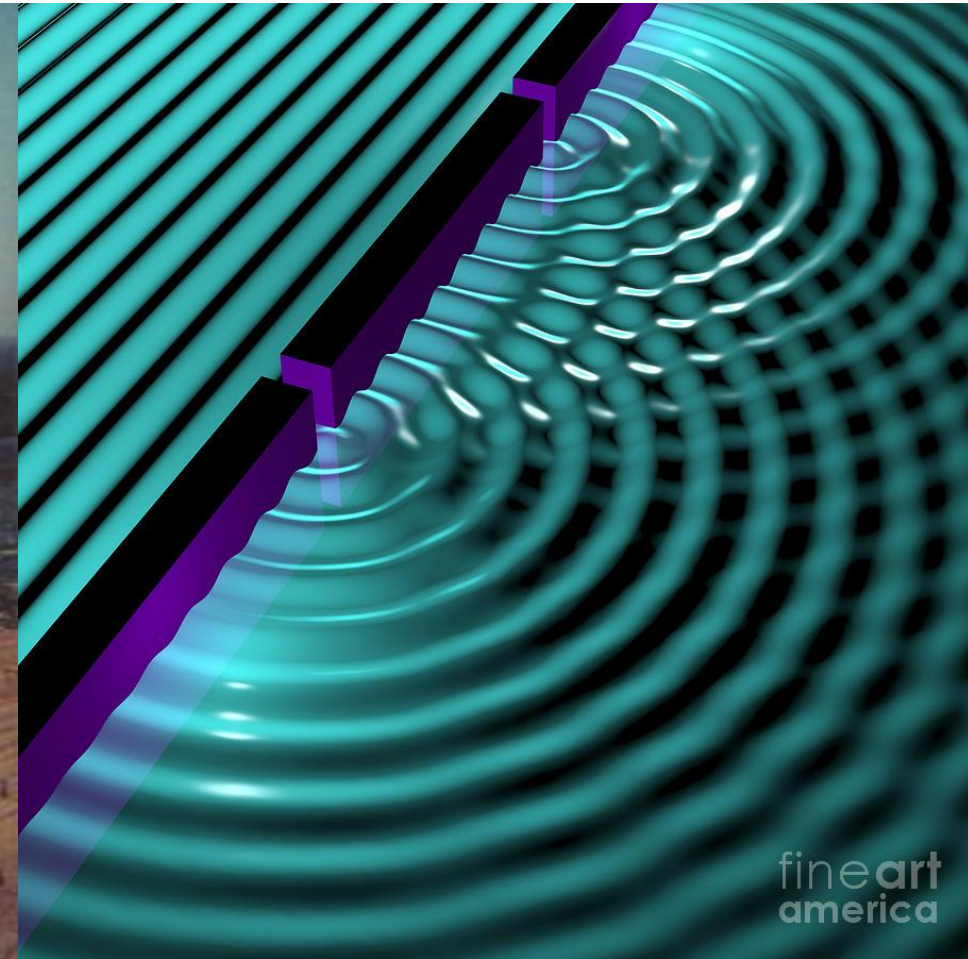
Exercise Week 3: Introduction to COMSOL

Yannik Horst, Manuel Kohli, Raphael Schwanninger

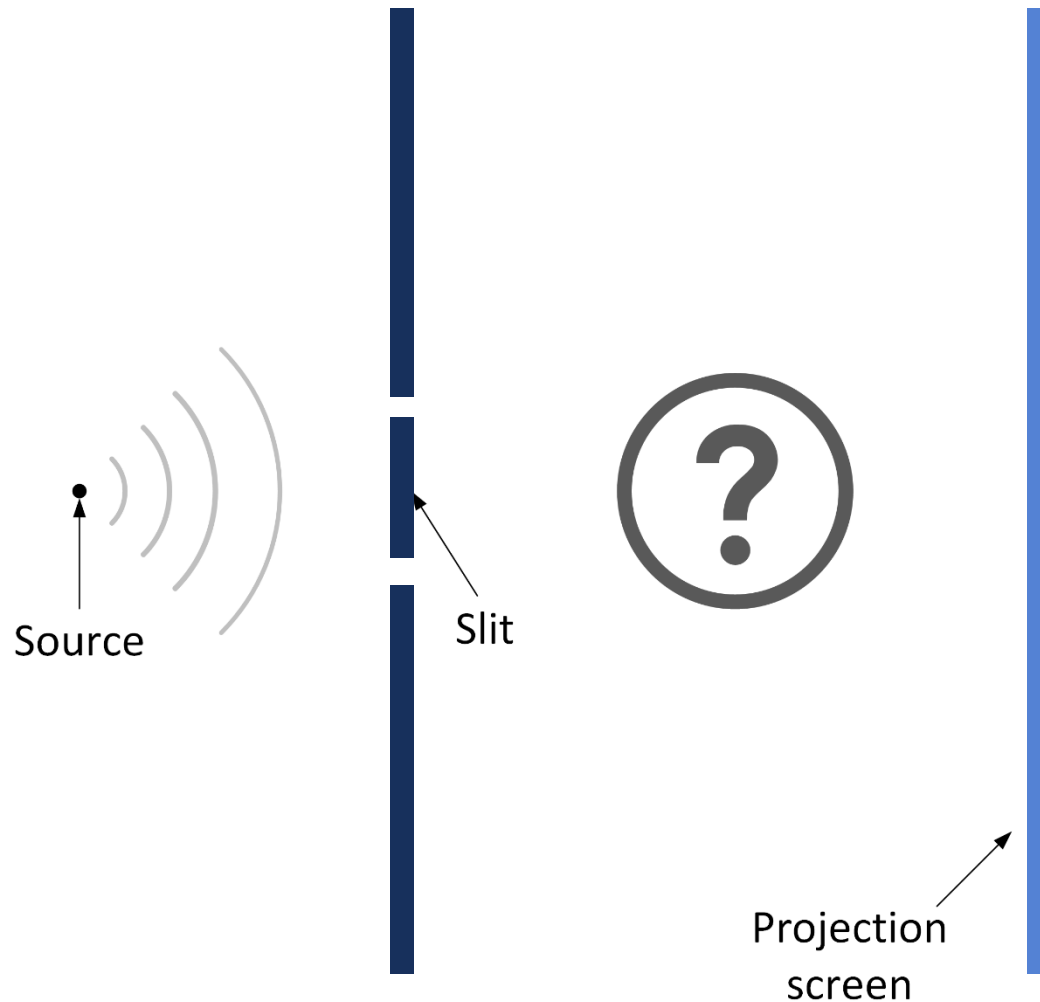
Content

- Tutorial 3: Young's Slit Experiments
 - Single slit
 - Theory
 - Simulation
 - Double slit
 - Theory
 - Simulation

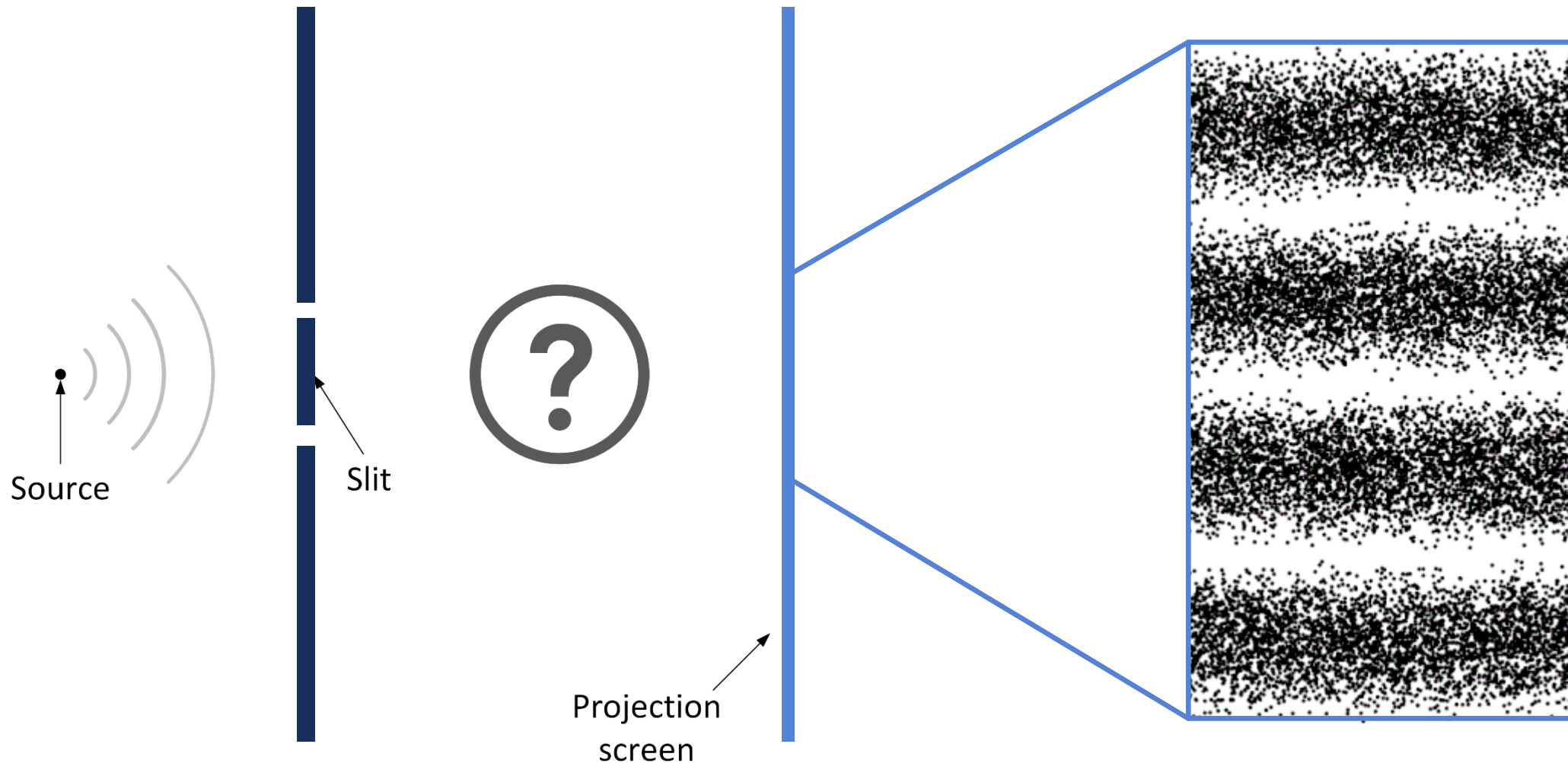
Young's Slit Experiment: Single Slit



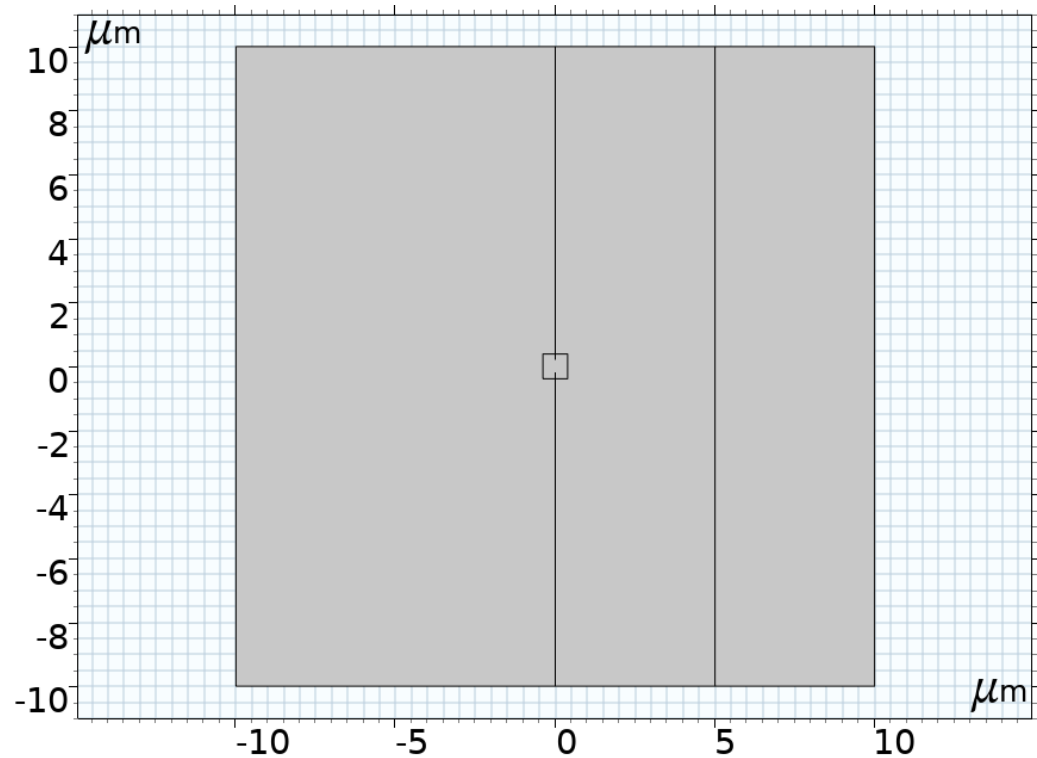
Young's Slit Experiment: Single Slit



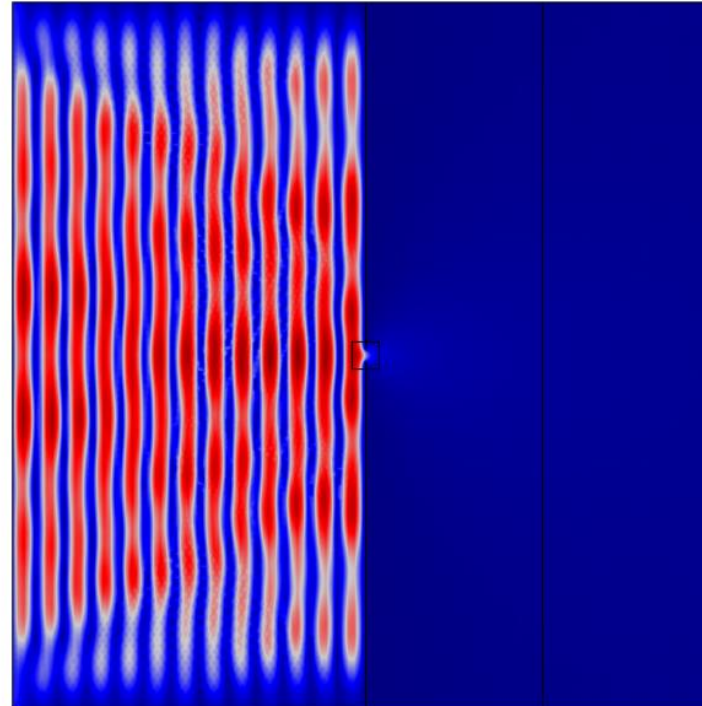
Young's Slit Experiment: Single Slit



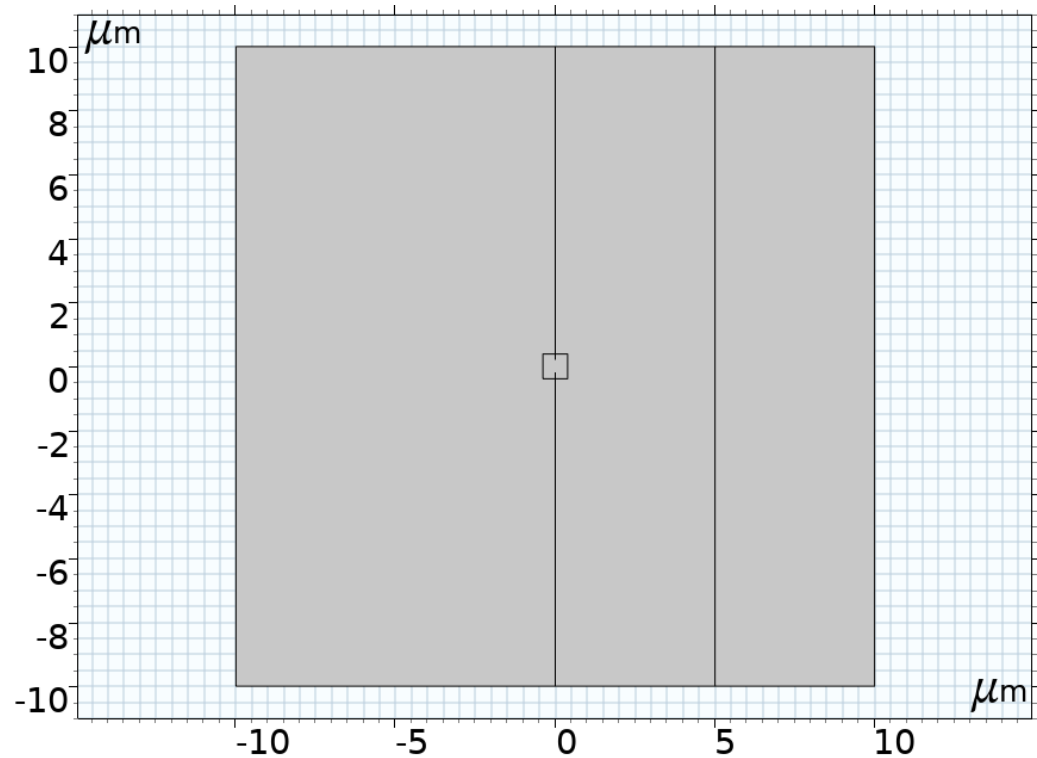
Single Slit Plane Wave



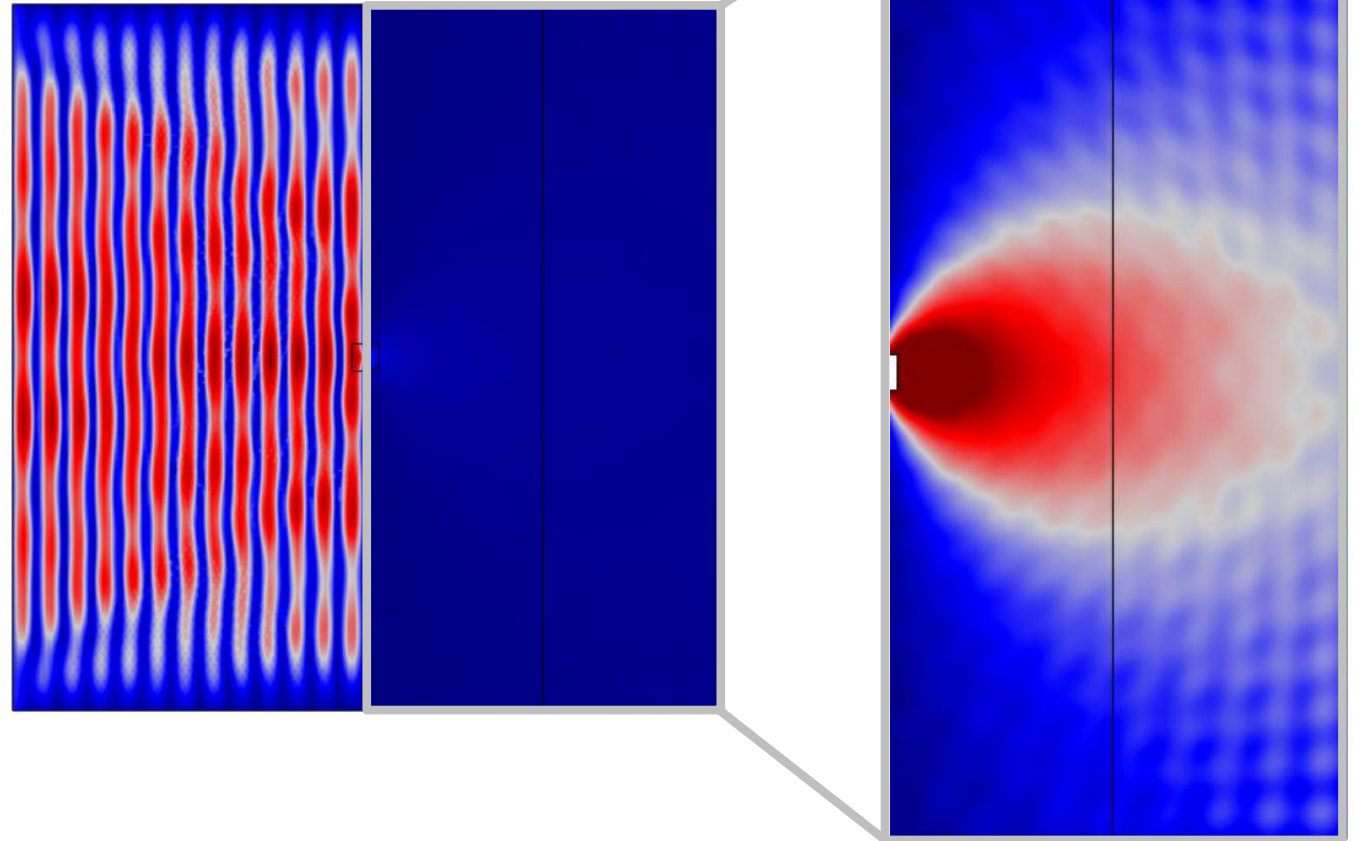
Normalized E -Field



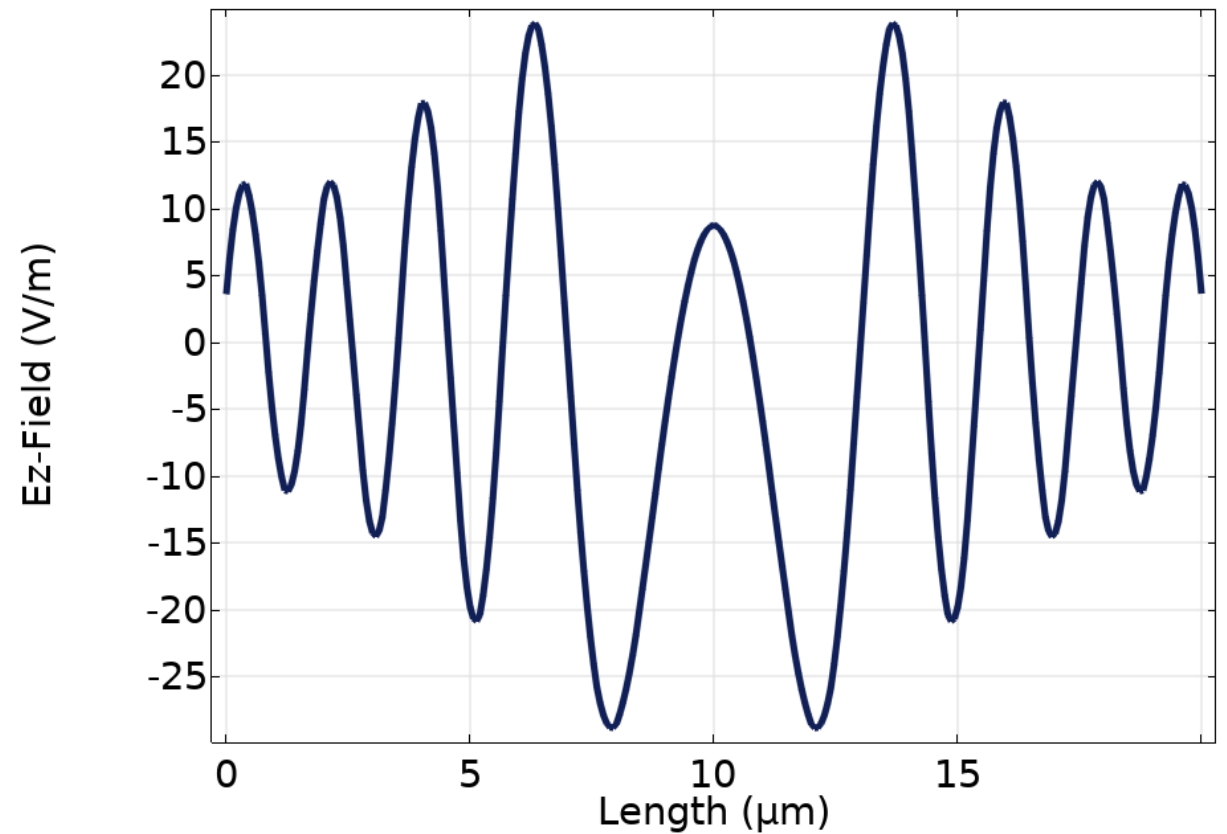
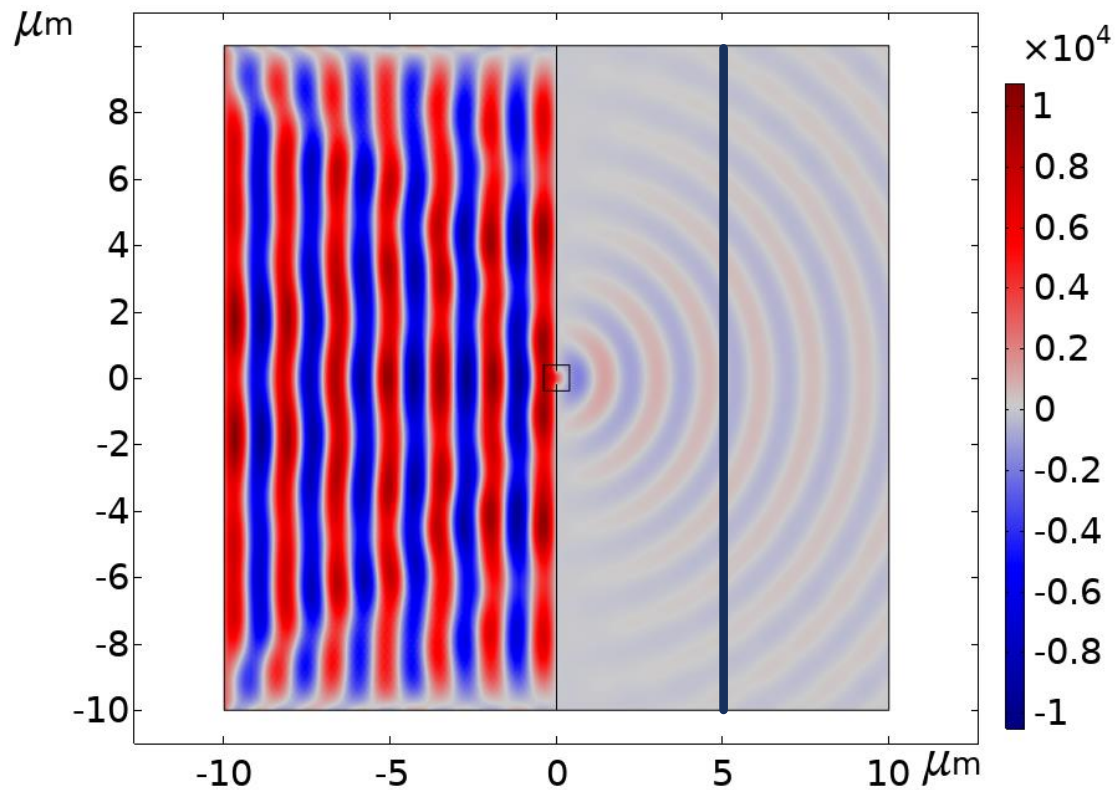
Single Slit Plane Wave



Normalized E -Field

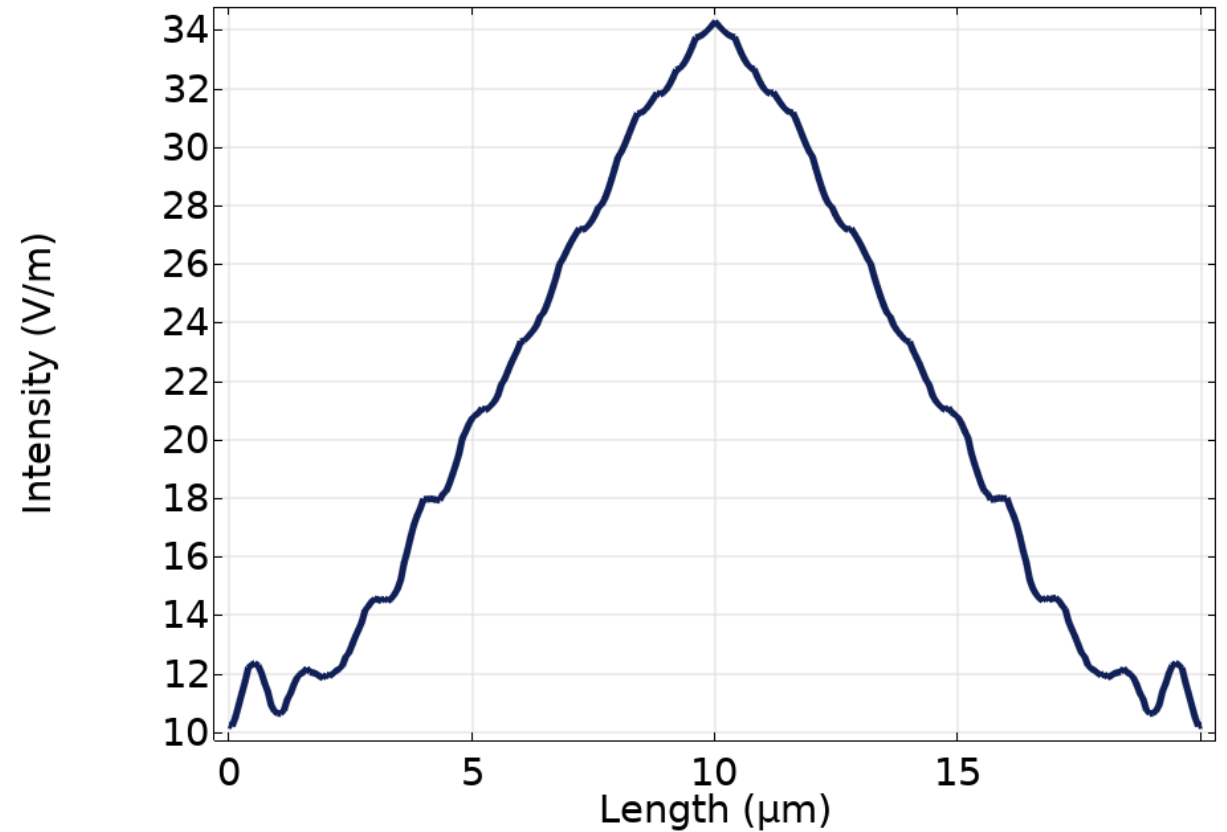
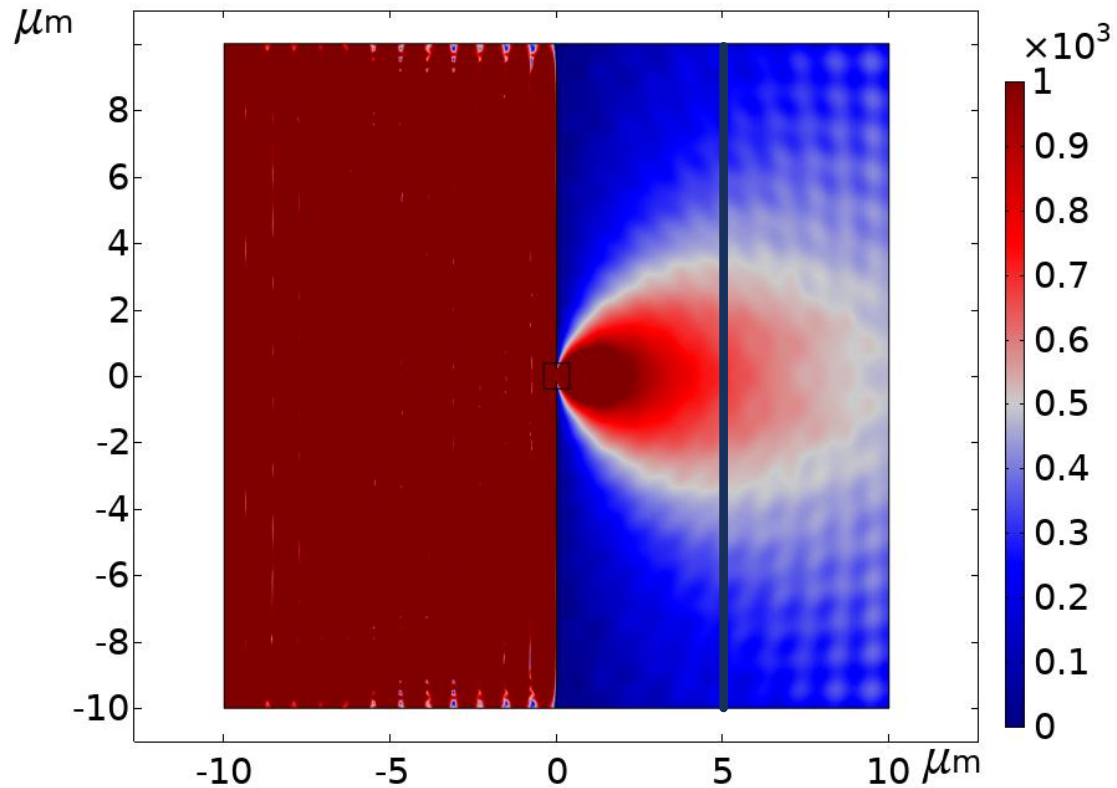


Single Slit Plane Wave

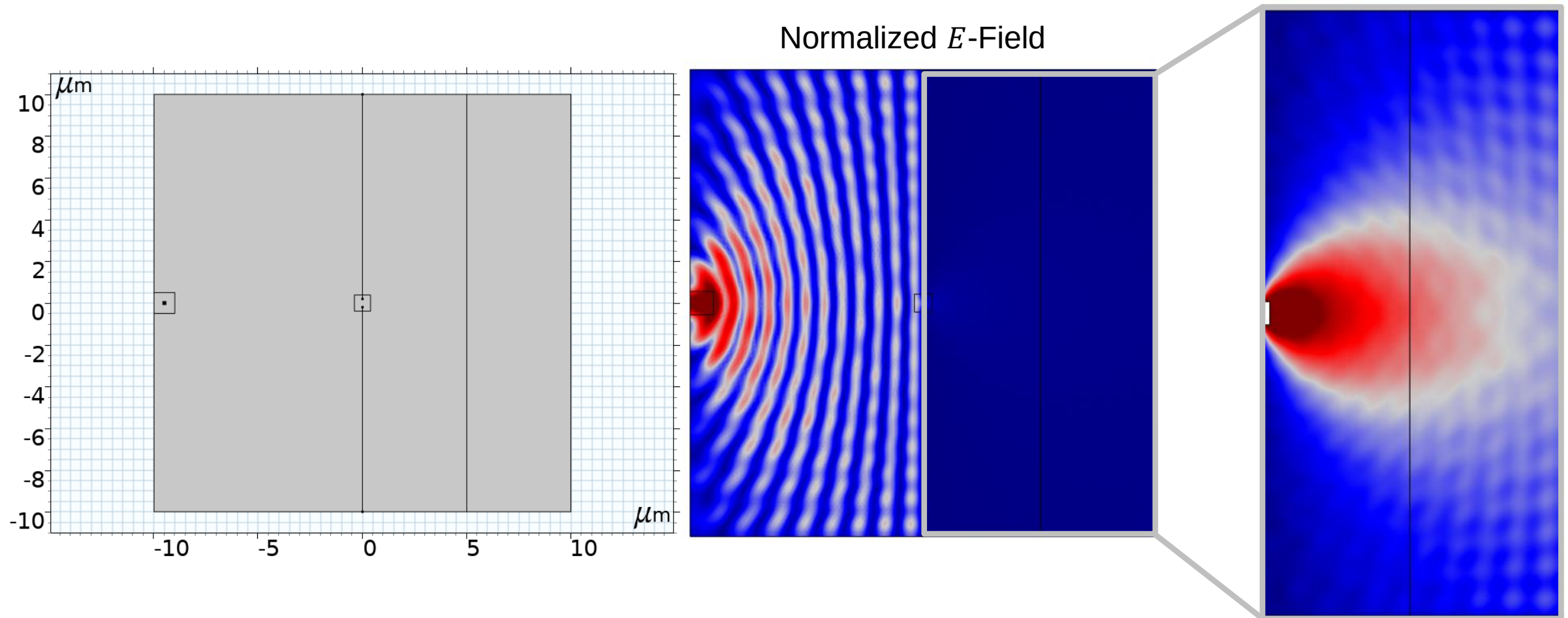
 E_z -Field

Single Slit Plane Wave

Intensity: $\sqrt{|E_z|^2}$

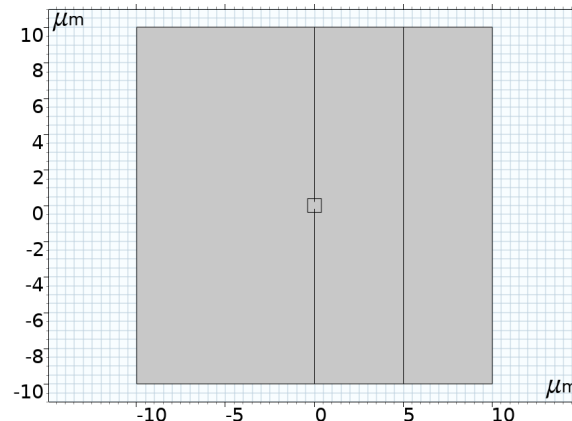


Single Slit Point Source

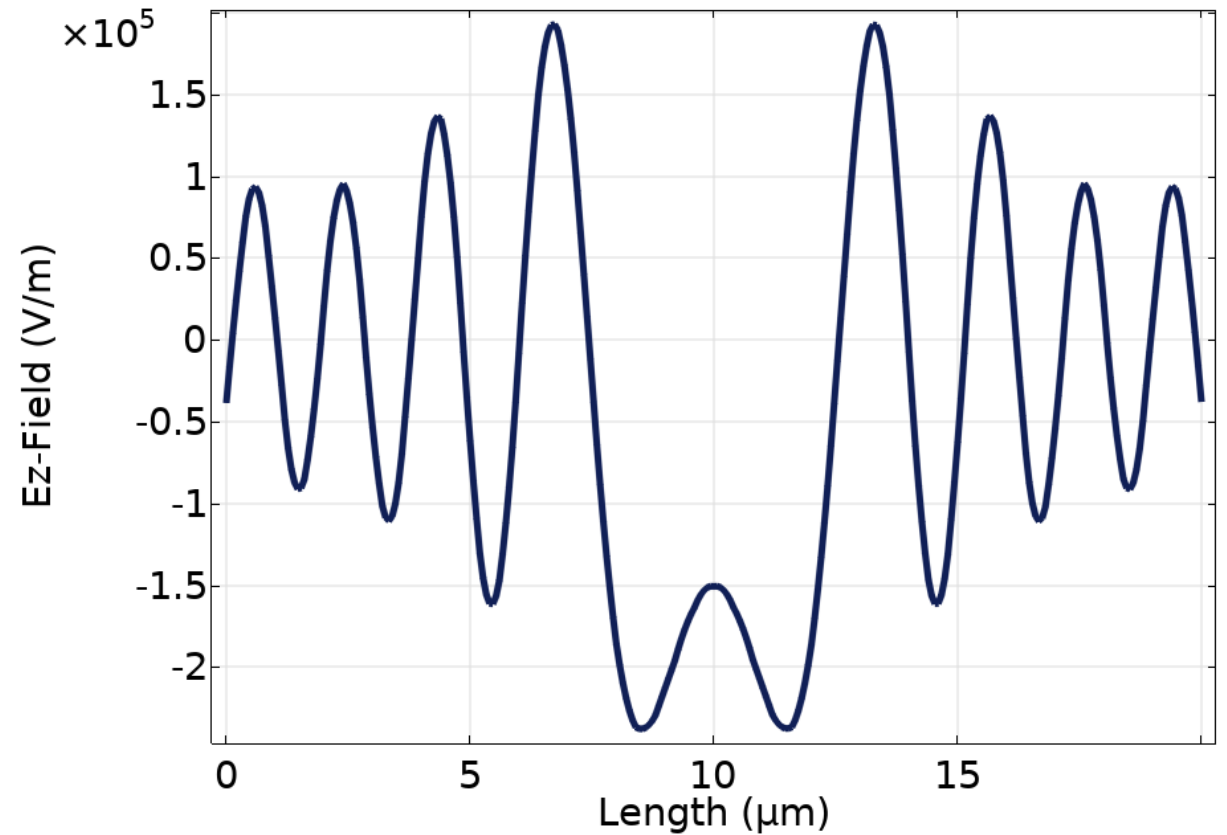
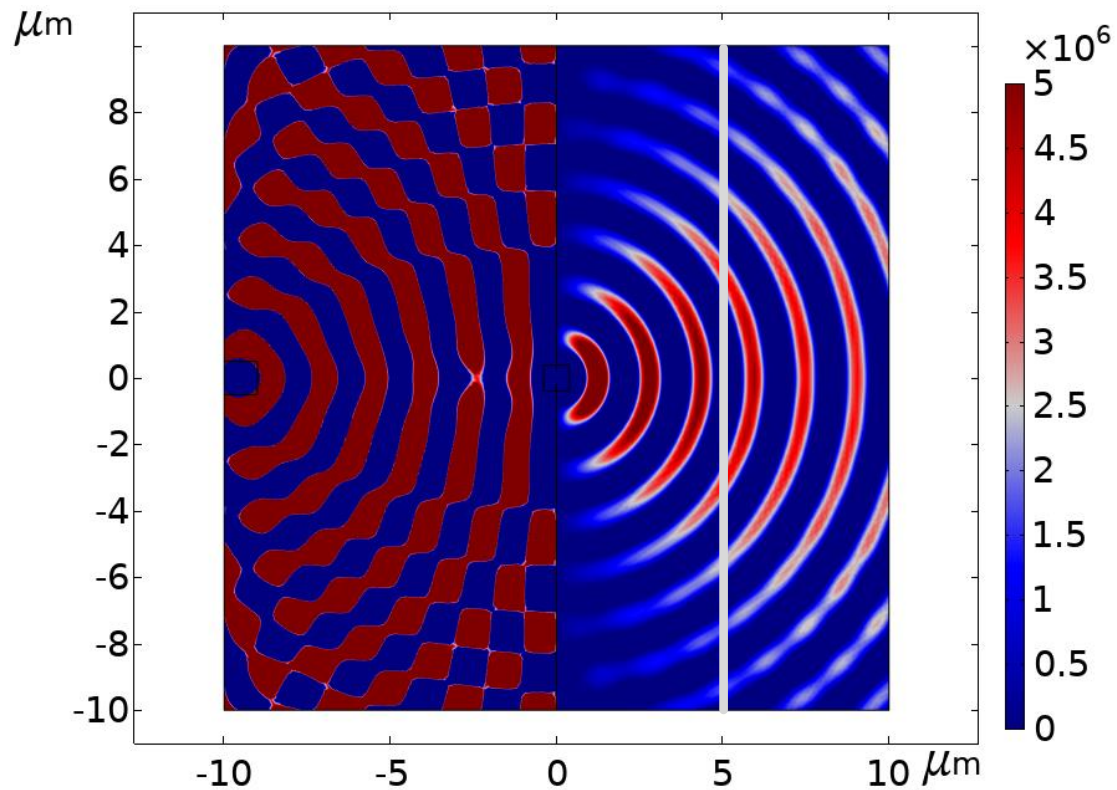


Single Slit Plane Wave

domain_x	20[um]	2E-5 m	length domain
domain_y	20[um]	2E-5 m	width domain
lam0	1550[nm]	1.55E-6 m	wavelength
f0	c_const/lam0	1.9341E14 1/s	frequency
slit_width	lam0/4	3.875E-7 m	slit width
sep	5[um]	5E-6 m	seperation
screen	5[um]	5E-6 m	location of screen
source_x	-9.5[um]	-9.5E-6 m	location of point source
source_box	1[um]	1E-6 m	mesh refinement point source

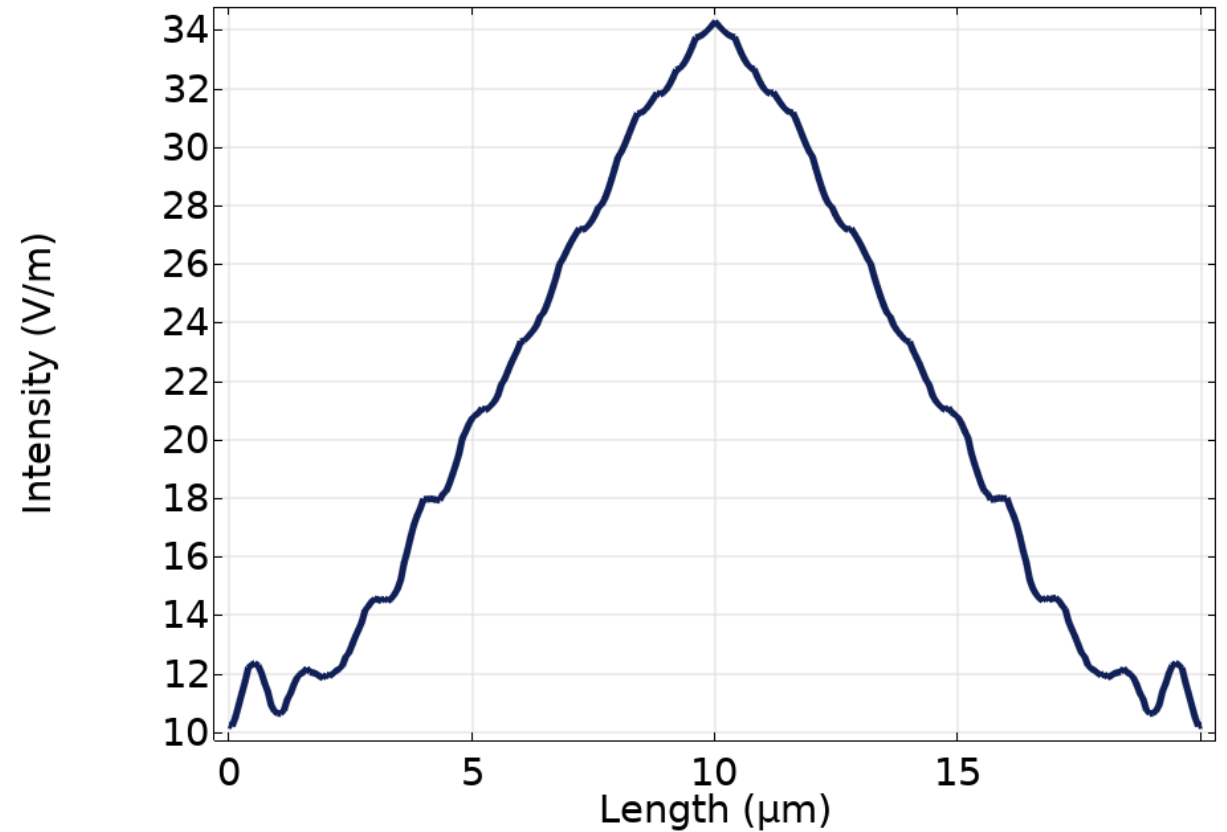
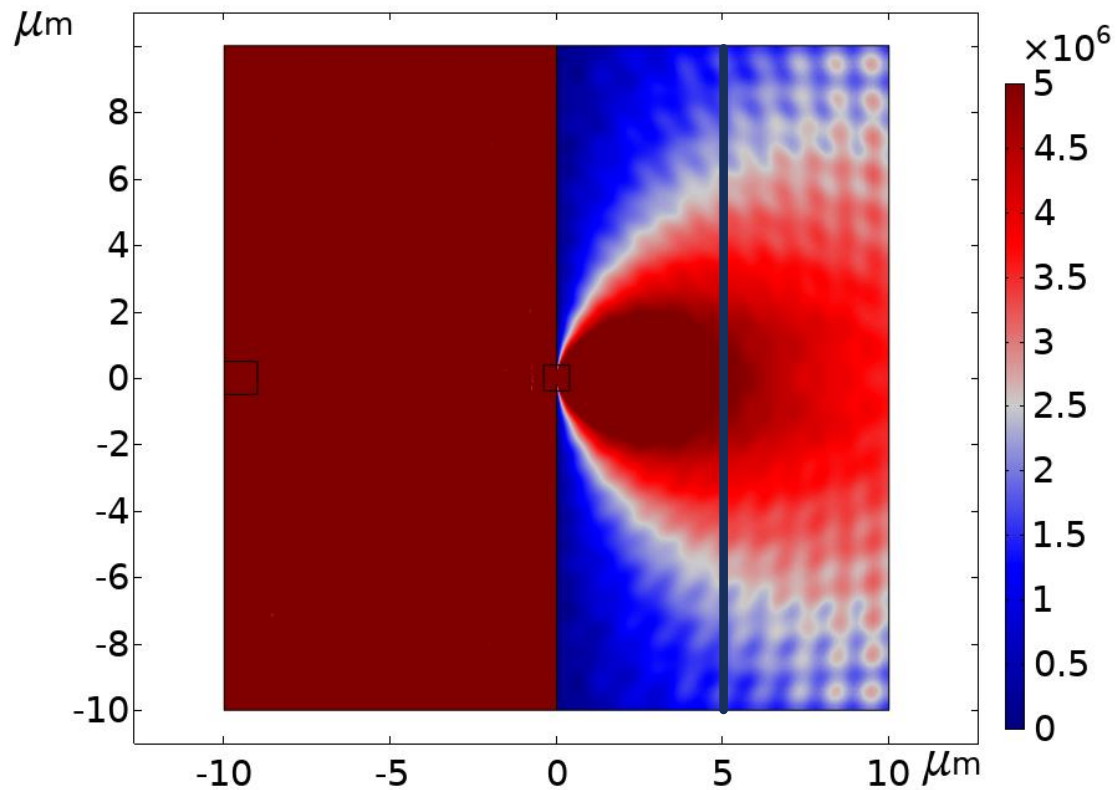


Single Slit Plane Wave

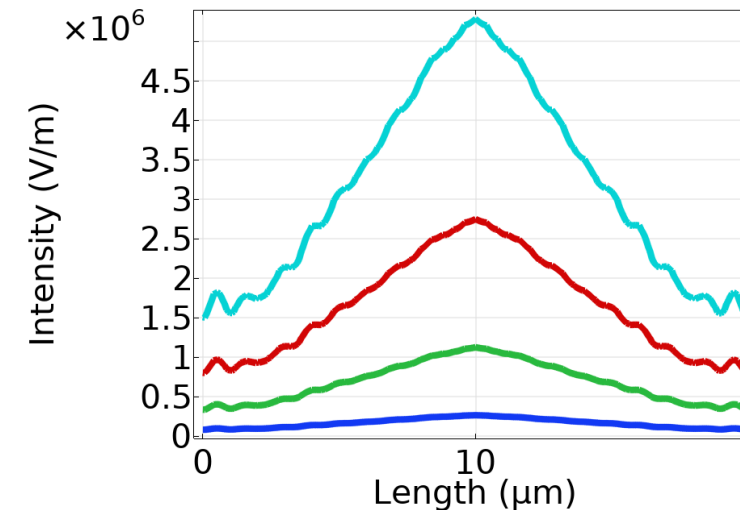
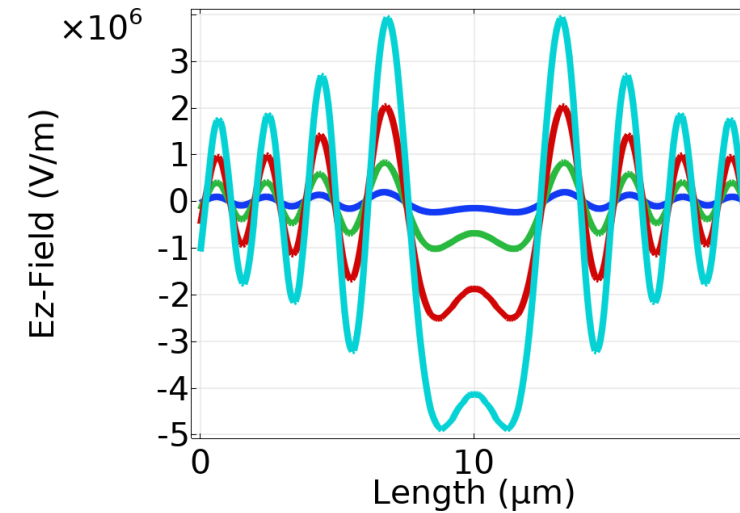
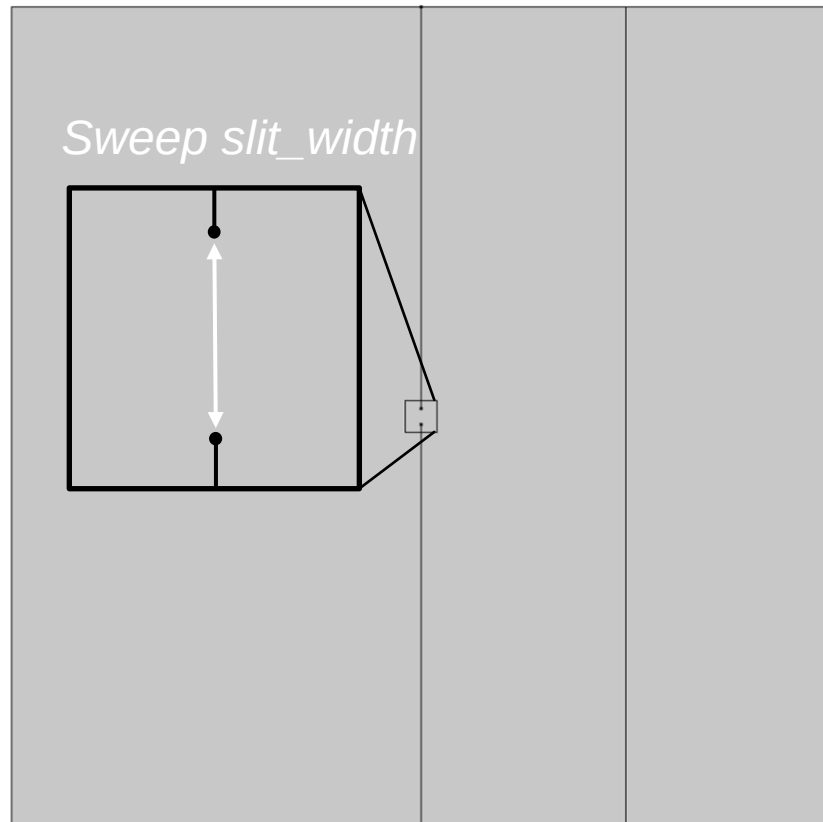
 E_z -Field

Single Slit Plane Wave

Intensity: $\sqrt{|E_z|^2}$



Young's Slit Experiment: Single Slit – Parametric Sweep Results

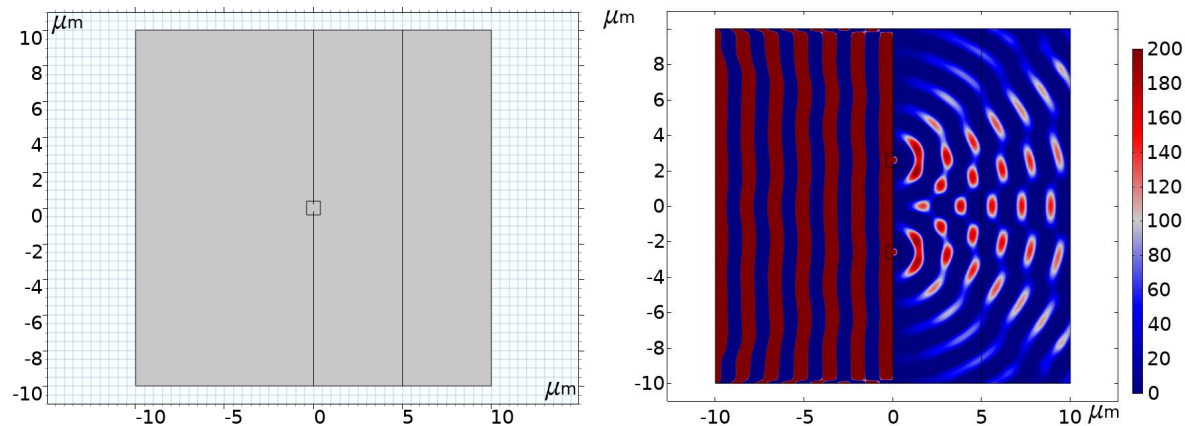


Young's Slit Experiment: Single Slit – Parametric Sweep Results

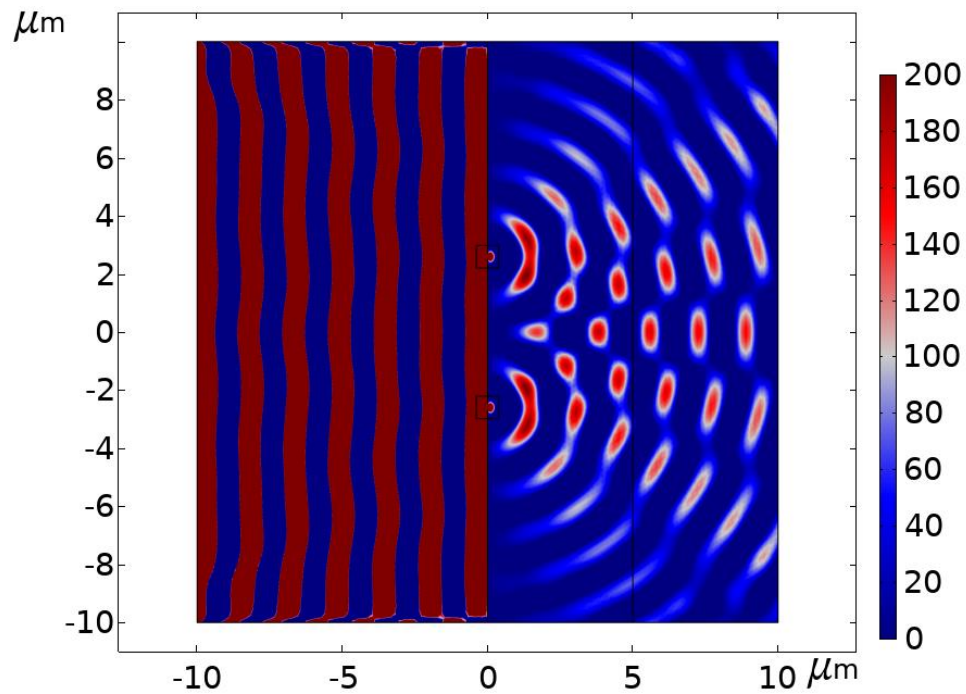
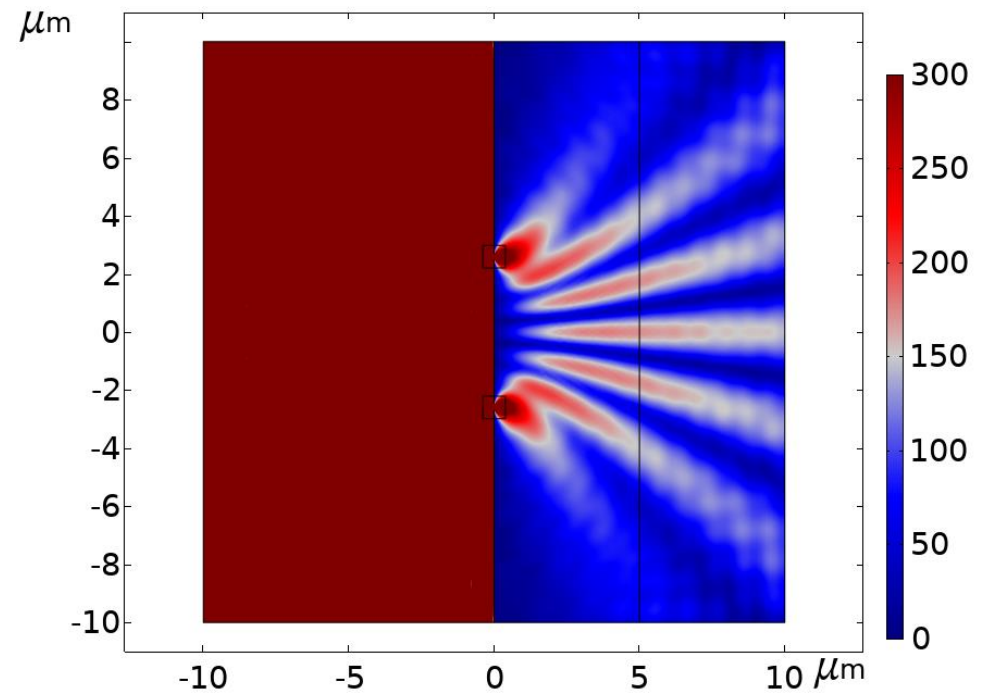
Let's take a look at COMSOL

Single Slit Plane Wave

domain_x	20[um]	2E-5 m	length domain
domain_y	20[um]	2E-5 m	width domain
lam0	1550[nm]	1.55E-6 m	wavelength
f0	c_const/lam0	1.9341E14 1/s	frequency
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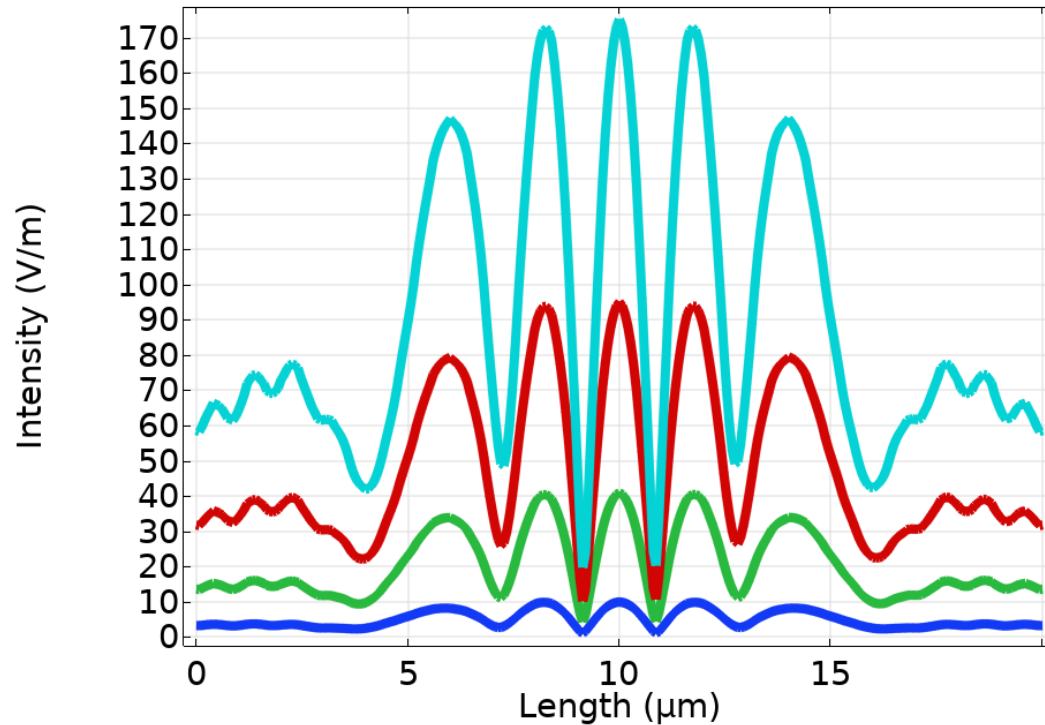


Young's Slit Experiment: Double Slit – Theory

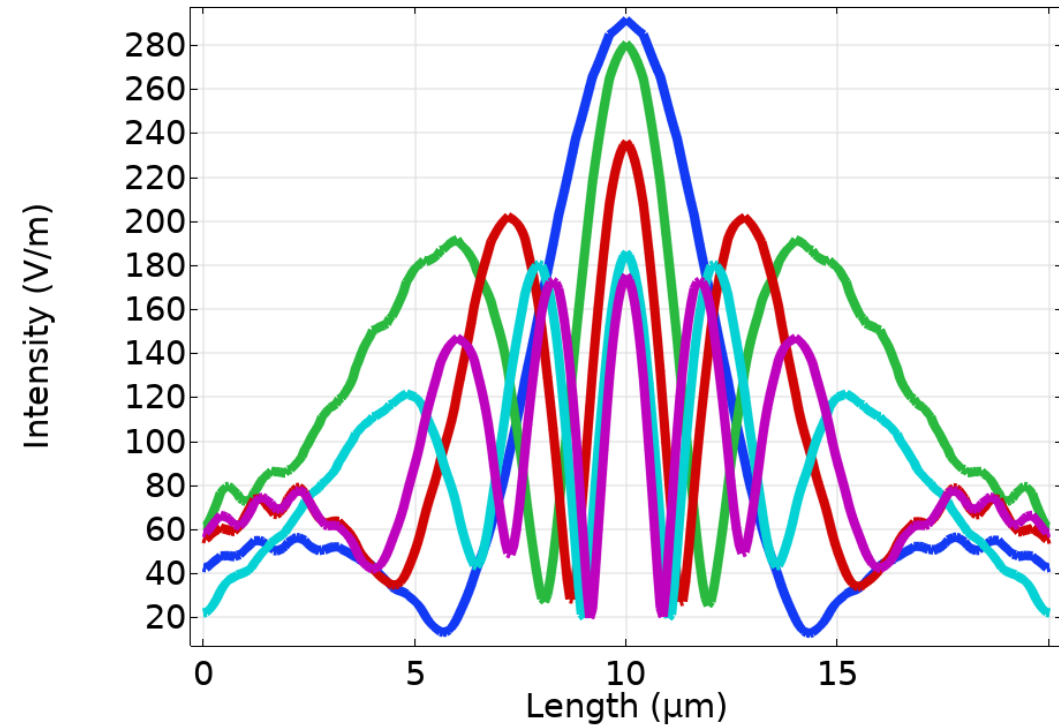
 E_z -FieldIntensity: $\sqrt{|E_z|^2}$ 

Young's Slit Experiment: Double Slit – Theory

Gapsweep $\left(\frac{\lambda m_0}{16} \rightarrow \frac{\lambda m_0}{4}\right)$, step: $\left(\frac{\lambda m_0}{16}\right)$

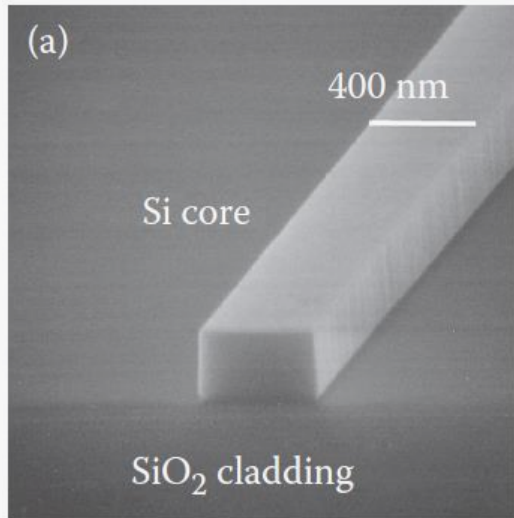


Separation Sweep $1 \rightarrow 5 \mu\text{m}$, step: $1 \mu\text{m}$

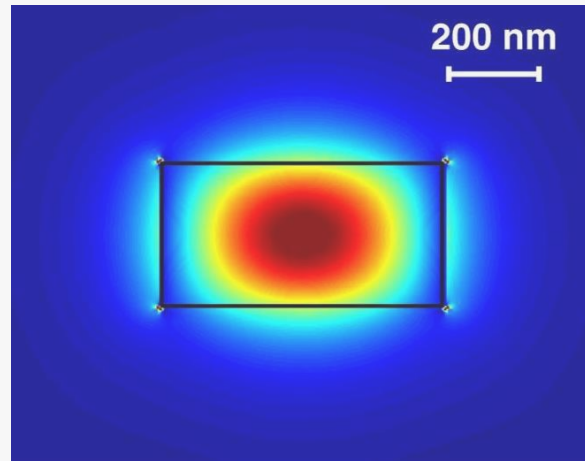


Next Week

Photonic Waveguide



Mode Analysis



Photonic Integrated Circuits

