

# Edge Coupler

Moisés de Araújo Oliveira

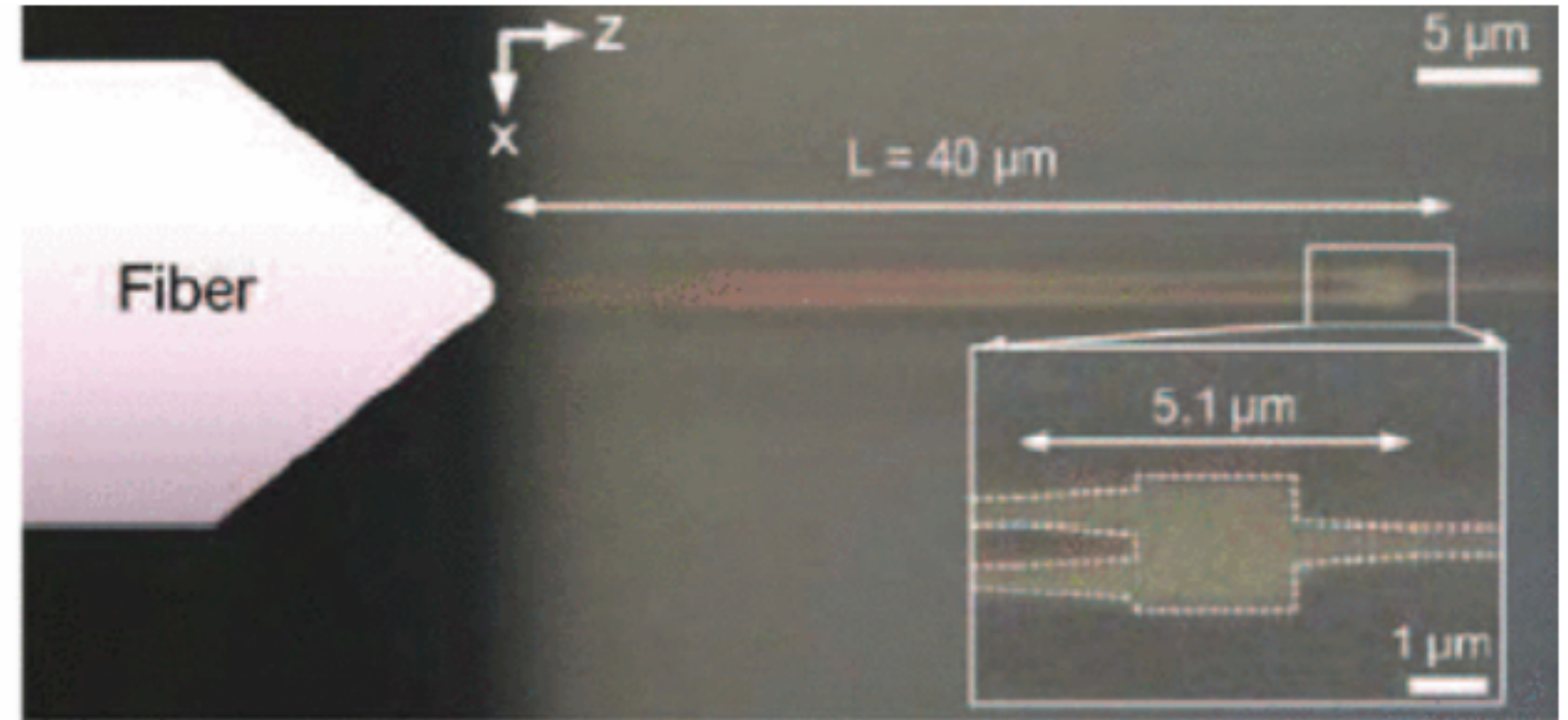
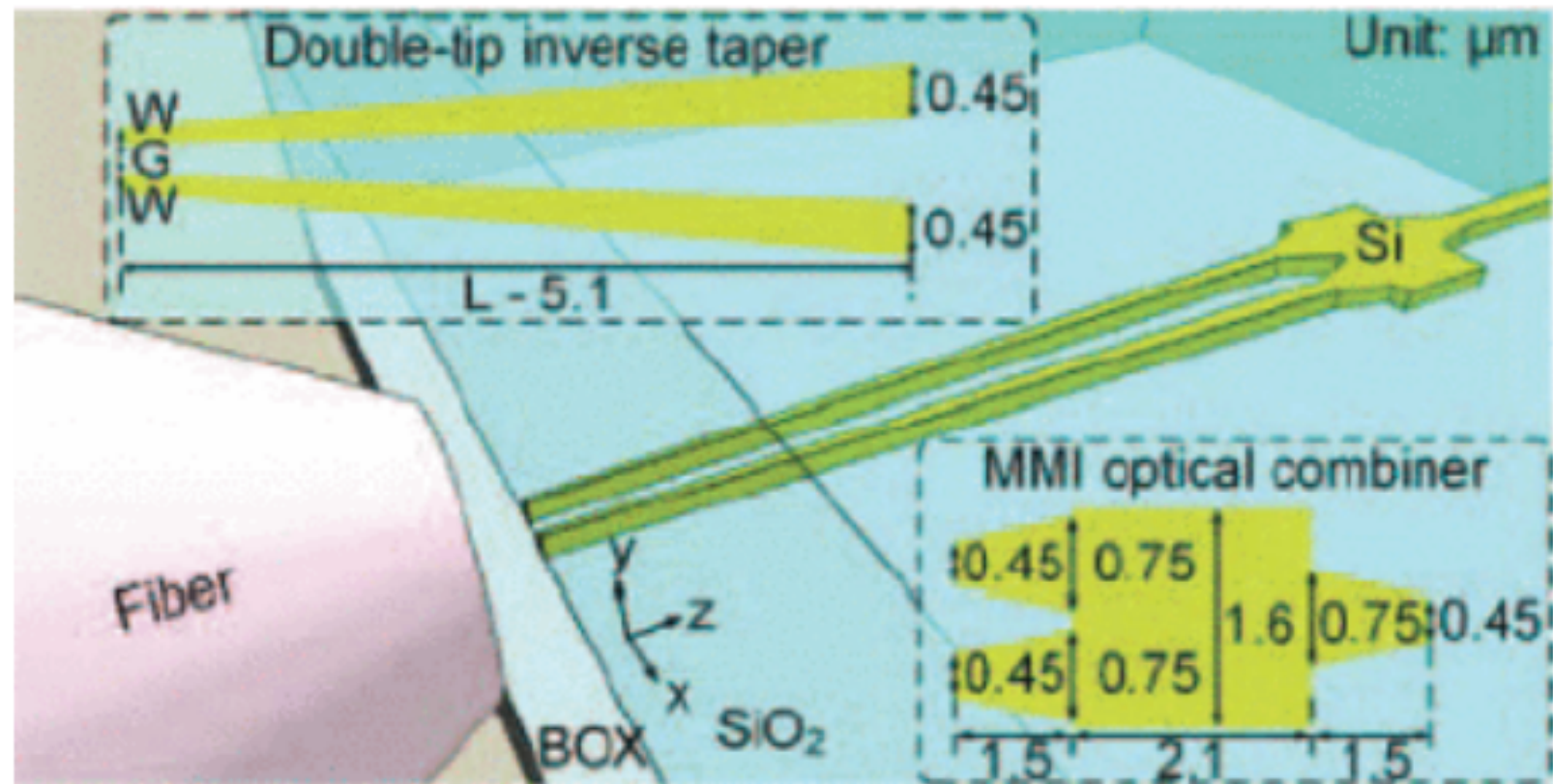
# Referência

J. Wang et al., "Low-loss and misalignment-tolerant fiber-to-chip edge coupler based on double-tip inverse tapers," 2016 Optical Fiber Communications Conference and Exhibition (OFC), Anaheim, CA, USA, 2016, pp. 1–3.

# Double-tip Inverse Taper

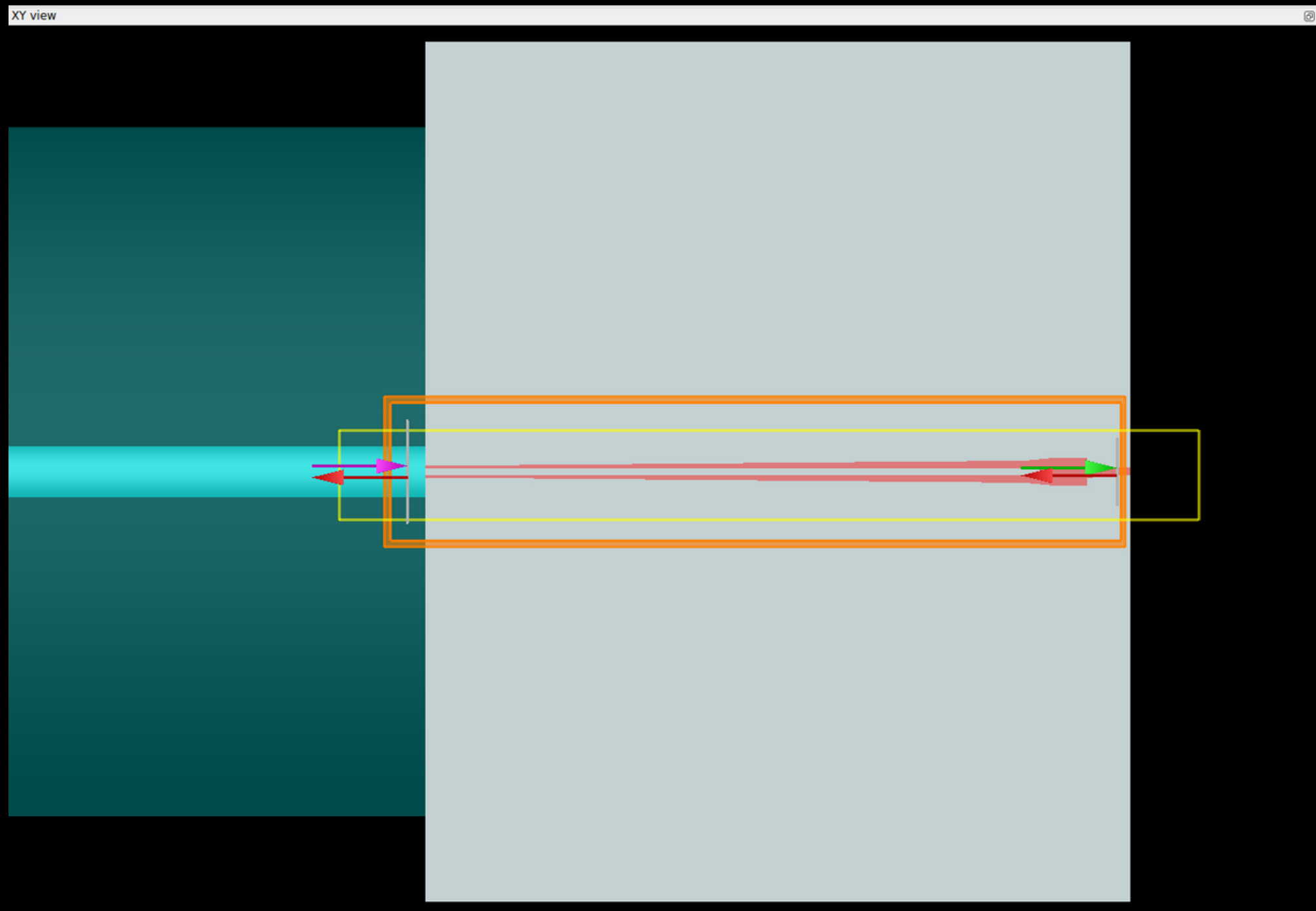
- maior grau de liberdade para design
- maior coeficiente de acoplamento
- tolerância ao desalinhamento
-

# Design



semana 1

# Design – FDTD



# FDTD SETTINGS

name

General Geometry Mesh settings Boundary conditions Advanced options

dimension

simulation time (fs)

simulation temperature (K)

background material

index

name

General Geometry Mesh settings Boundary conditions Advanced options

PML settings

x min bc

x max bc

y min bc

y max bc

z min bc

z max bc

☐ allow symmetry on all boundaries

type

☒ same settings on all boundaries

profile	standard
layers	8
kappa	2
sigma	1
polynomial	3
alpha	0
alpha polynomial	1
min layers	8
max layers	64

☒ extend structure through pml

☐ auto scale pml parameters

Bloch boundary conditions

☒ set based on source angle

bloch units

kx

ky

kz

name

General Geometry Mesh settings Boundary conditions Advanced options

x ( $\mu\text{m}$ )  x min ( $\mu\text{m}$ )

x span ( $\mu\text{m}$ )  x max ( $\mu\text{m}$ )

y ( $\mu\text{m}$ )  y min ( $\mu\text{m}$ )

y span ( $\mu\text{m}$ )  y max ( $\mu\text{m}$ )

z ( $\mu\text{m}$ )  z min ( $\mu\text{m}$ )

z span ( $\mu\text{m}$ )  z max ( $\mu\text{m}$ )

General Geometry Mesh settings Boundary conditions Advanced options

mesh type

Mesh accuracy

mesh accuracy

High accuracy.  
Please check memory requirements before running simulations.

Time step

dt stability factor

dt (fs)

Minimum mesh step settings

min mesh step ( $\mu\text{m}$ )

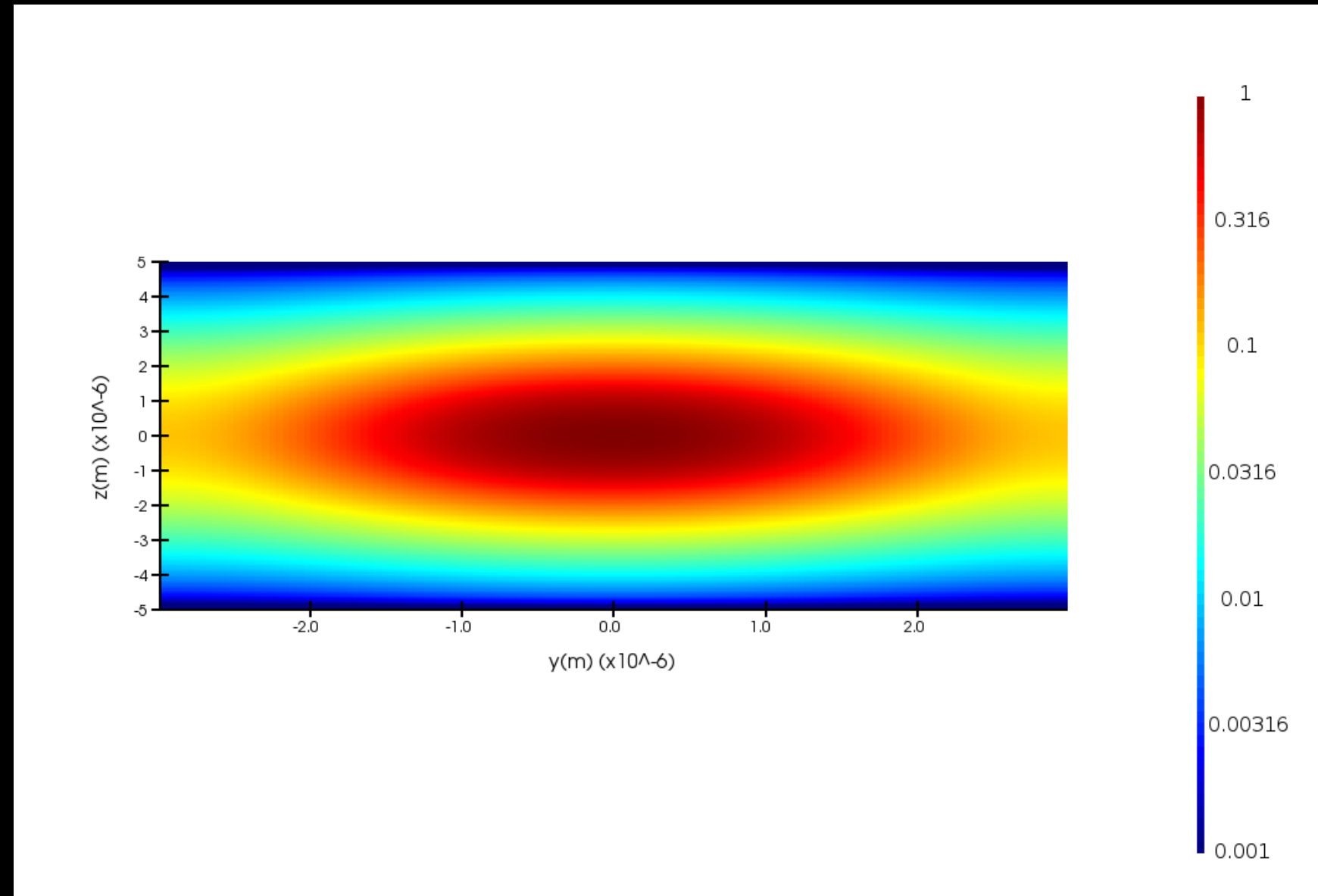
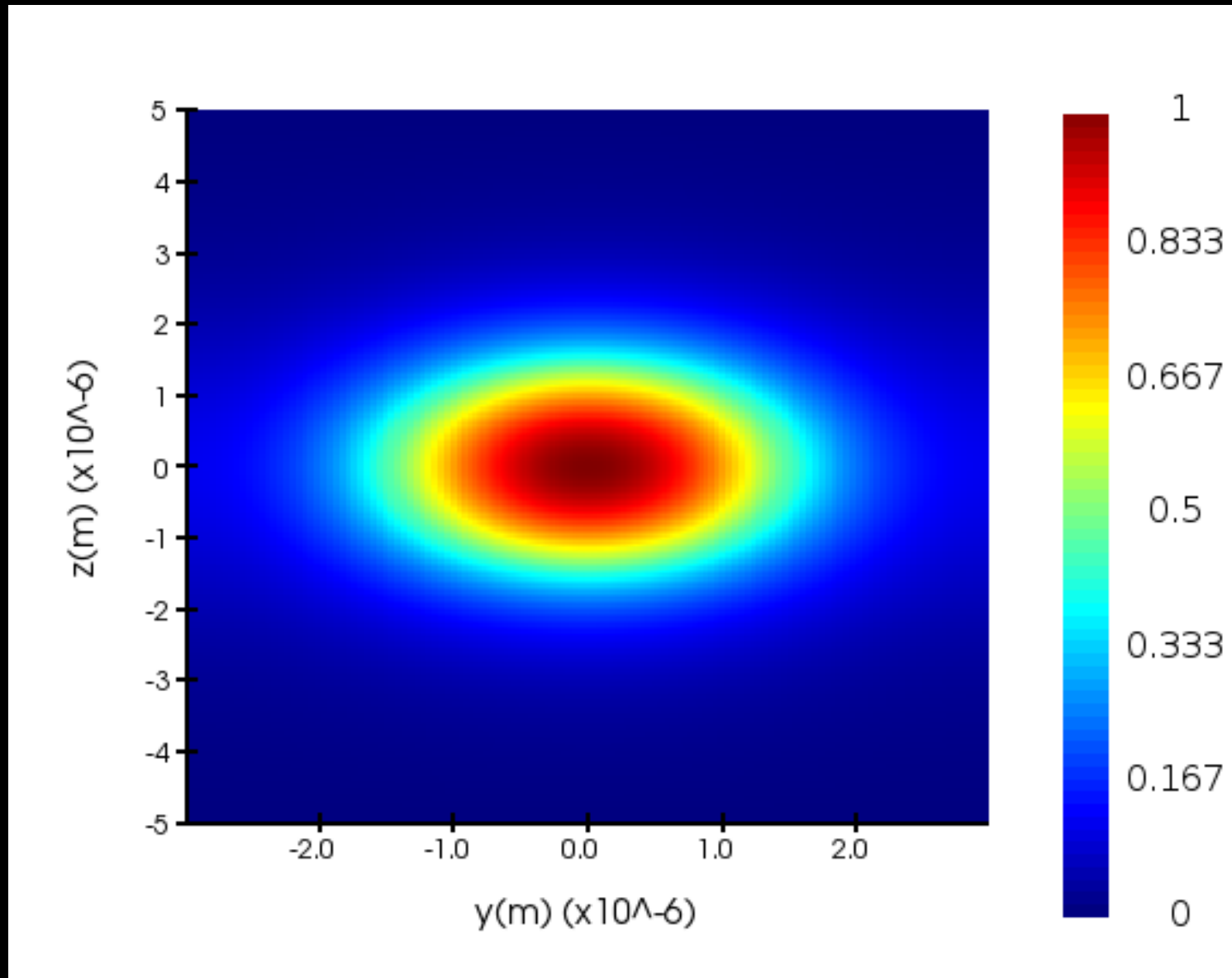
Mesh refinement

mesh refinement

[How do I choose?](#)



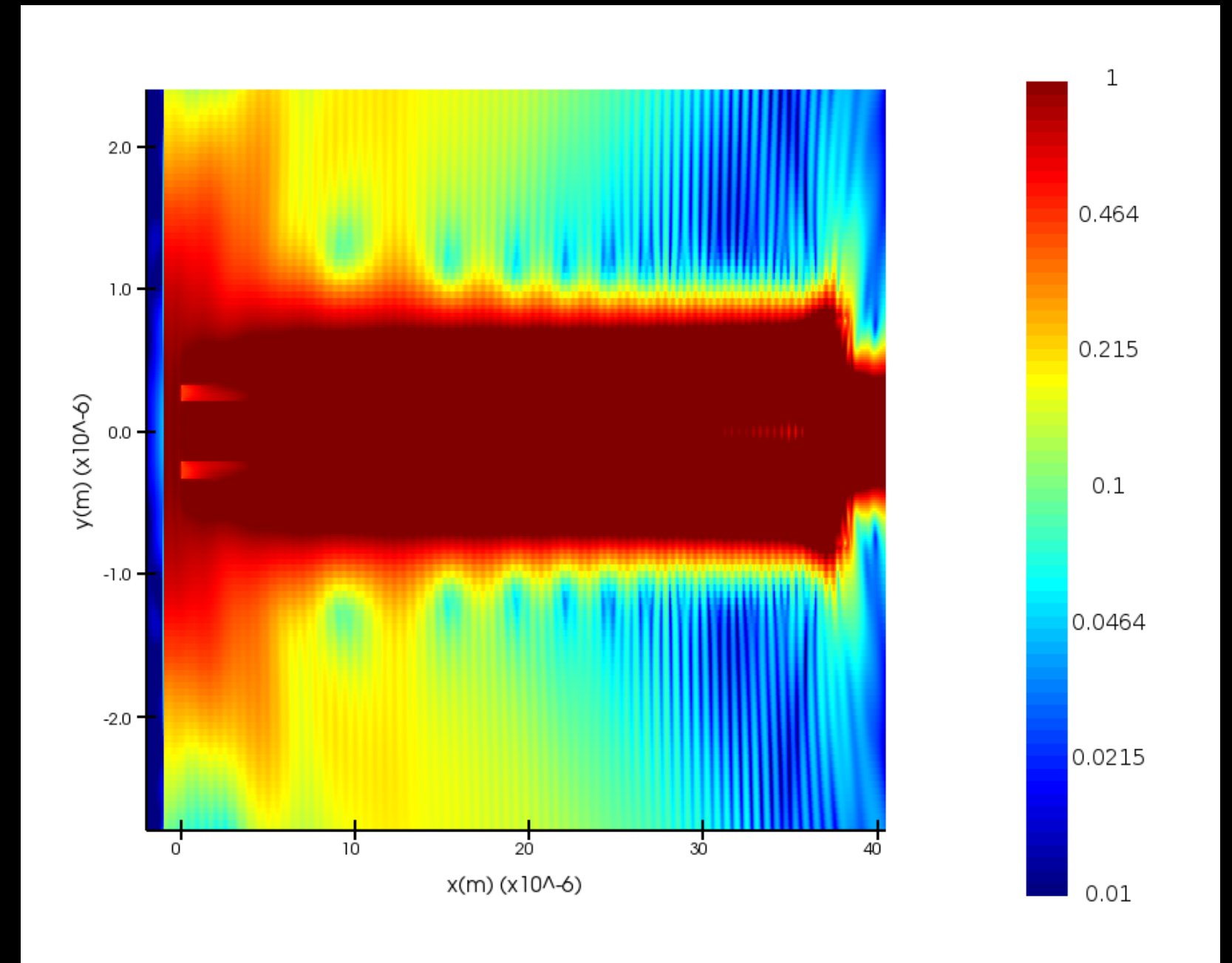
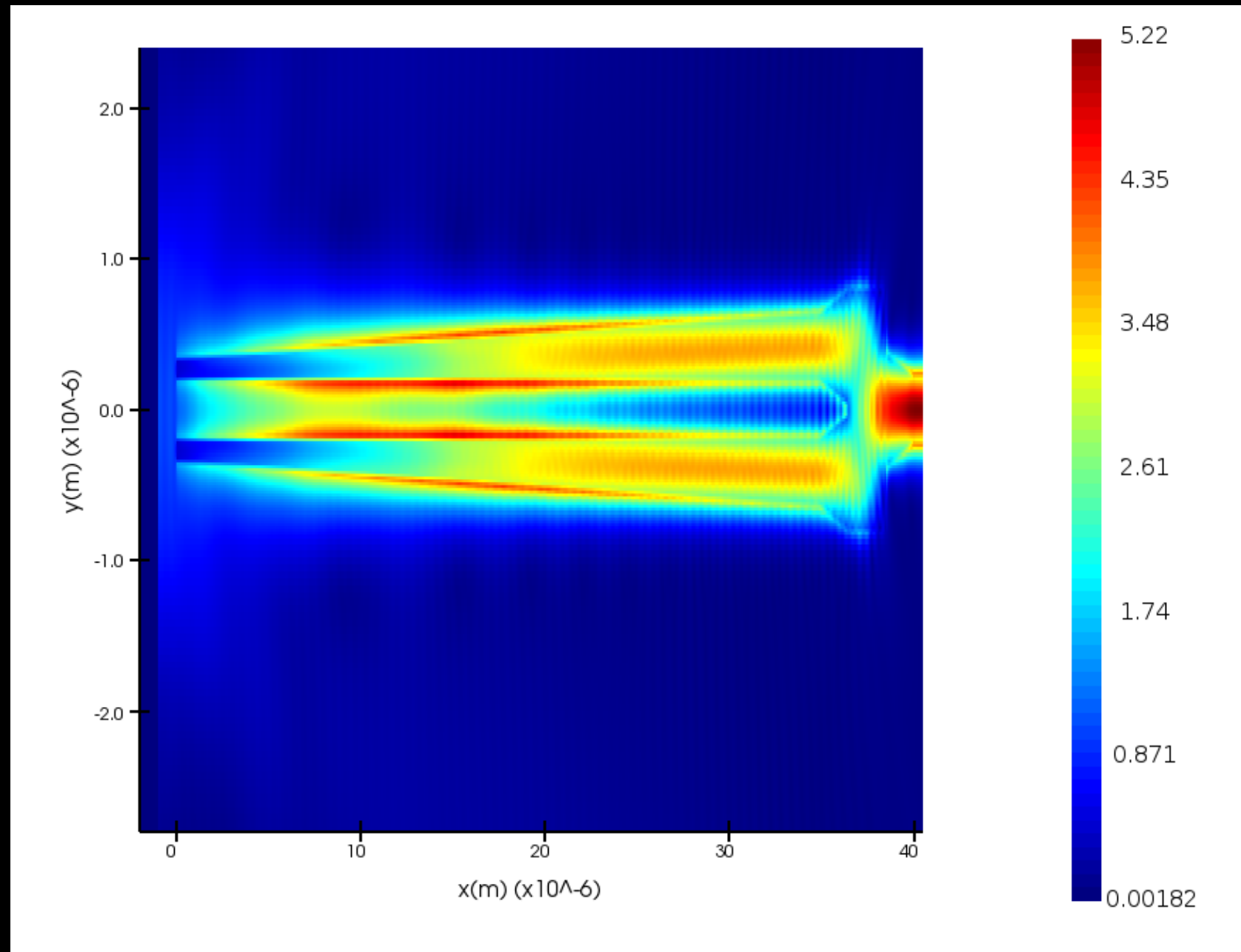
# TE MODE INPUT FIELD IN THE FIBER



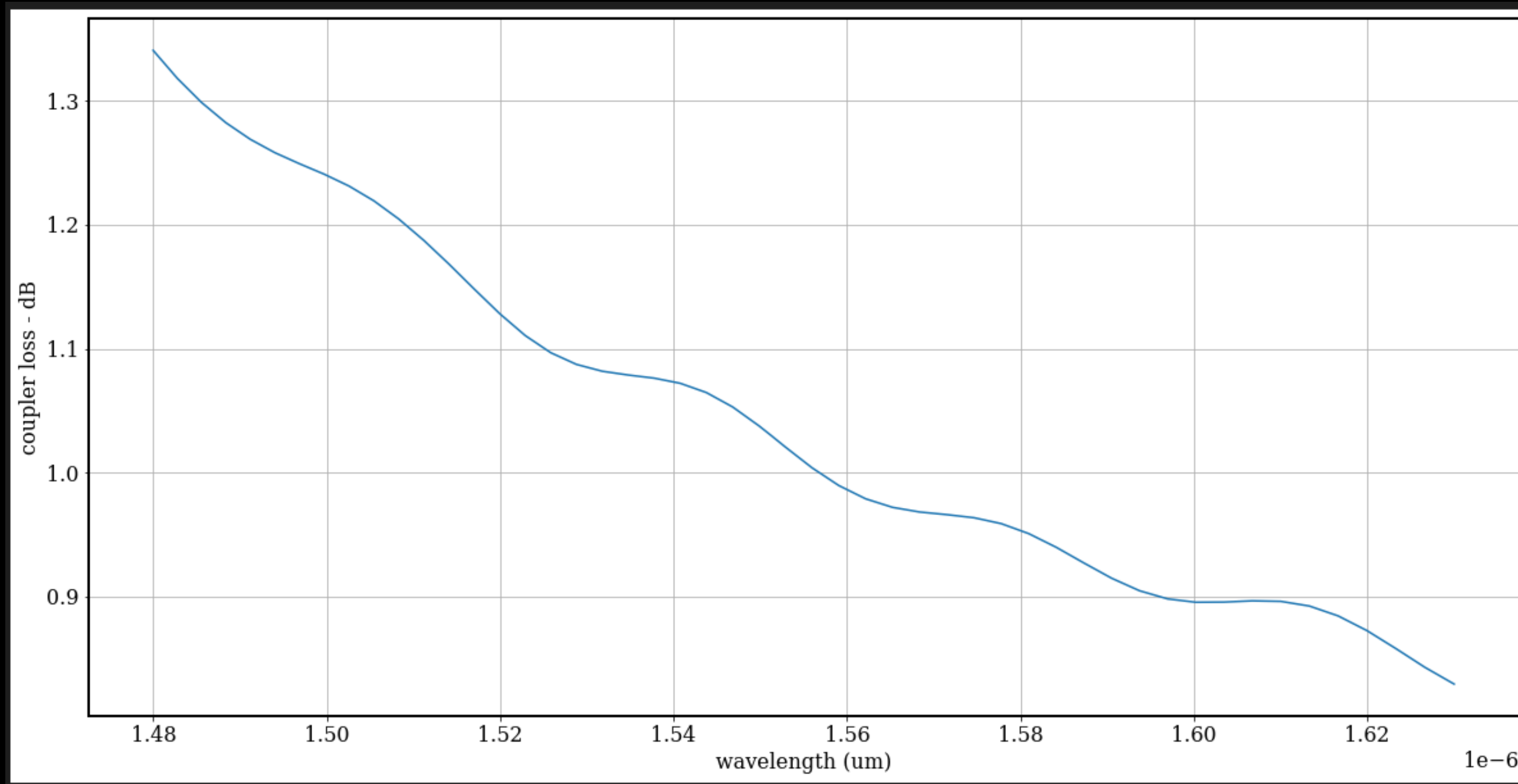
$y$  span = 6  $\mu\text{m}$   
 $z$  span = 10  $\mu\text{m}$



# DISTRIBUIÇÃO DE CAMPO

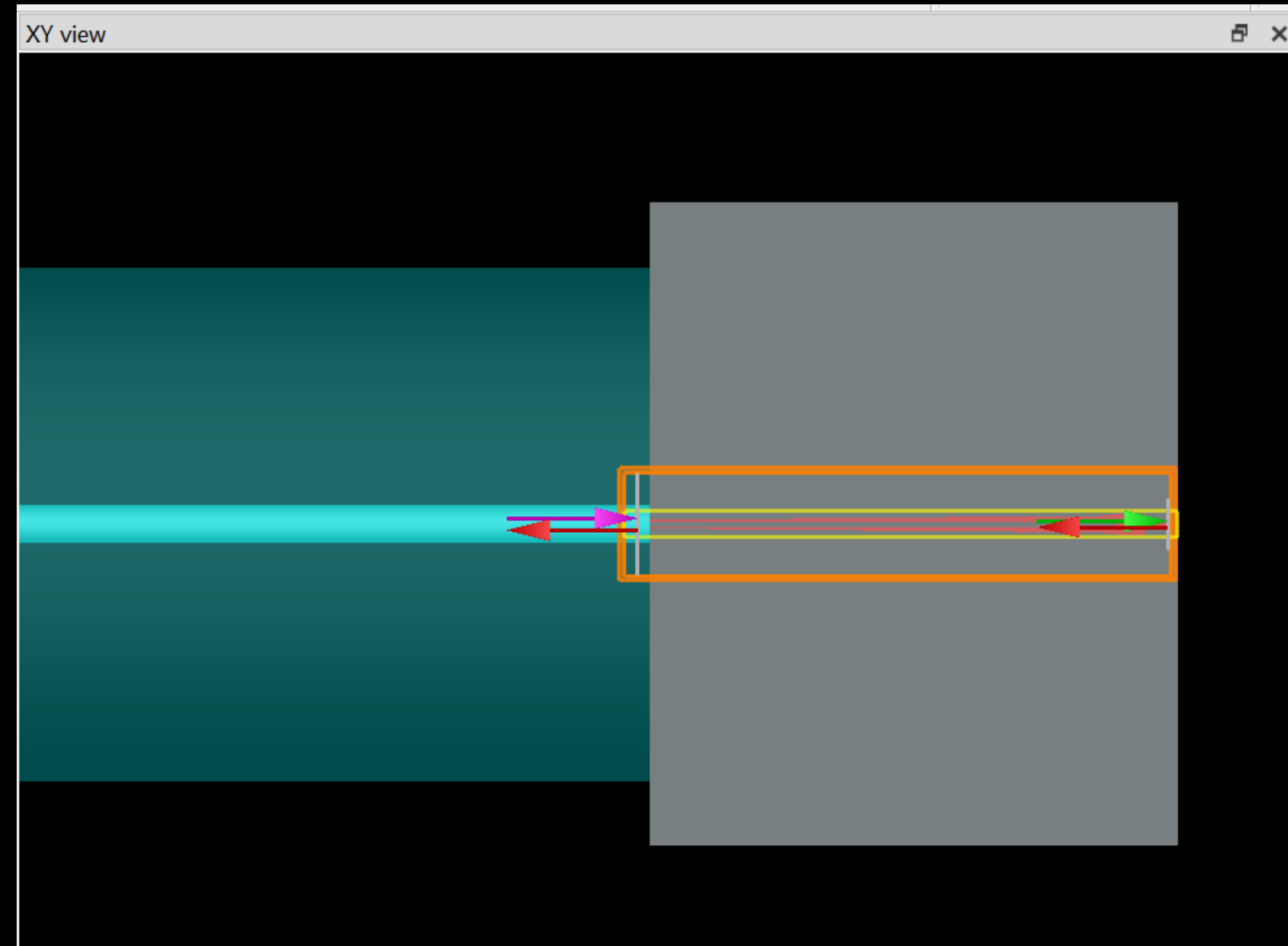


# COUPLING LOSS



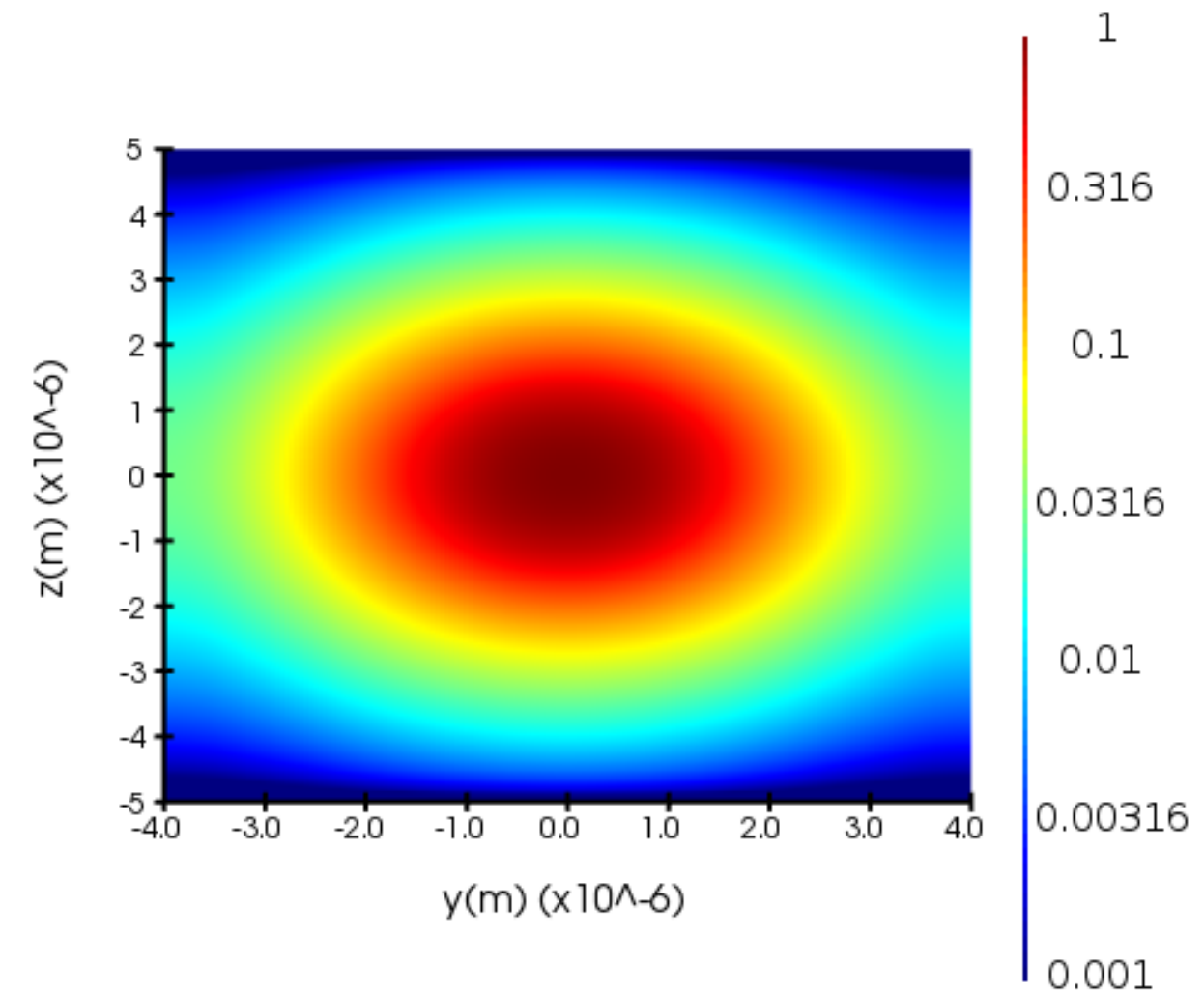
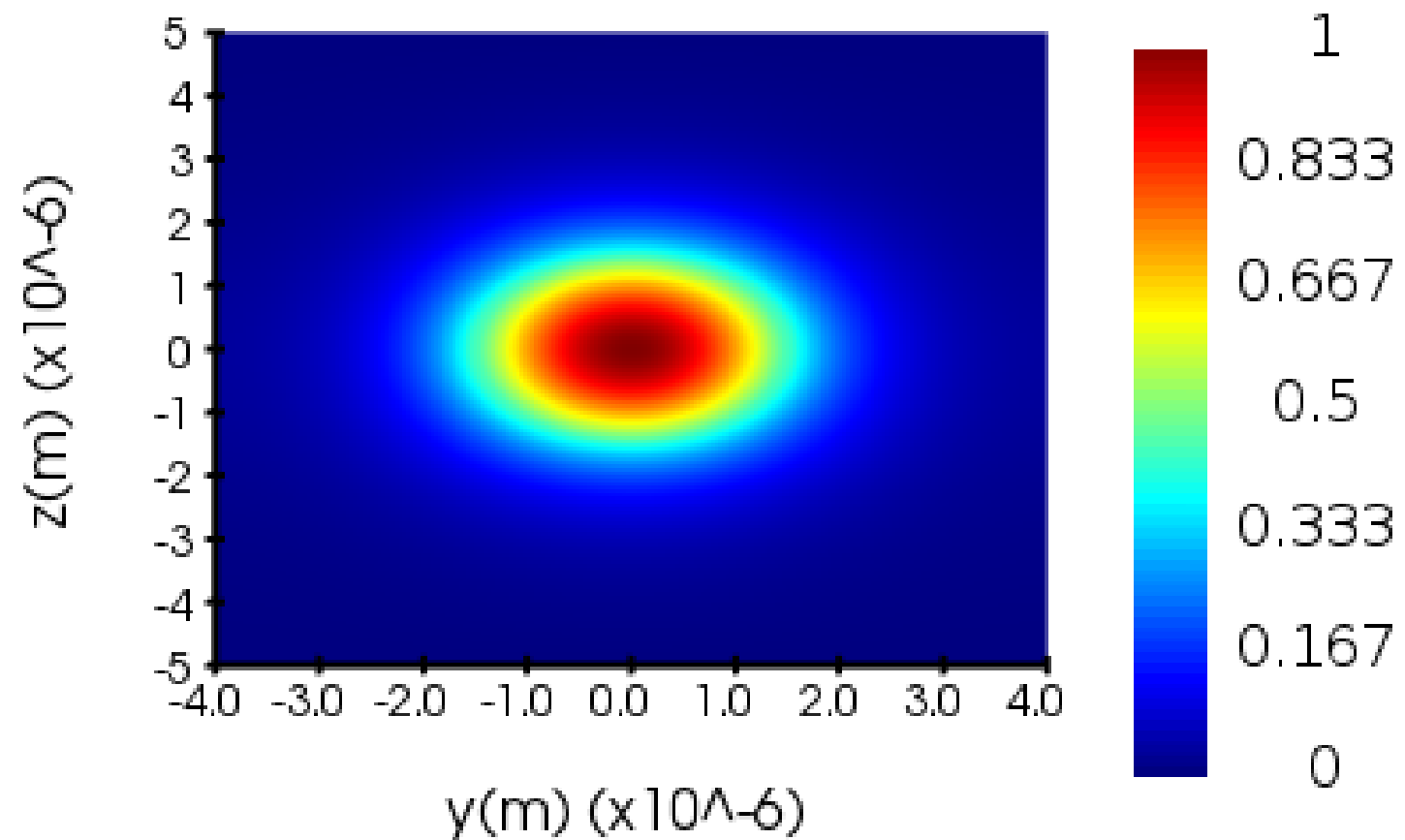
semana 2

06/03 - 17/03



- o yspan da porta de entrada foi aumentada para 8um
- a condição de fronteira para z min foi mudada para summetric
- o mesh utilizado foi de 5

# TE MODE INPUT FIELD IN THE FIBER



$y$  span = 8  $\mu\text{m}$   
 $z$  span = 10  $\mu\text{m}$

# COUPLING LOSS

