Edge Coupler

Moisés de Araújo Oliveira

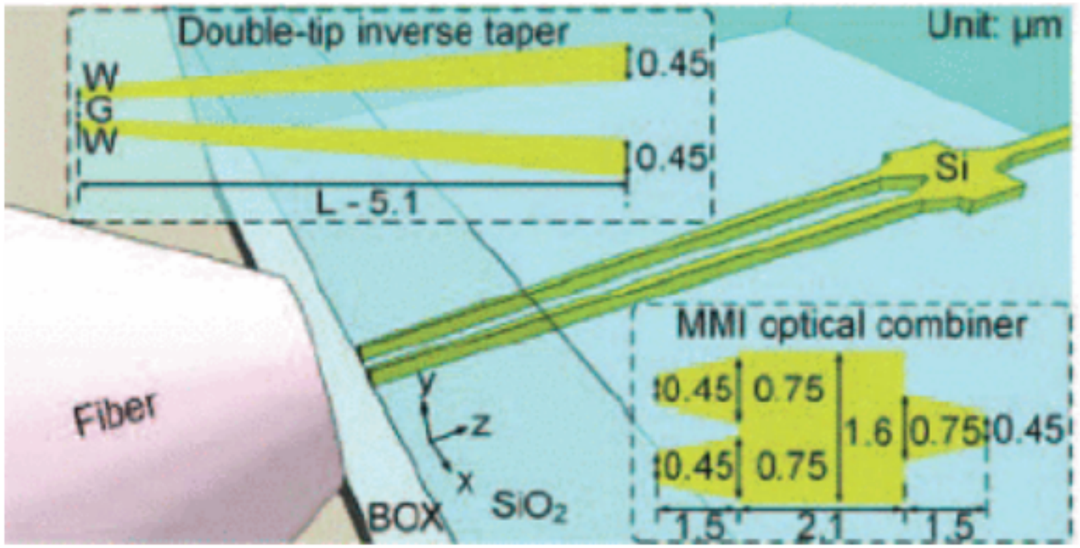
Referência

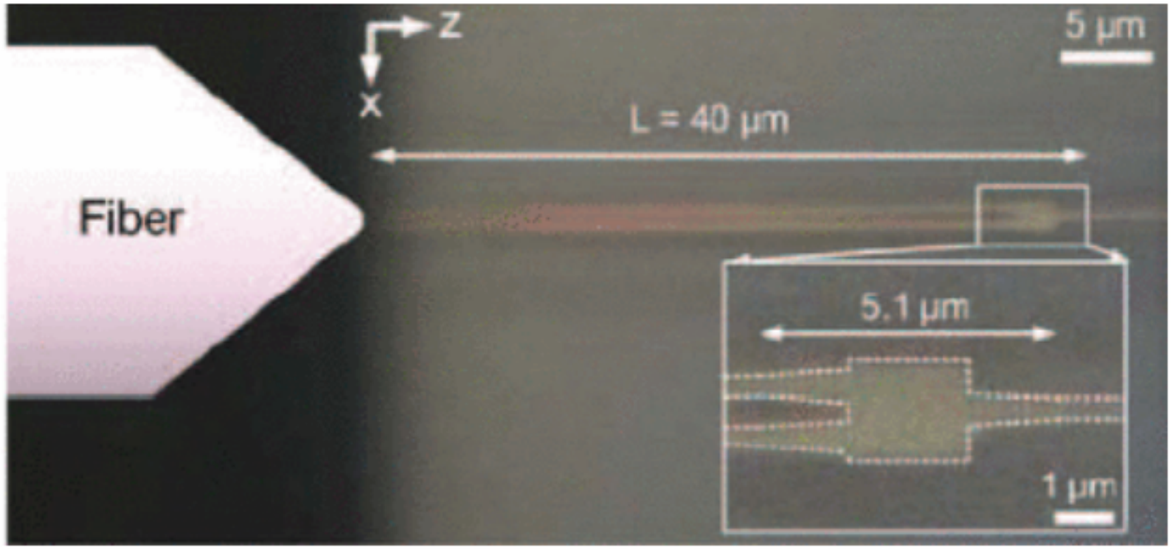
J. Wang et al., "Low–loss and misalignment–tolerant fiber–to–chip edge coupler based on double–tip inverse tapers," 2016 Optical Fiber Communications Conference and Exhibition (OFC), Anaheim, CA, USA, 2016, pp. 1–3.

Double-tip Inverse Taper

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

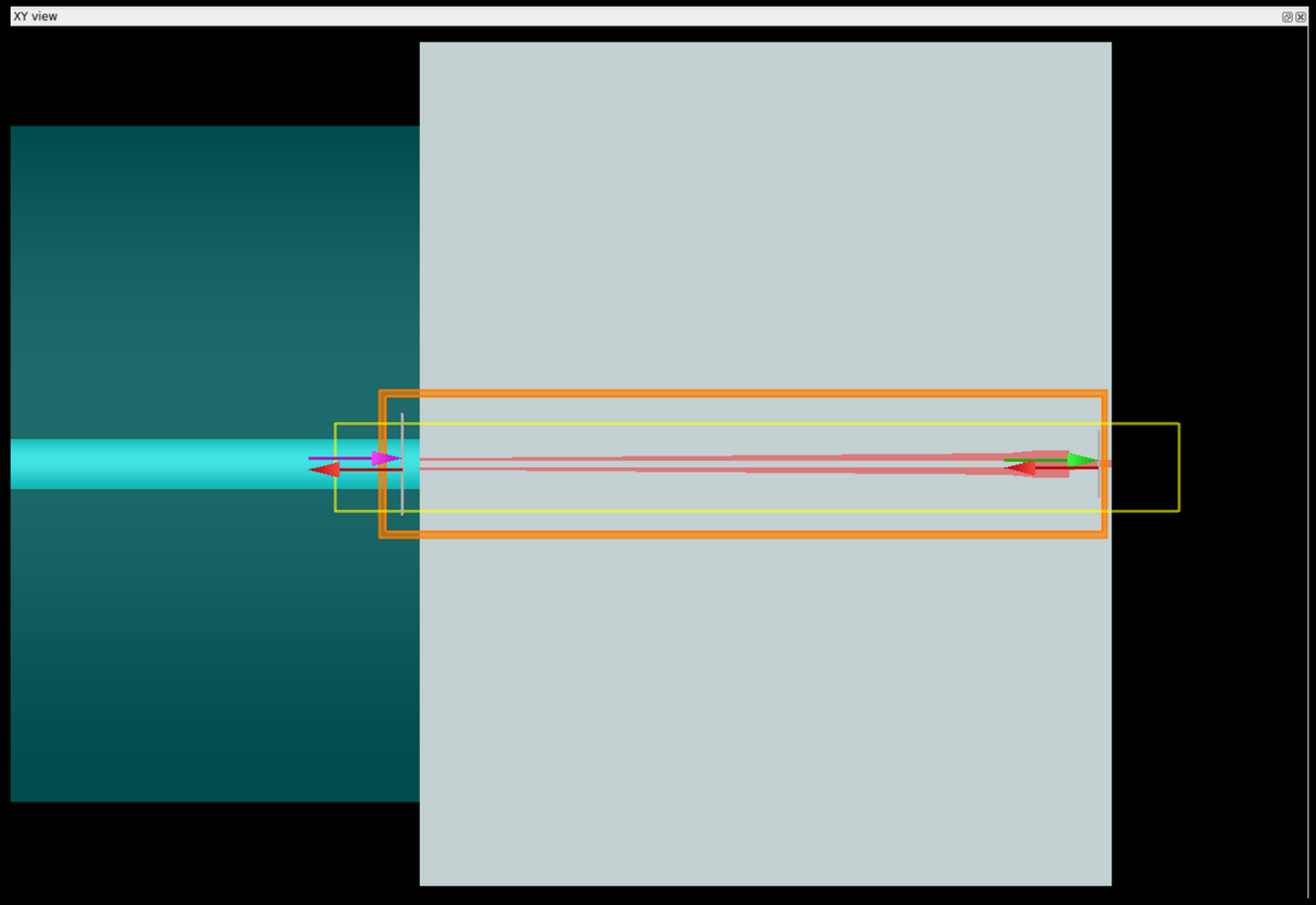
Design


Double-tip inverse taper
Unit: μm
W
G
W
0.45
0.45
L - 5.1
Si
MMI optical combiner
0.45
0.75
0.45
0.75
1.6
0.75
0.45
1.5
2.1
1.5
Fiber
y
z
x
BOX
SiO_2

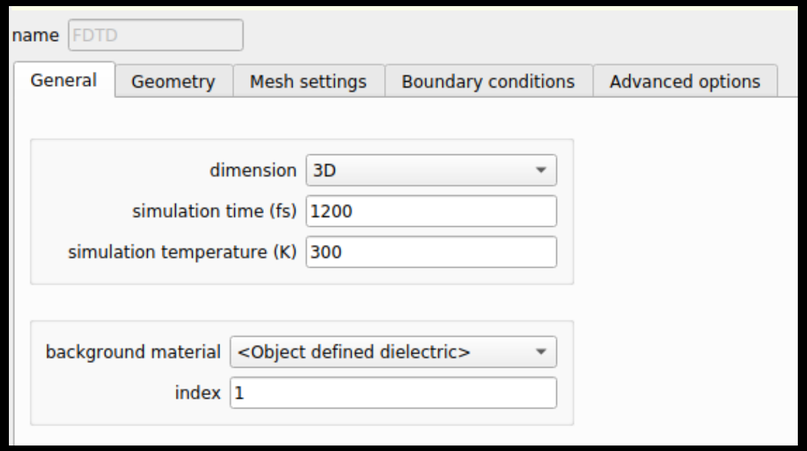

z
x
5 μm
L = 40 μm
Fiber
5.1 μm
1 μm

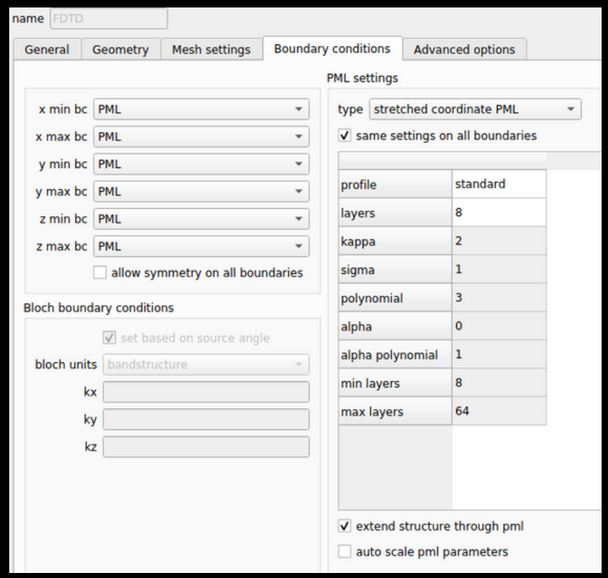
semana 1

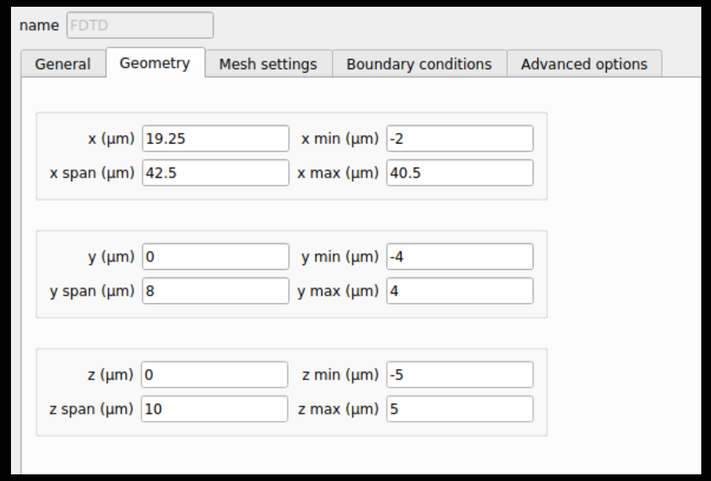
Design – FDTD

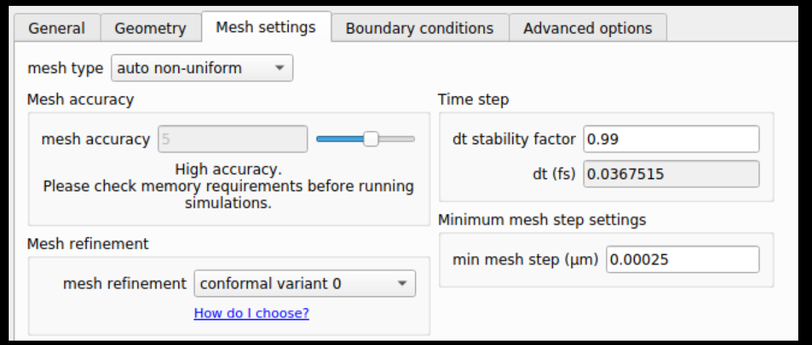


FDTD SETTINGS

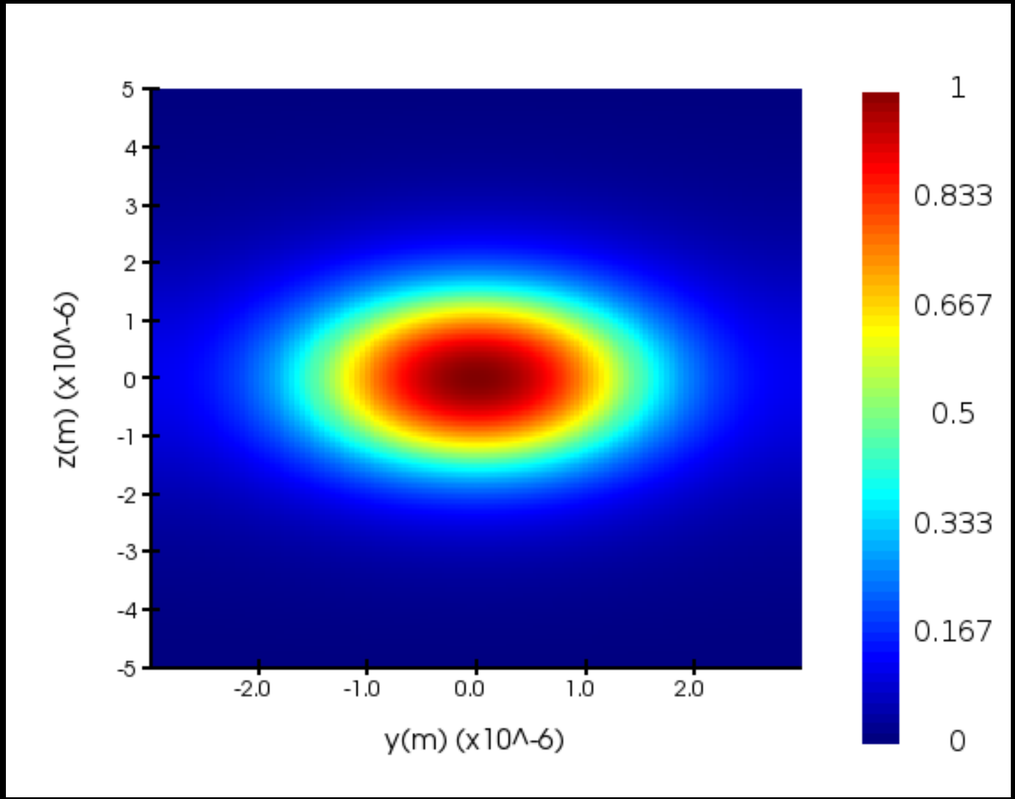


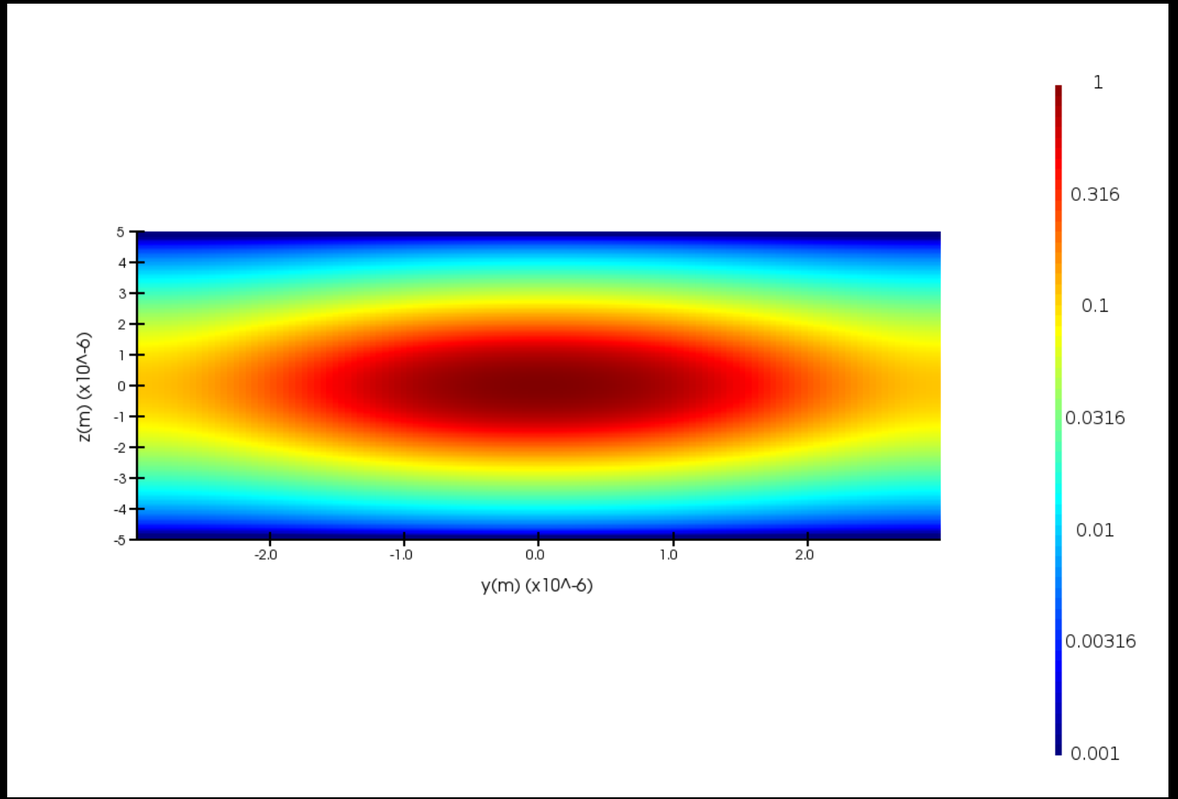






TE MODE INPUT FIELD IN THE FIBER

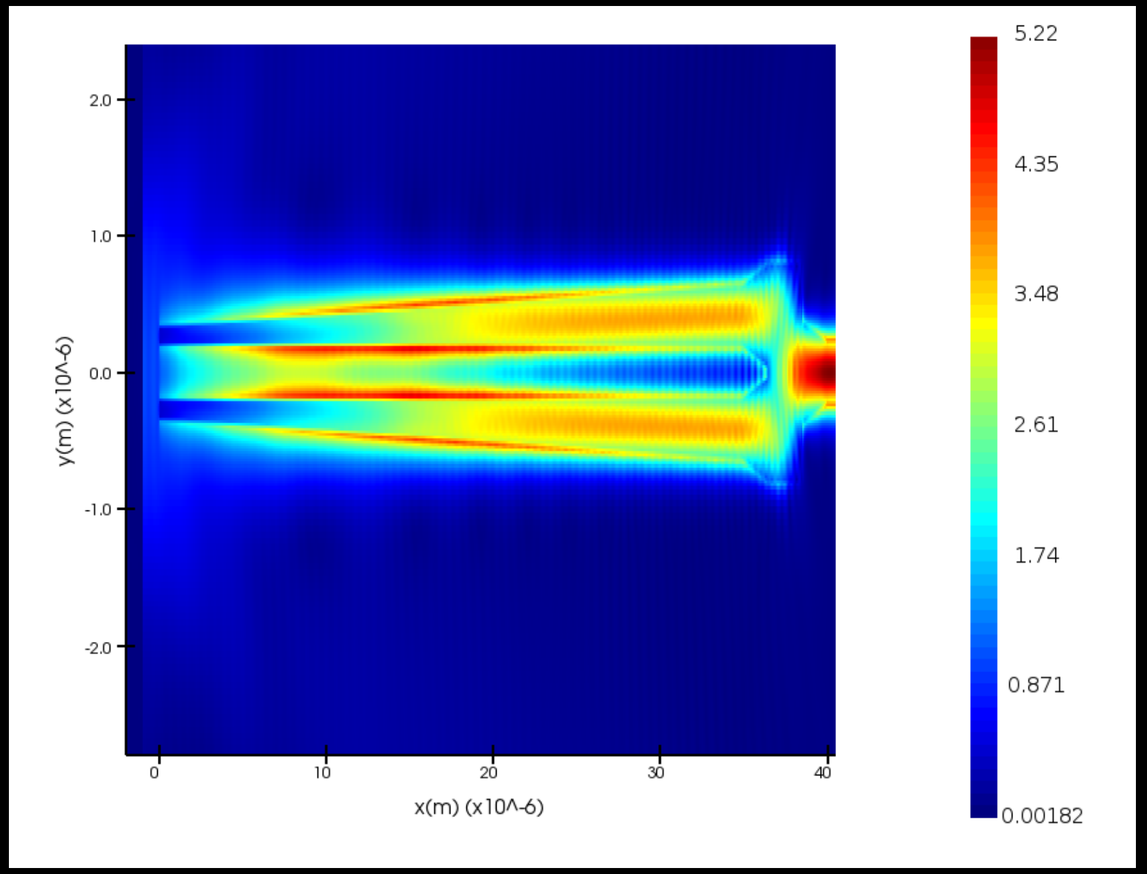


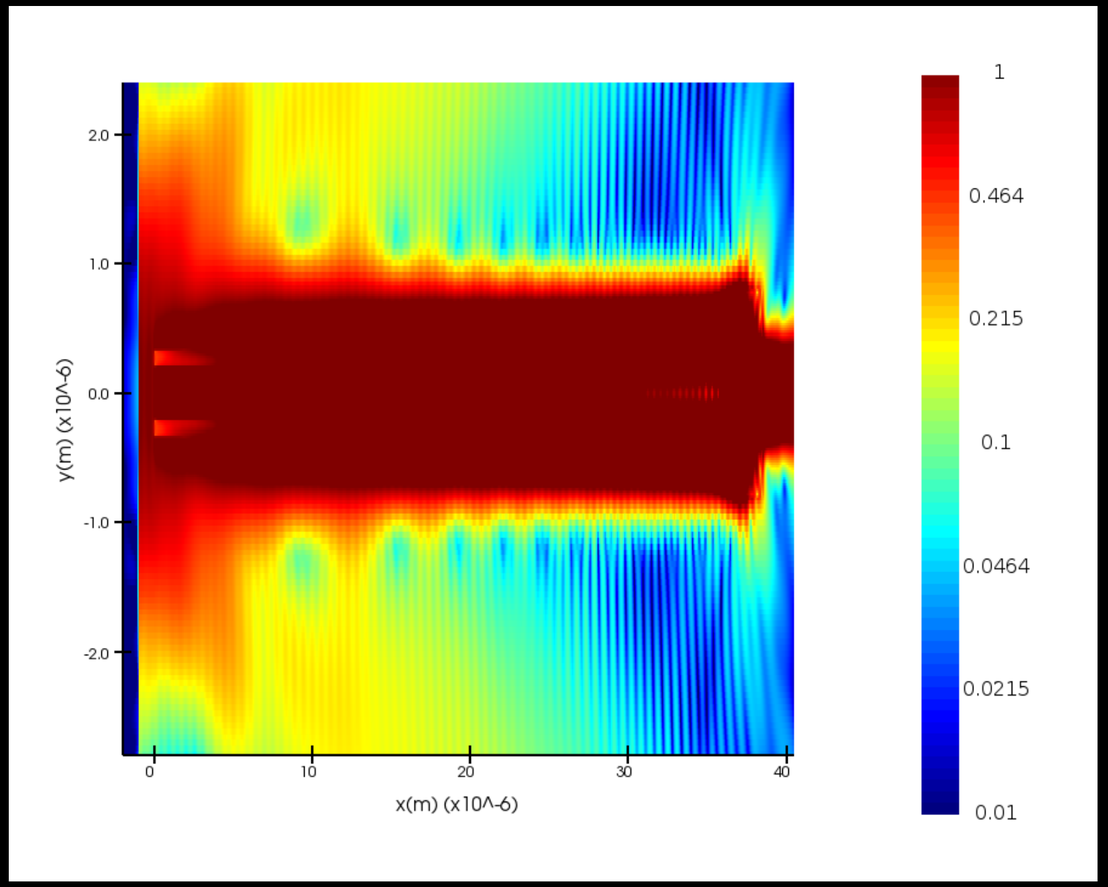


y span = 6 um

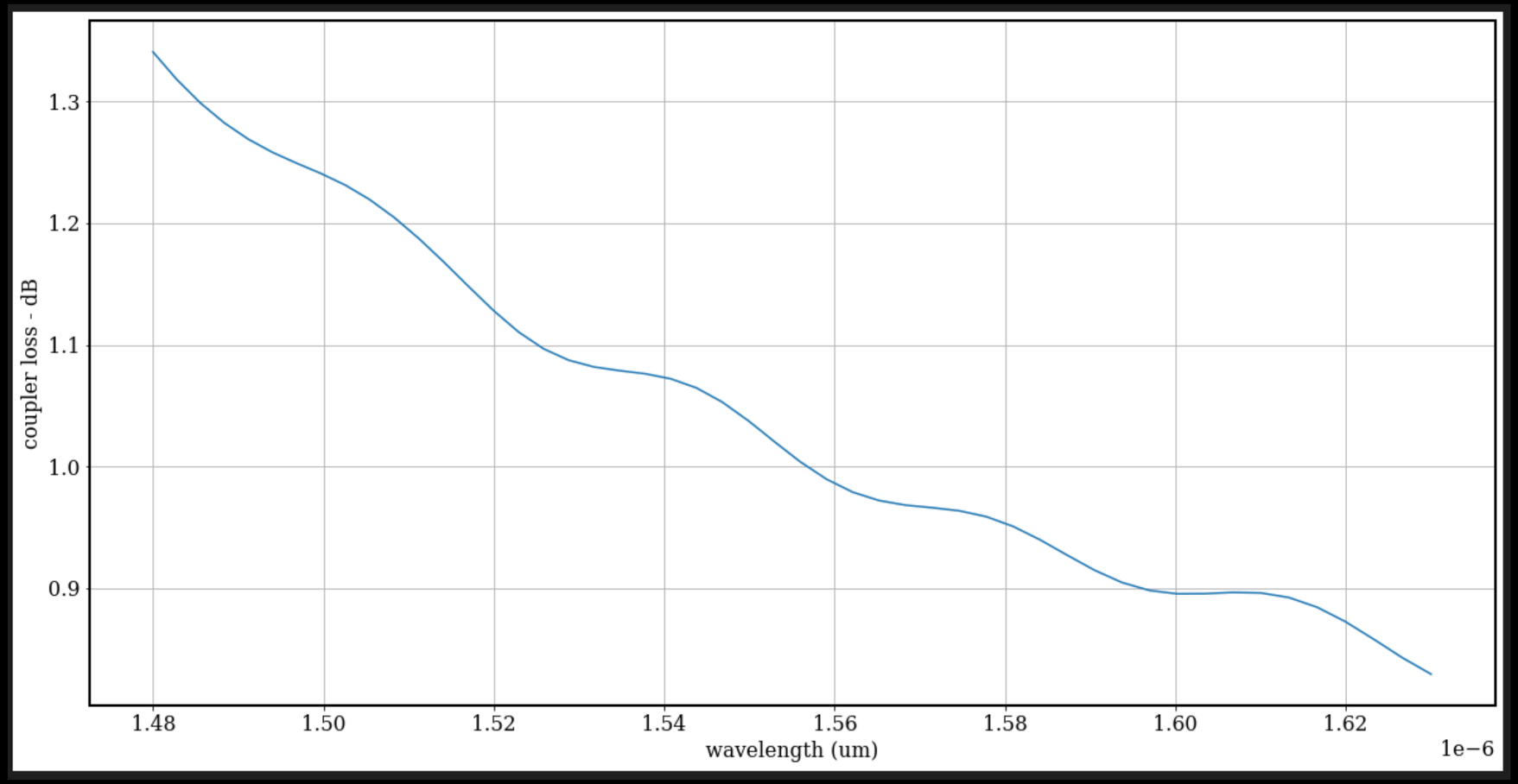
z span = 10 um

DISTRIBUIÇÃO DE CAMPO

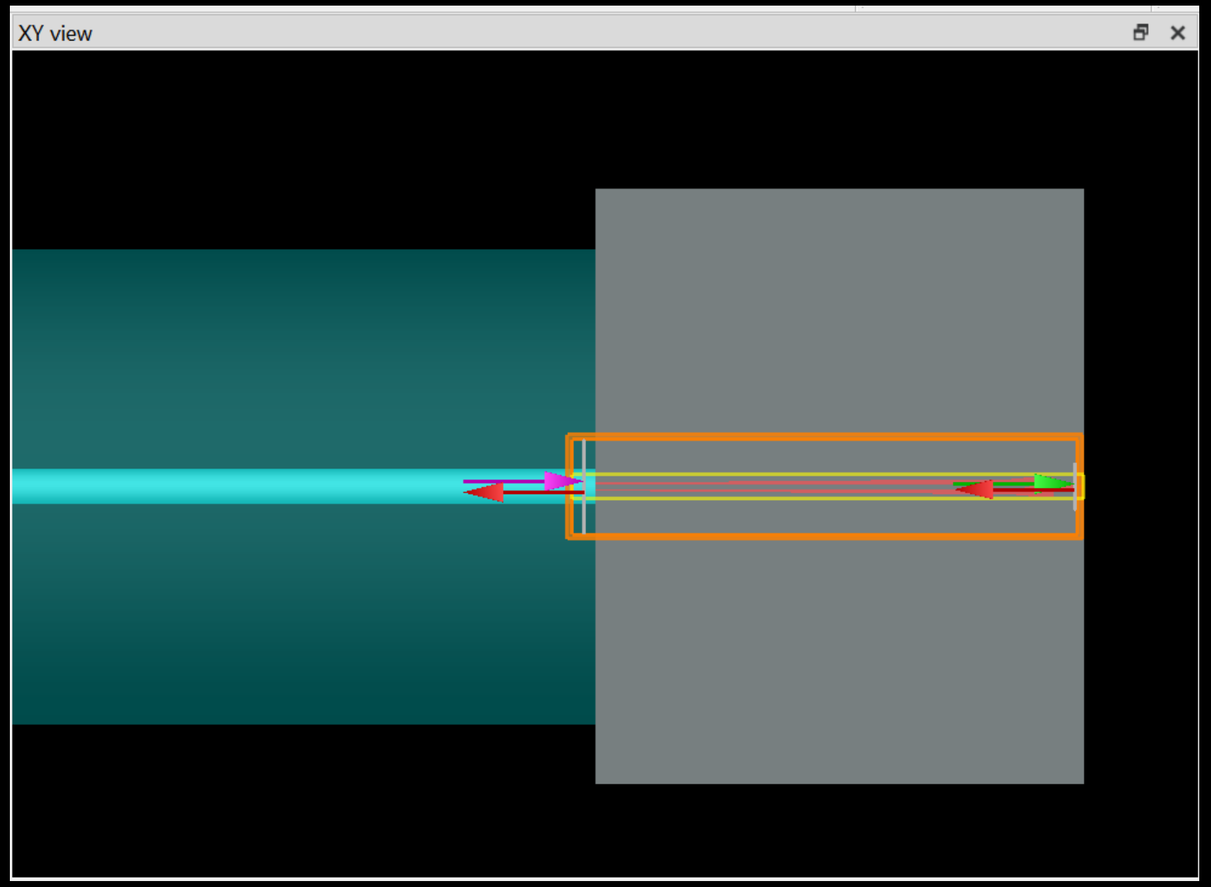




COUPLING LOSS

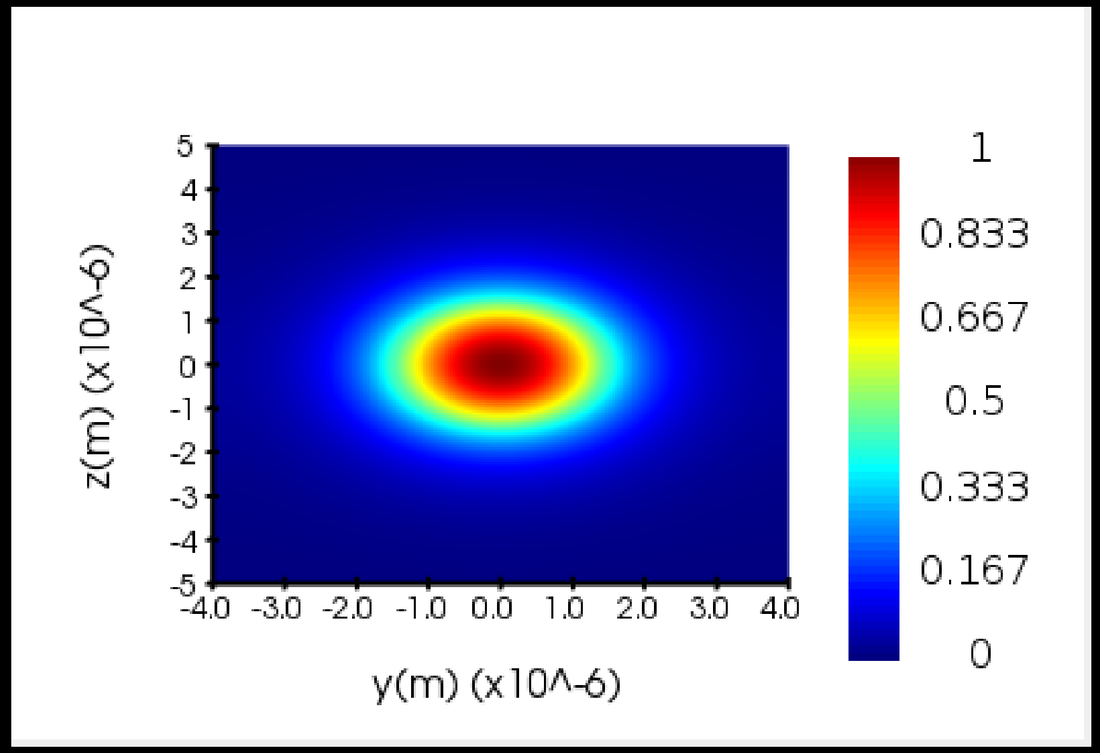


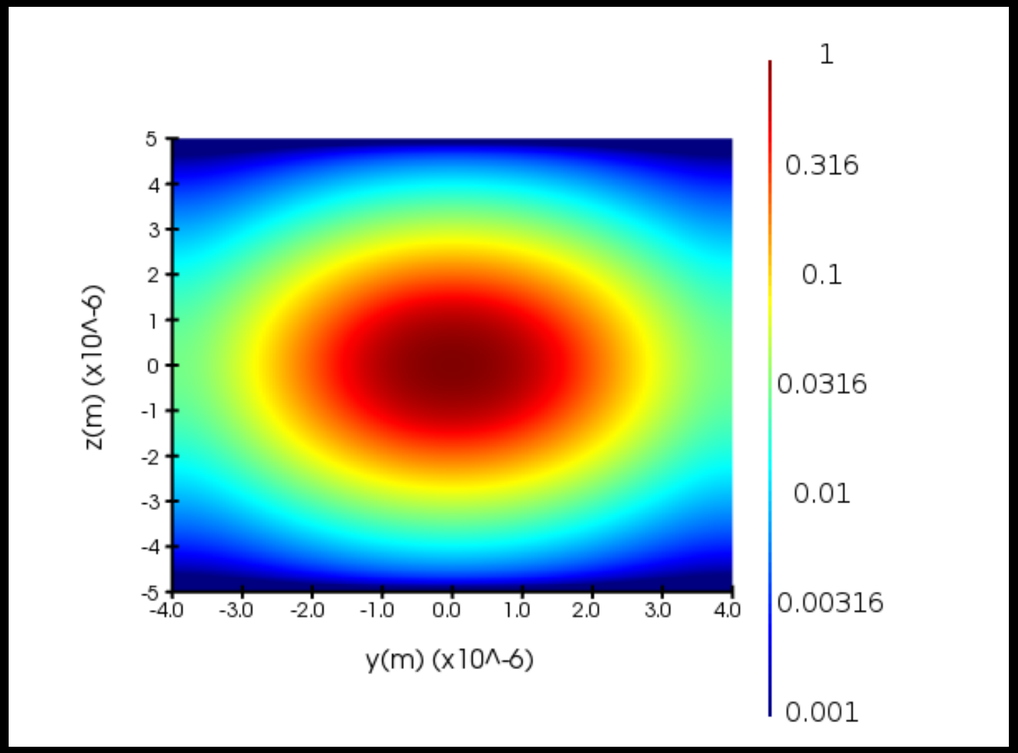
semana 2
06/03 - 17/03



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

TE MODE INPUT FIELD IN THE FIBER

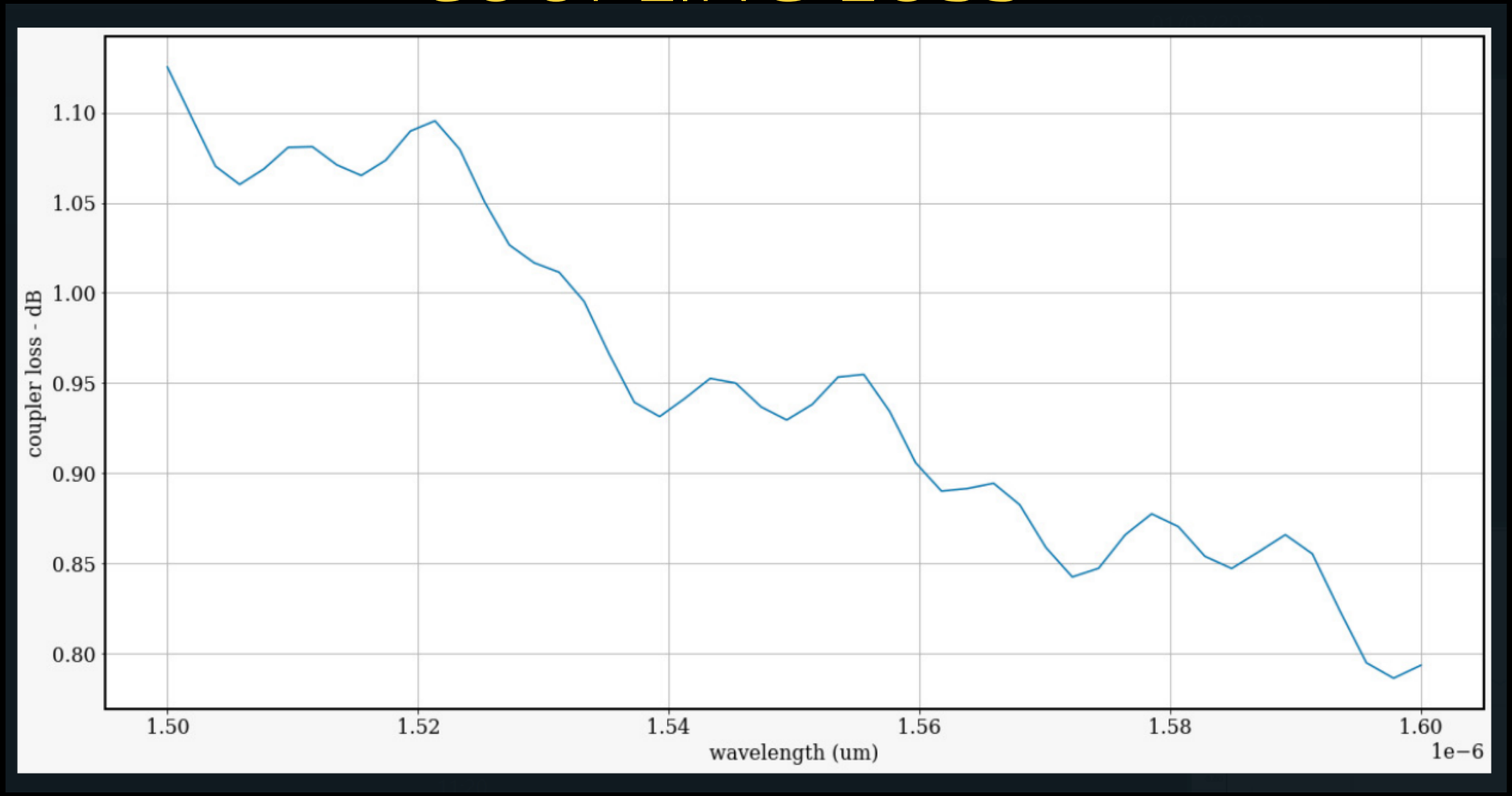




y span = 8 um

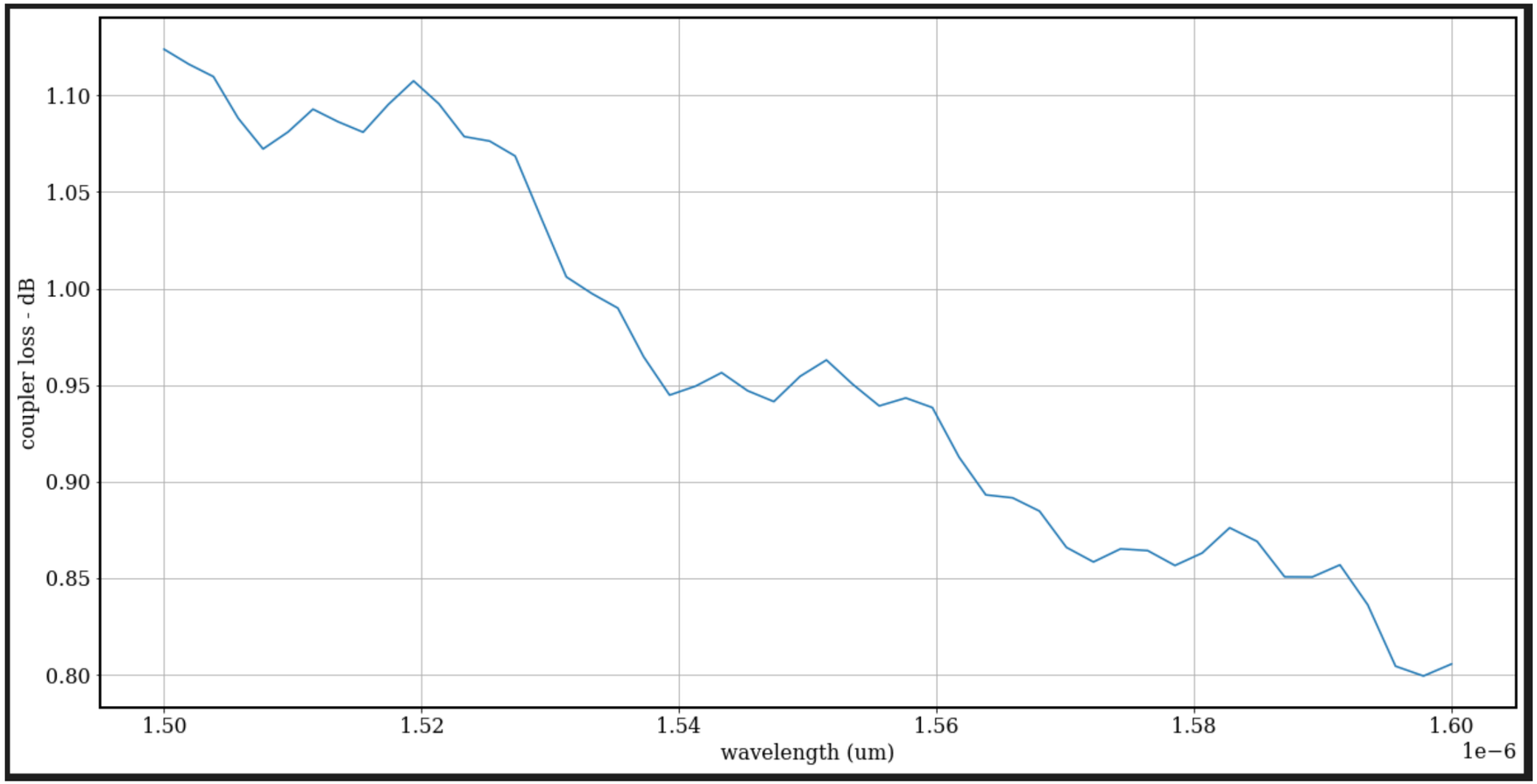
z span = 10 um

COUPLING LOSS



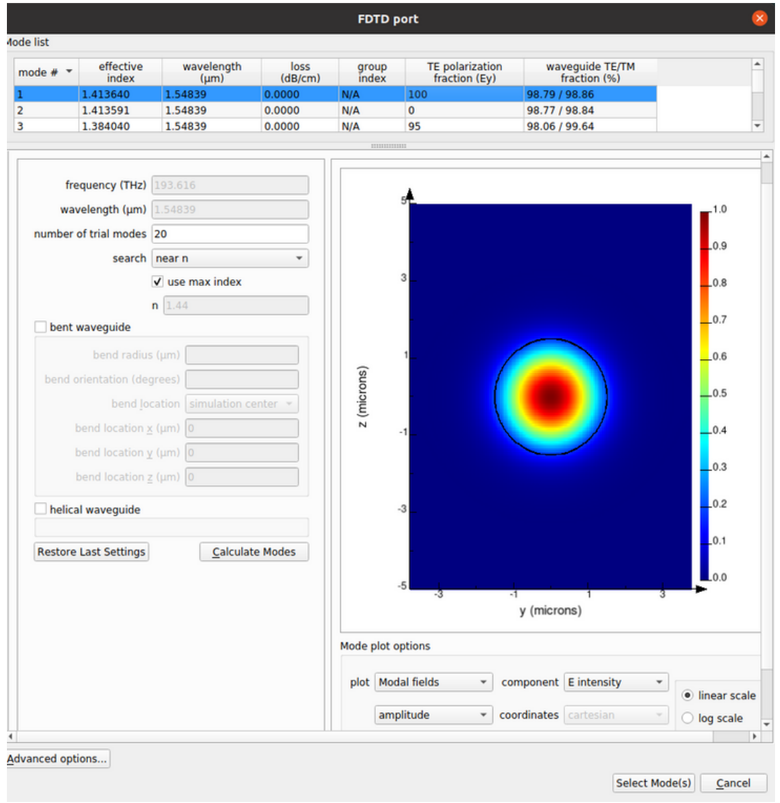
- o autoshutoff level foi de 5e−4
- simulation time estava em 1200 fs
- o probelma para esse caso foi a convergência da simulação

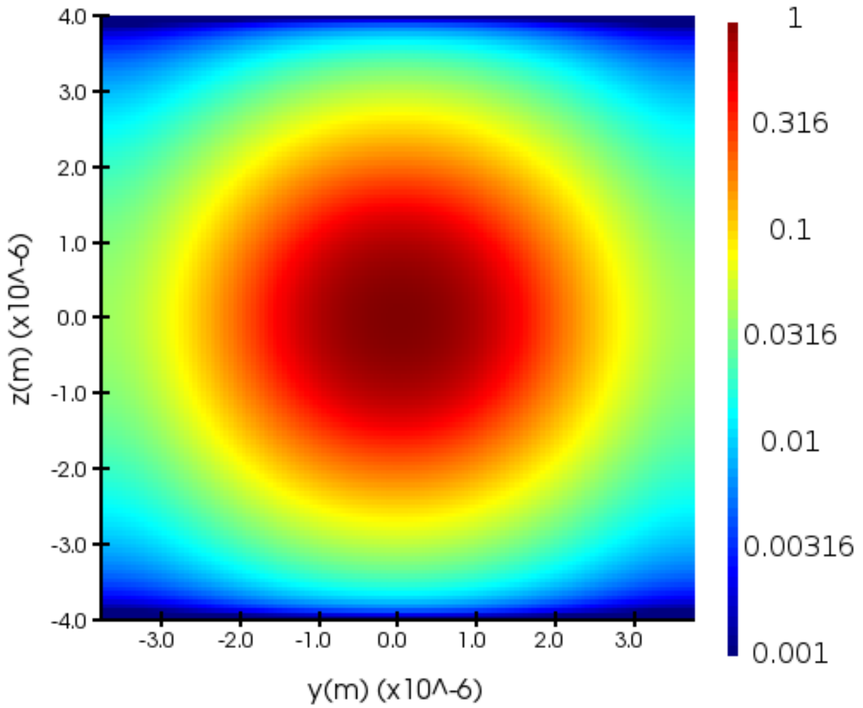
- **setando o DT STABILITY FACTOR para 0.95**
- **aumentando o simulation time para 1500 fs**



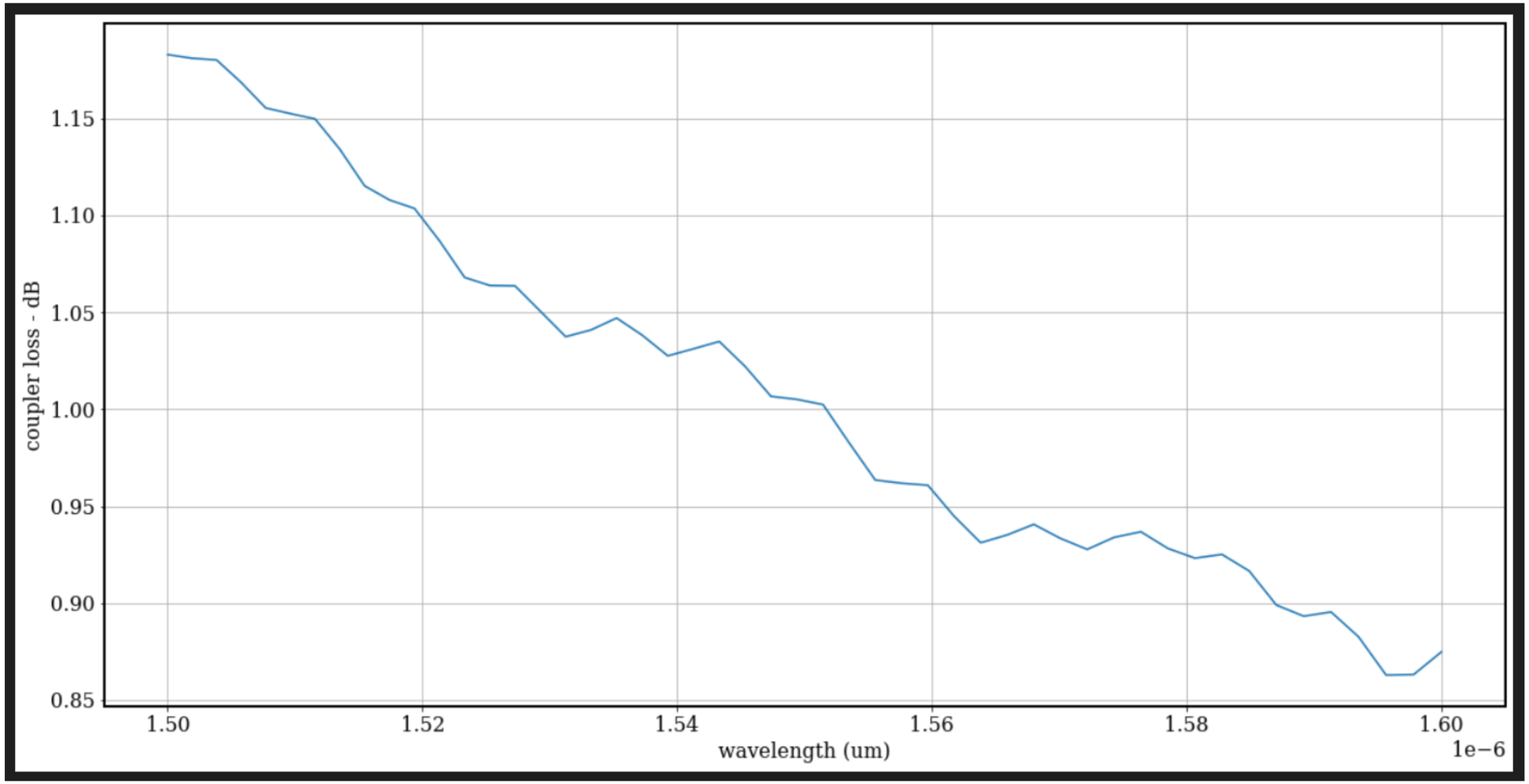
- **o autoshutoff level foi de 3.3e-4**
- **mais uma vez temos um problema na convergência**

- **mudando o zspan da porta de excitação para 8um**
- **setando a condição de fronteira em zmin para PML**





- **setando o mesh para 3**
- **deixando o simulation time em 1500 fs**
- **DT stability factor em 0.99**



- **o autosutoff level foi em torno de 2.2e-4**
- **mais uma vez temos um problema na convergência**