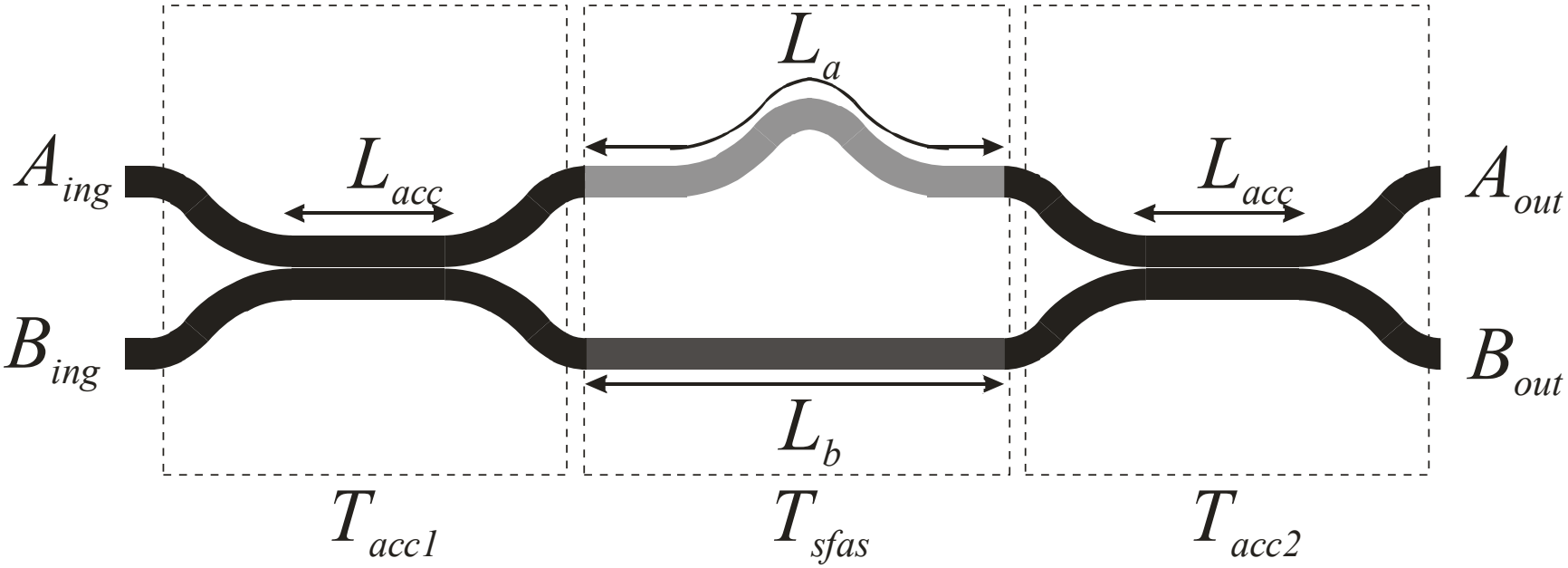
Corso di Componenti Fotonici

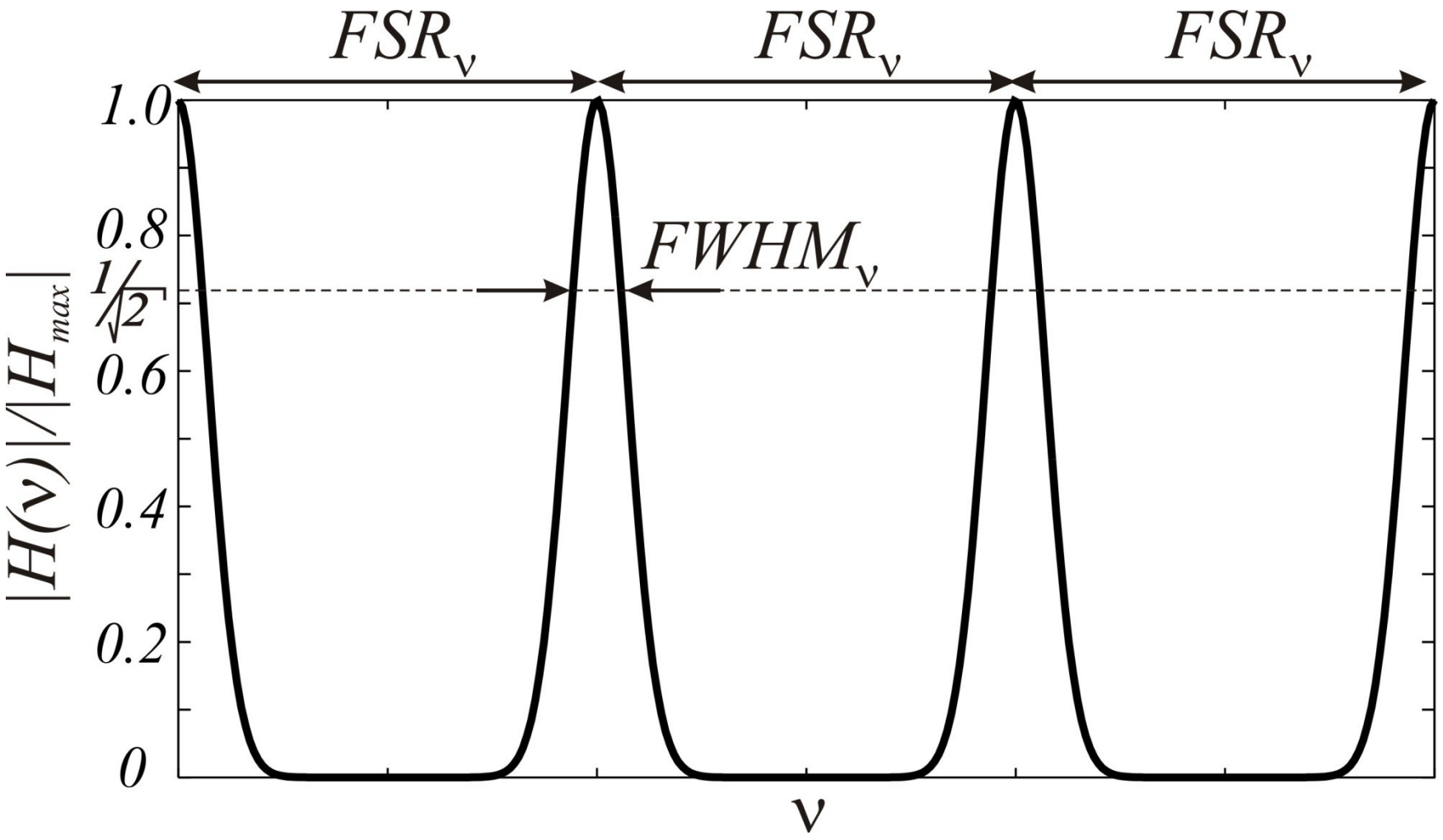
Interferometri e Modulatori Ottici

A.A. 2012-2013

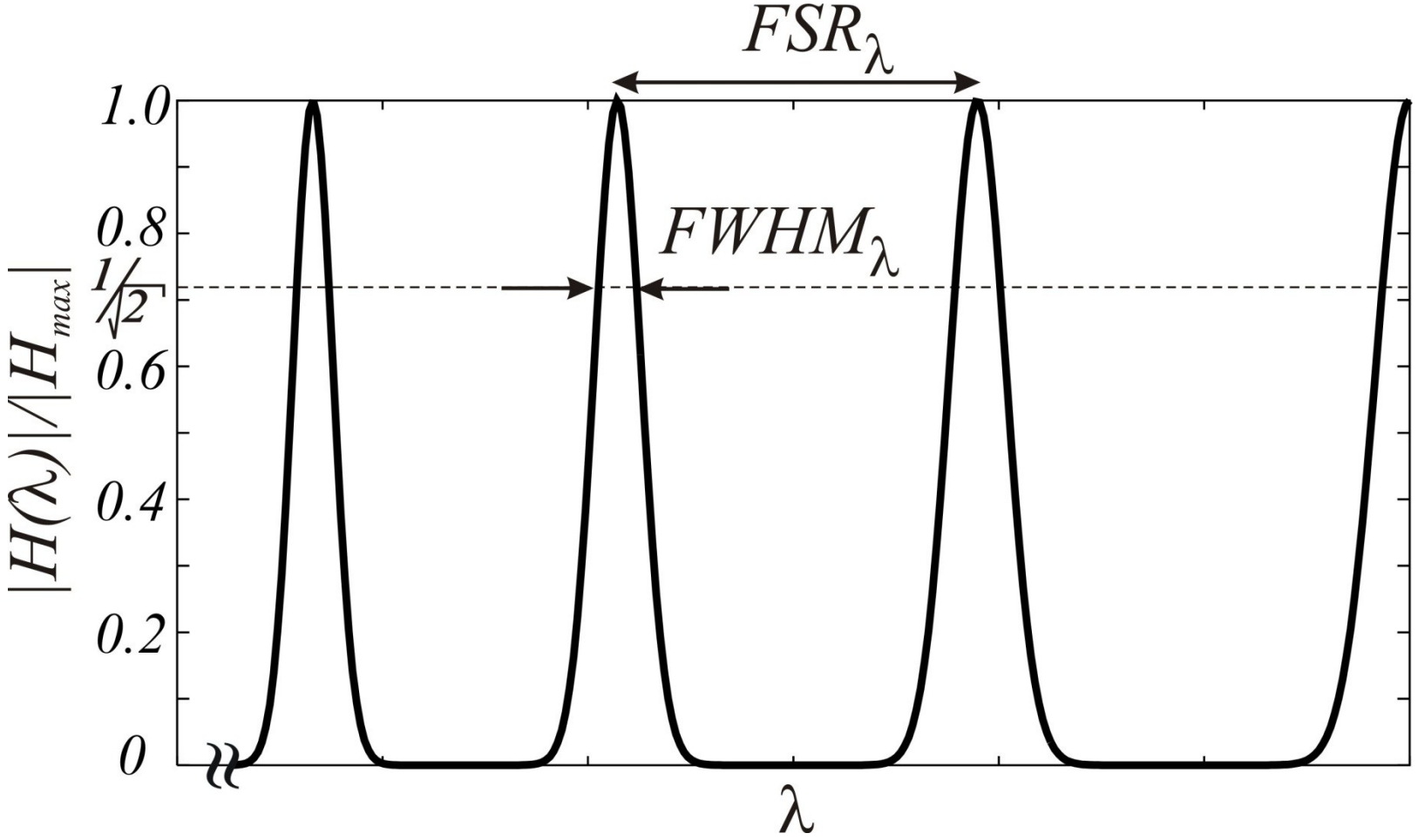
Interferometro di Mach Zehnder

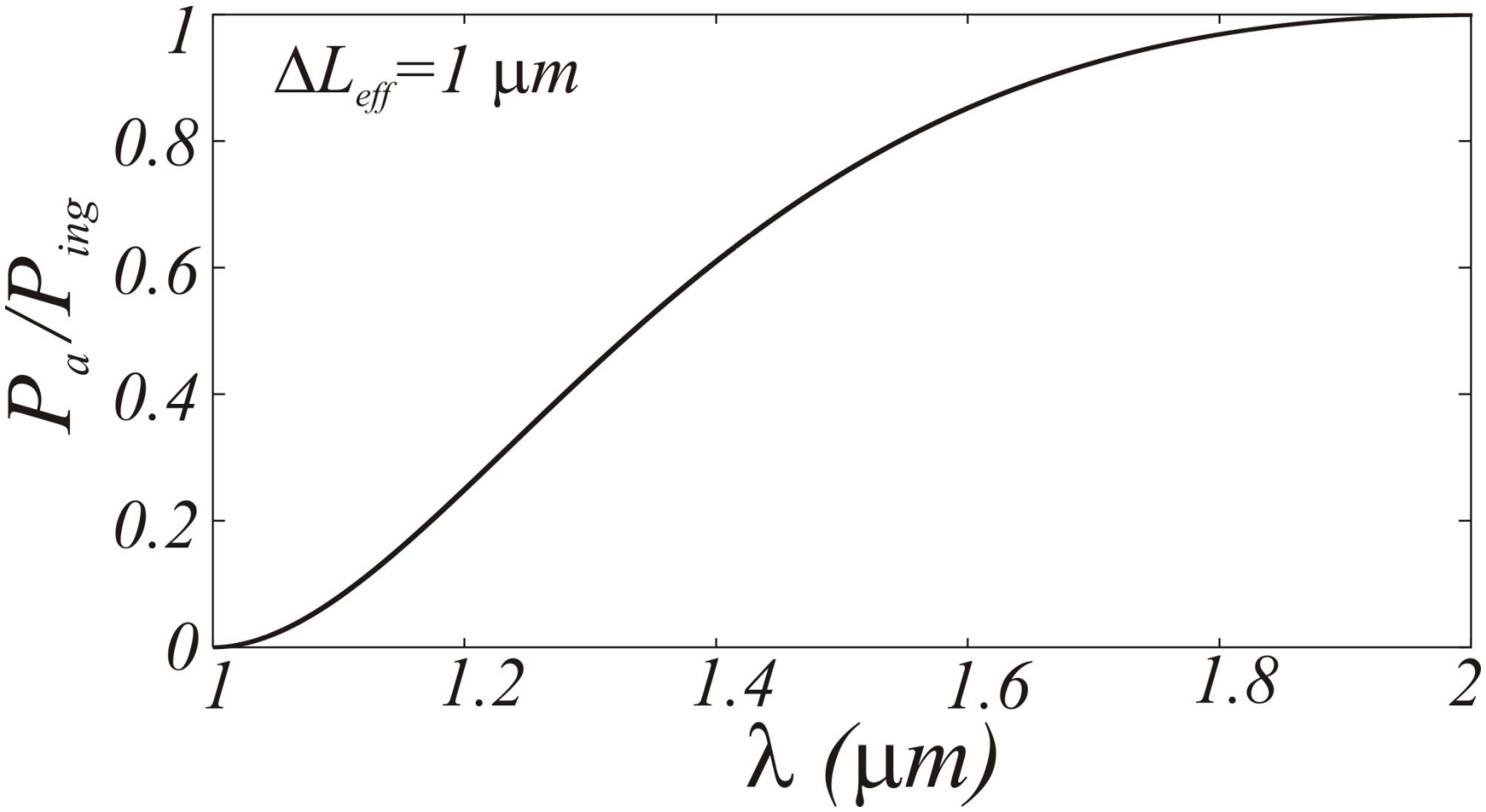


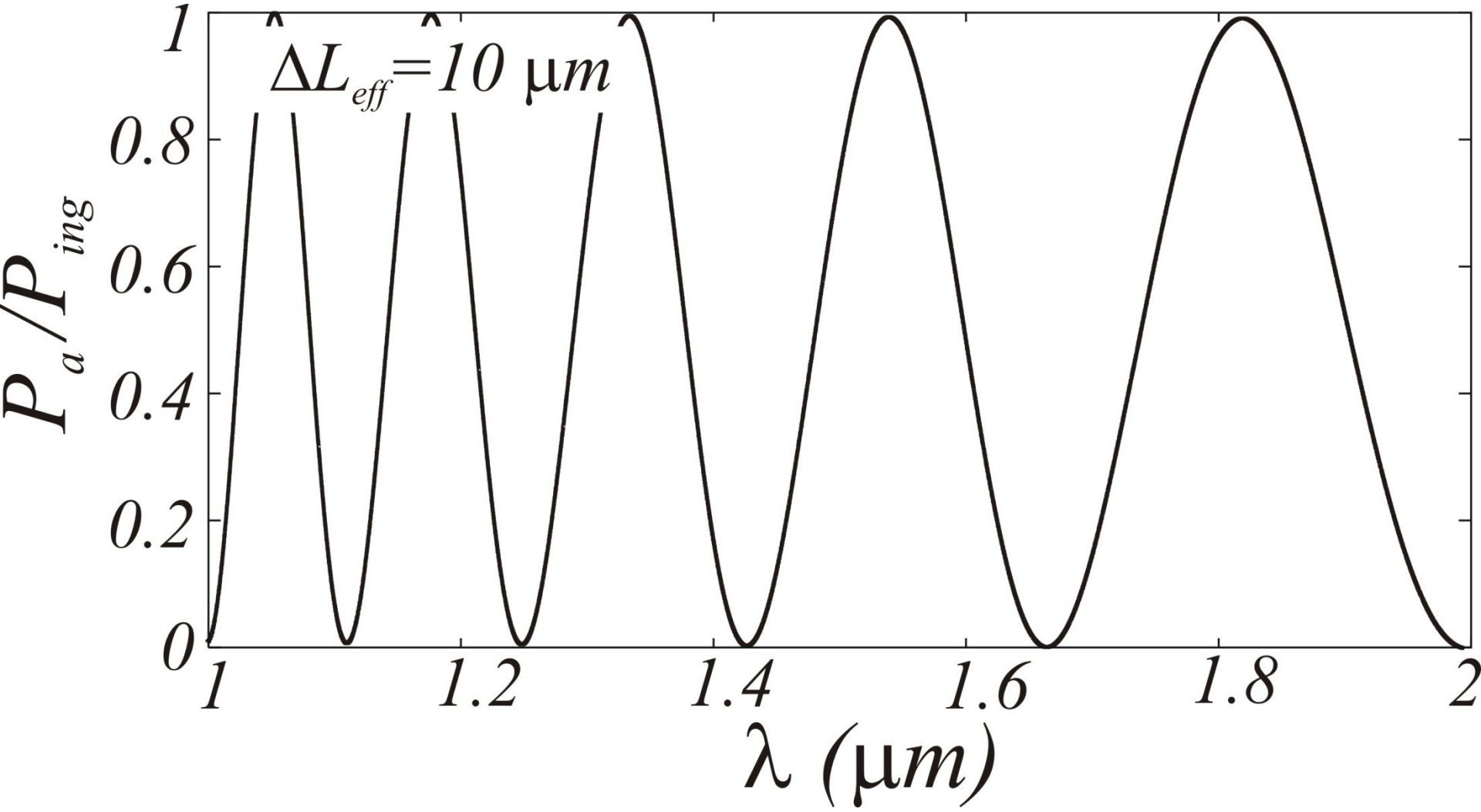
Andamento della funzione di trasferimento di un filtro ottico in funzione della frequenza

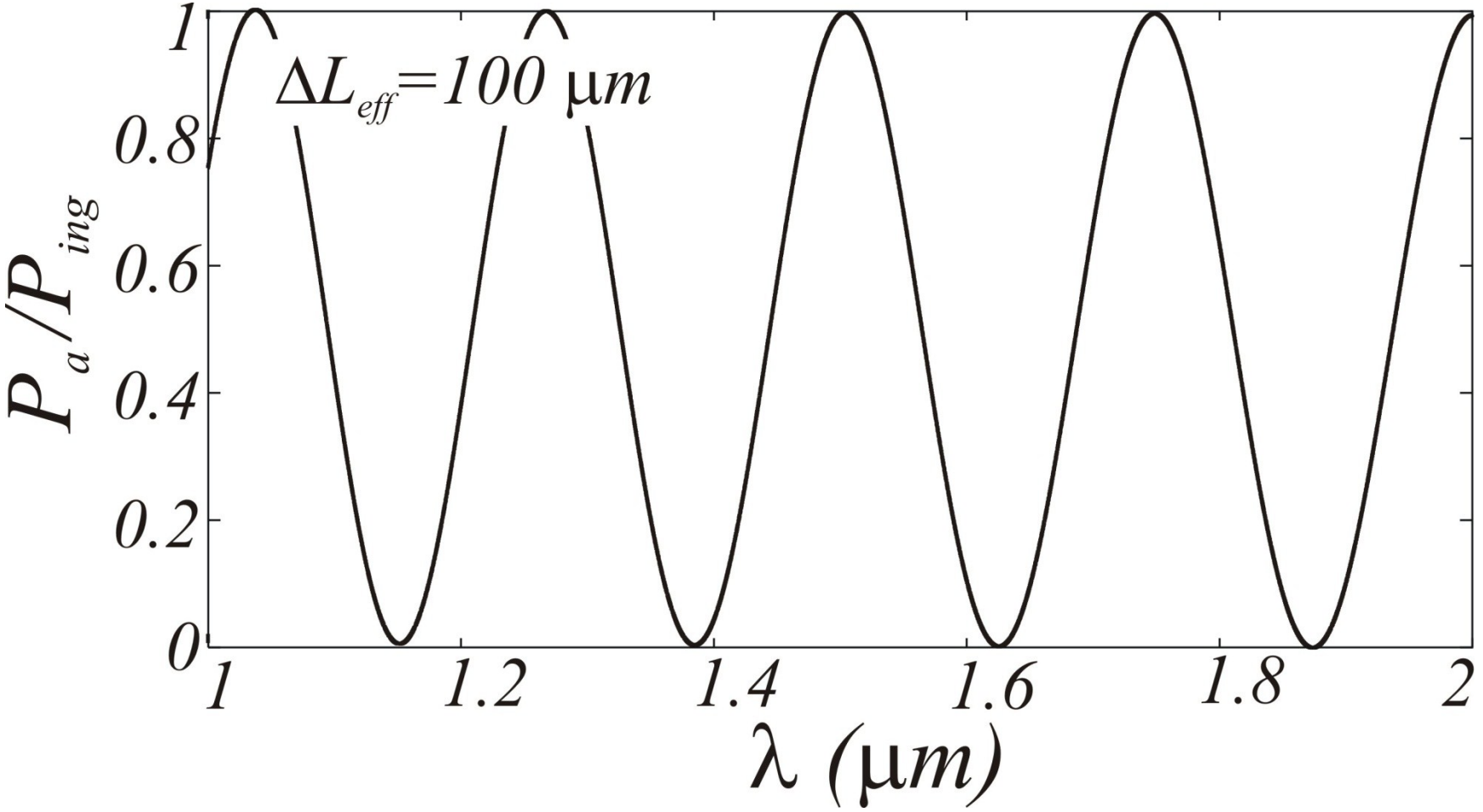


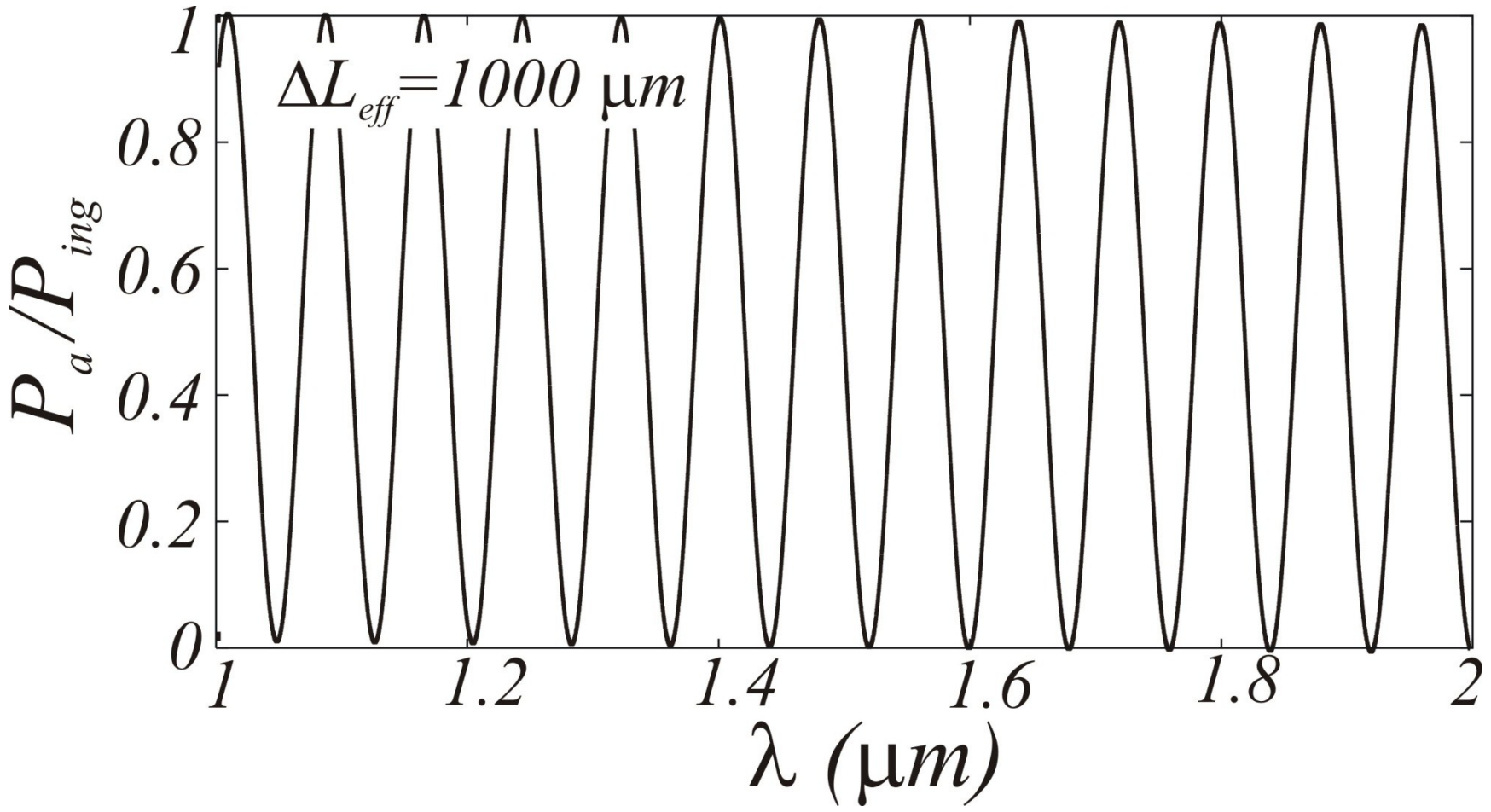
Andamento della funzione di trasferimento di un filtro ottico in funzione della lunghezza d'onda

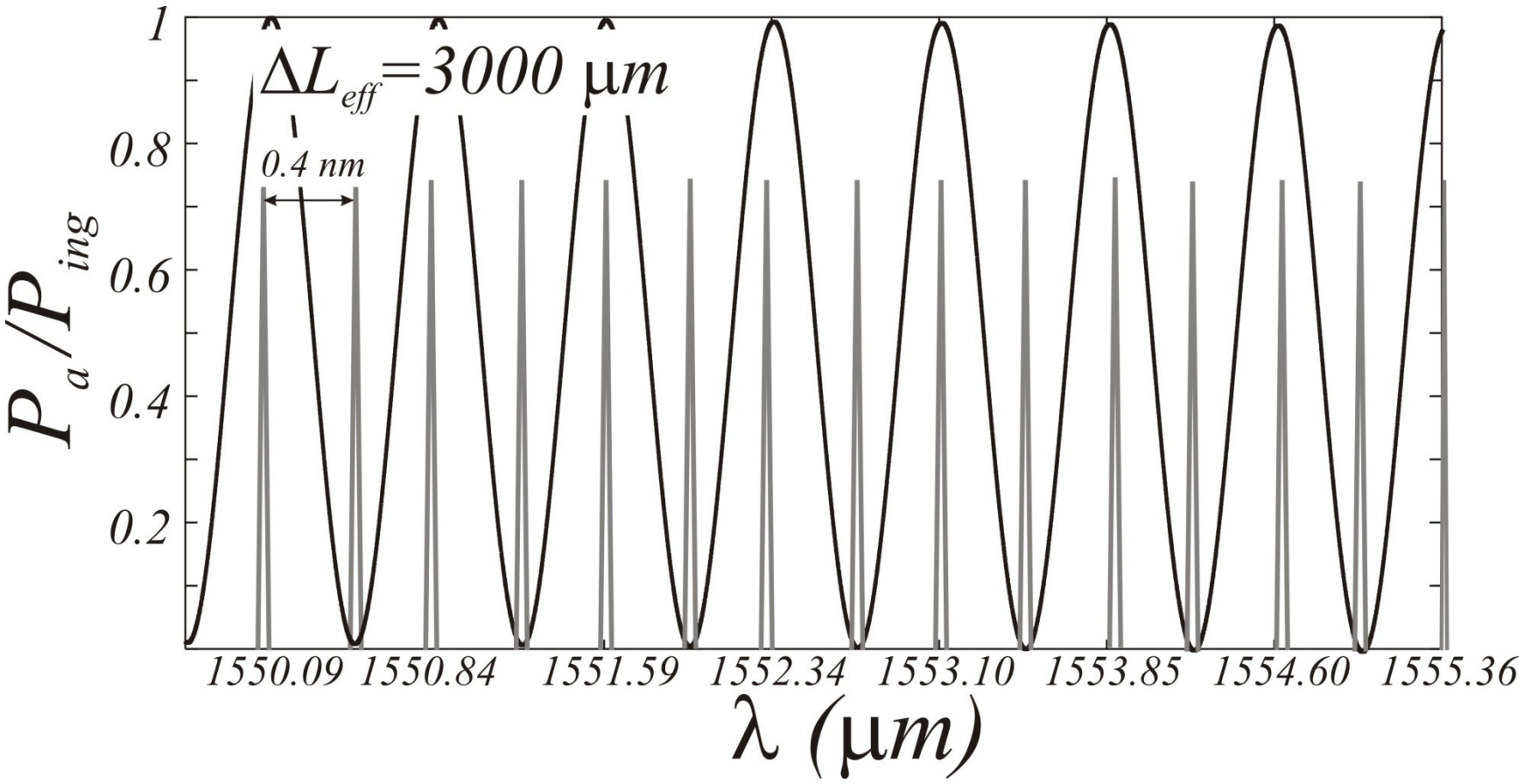



$\Delta L_{eff}=1\ \mu m$
P_a/P_{ing}
0
0.2
0.4
0.6
0.8
1
1
1.2
1.4
1.6
1.8
2
$\lambda\ (\mu m)$

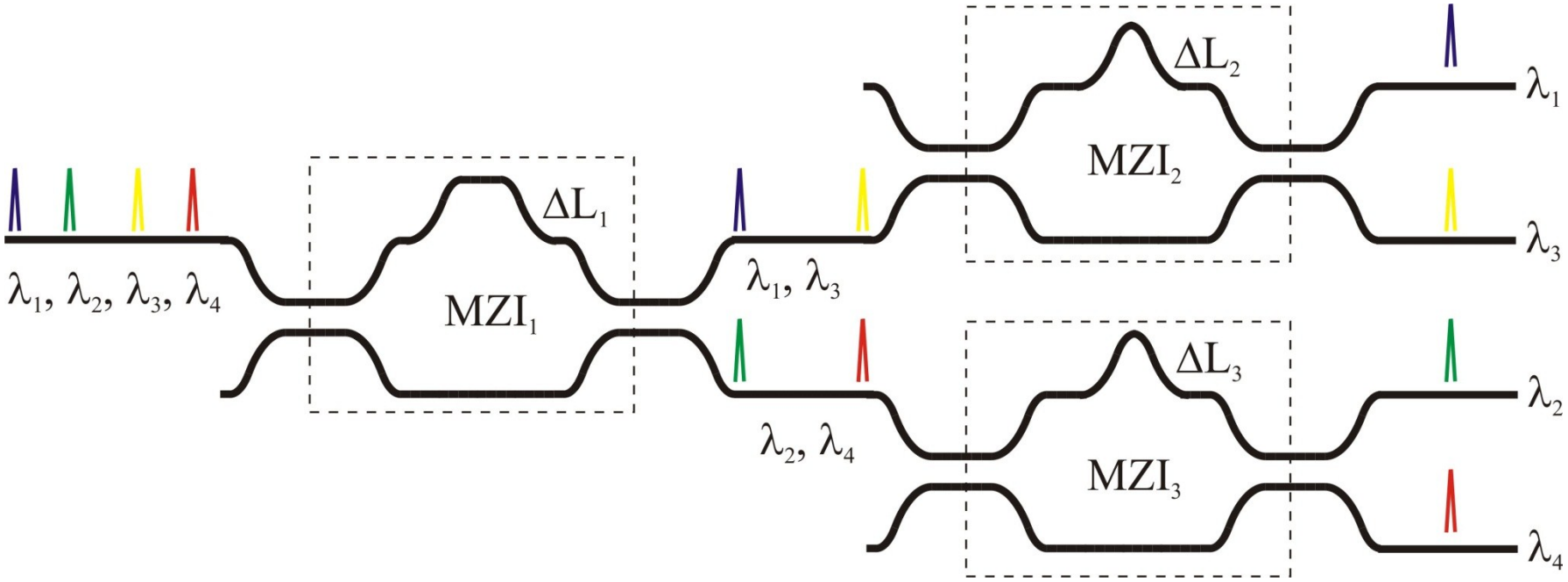

ΔL_{eff}=10 μm
P_a/P_{ing}
1
0.8
0.6
0.4
0.2
0
1
1.2
1.4
1.6
1.8
2
λ (μm)


ΔL_{eff}=100 μm
P_a/P_{ing}
1
0.8
0.6
0.4
0.2
0
1
1.2
1.4
1.6
1.8
2
λ (μm)

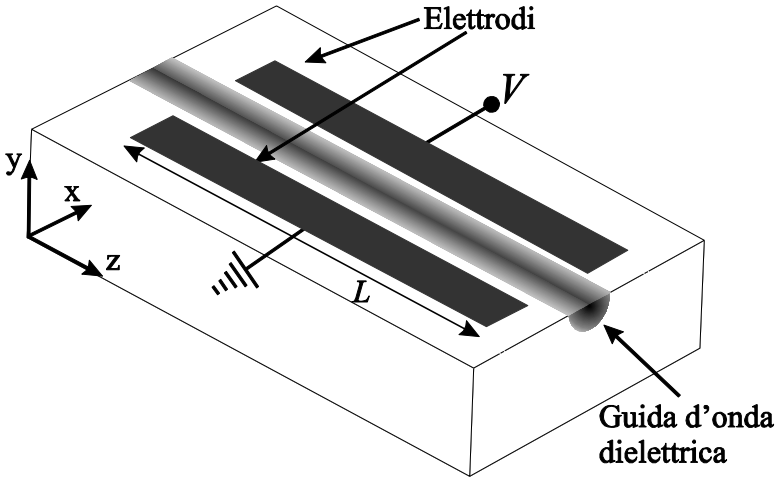

ΔL_{eff}=1000 μm
P_a/P_{ing}
1
0.8
0.6
0.4
0.2
0
1
1.2
1.4
1.6
1.8
2
λ (μm)

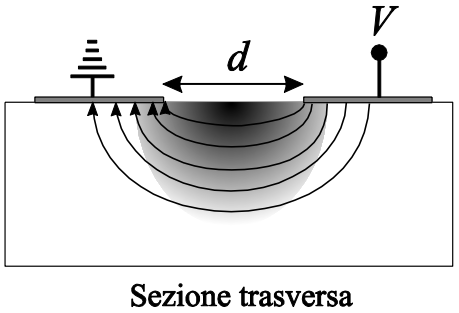


Spaziatura $\Delta\lambda$=0.4 nm

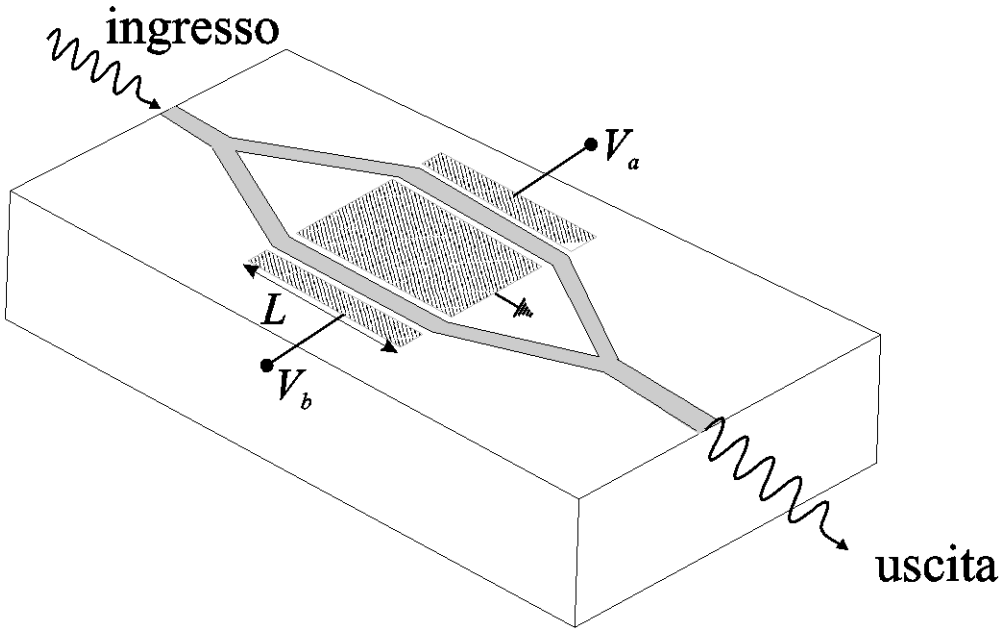

ΔL2
MZI2
λ1
λ3
ΔL1
λ1, λ2, λ3, λ4
MZI1
λ1, λ3
ΔL3
λ2
λ2, λ4
MZI3
λ4

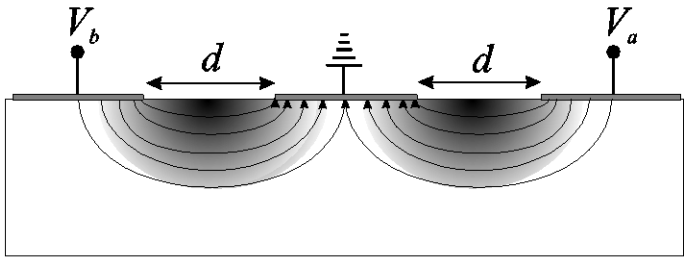
Modulatori elettro-ottici



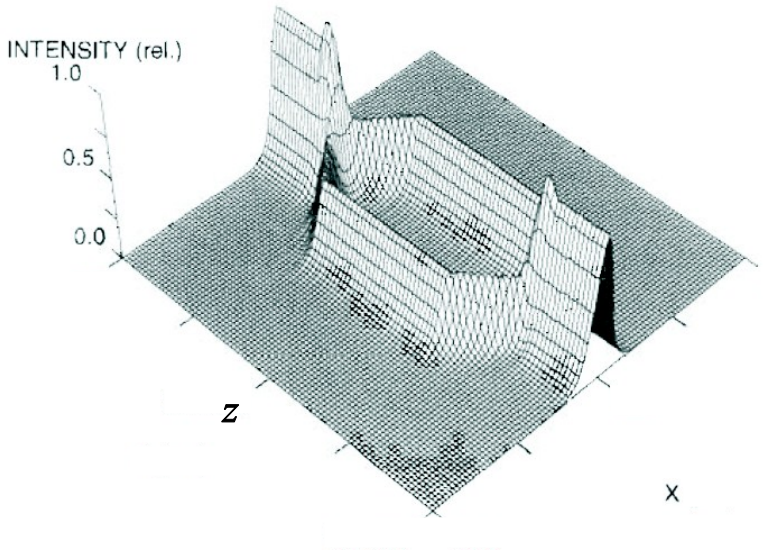


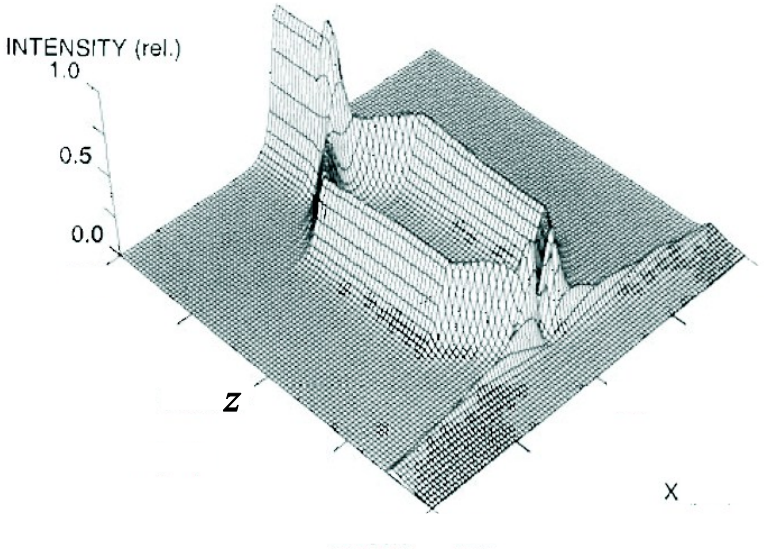
Modulatori Mach-Zehnder

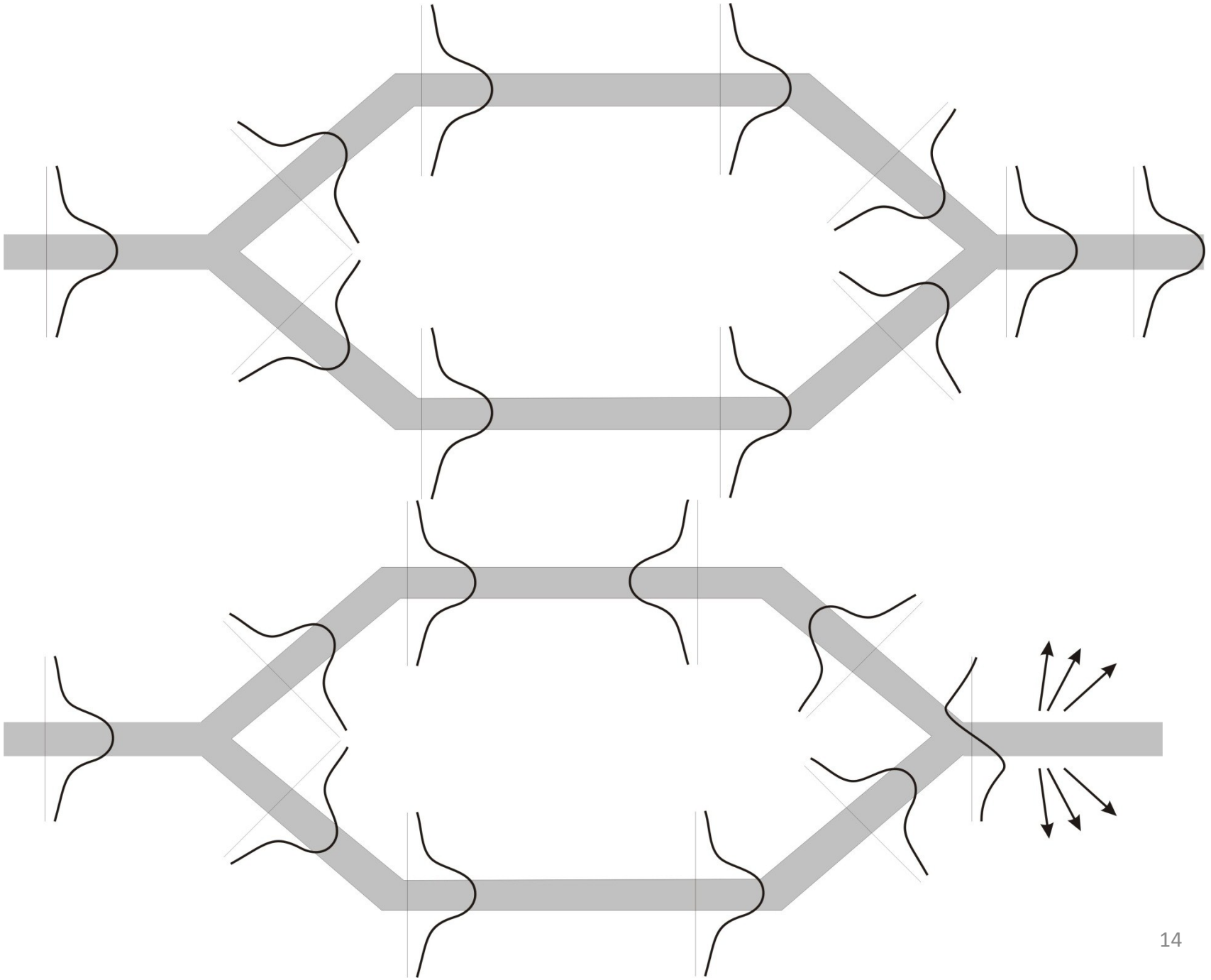


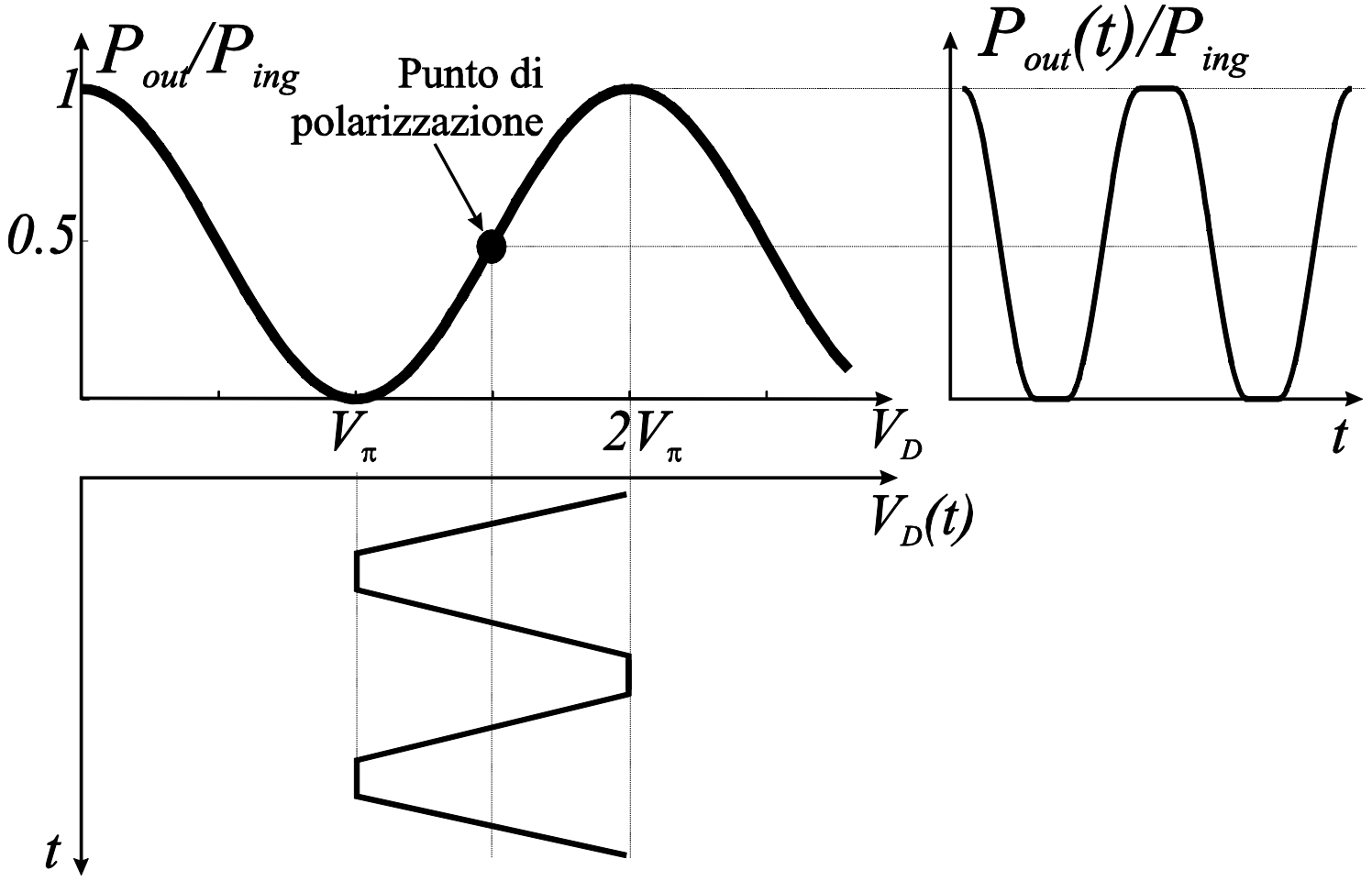


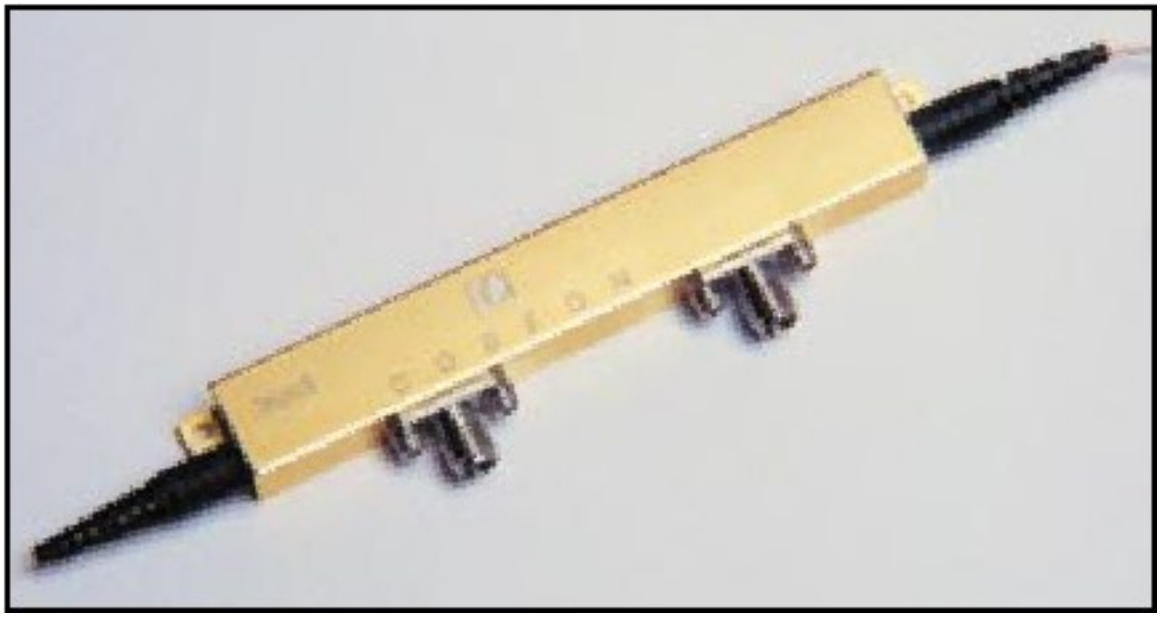
Sezione trasversa

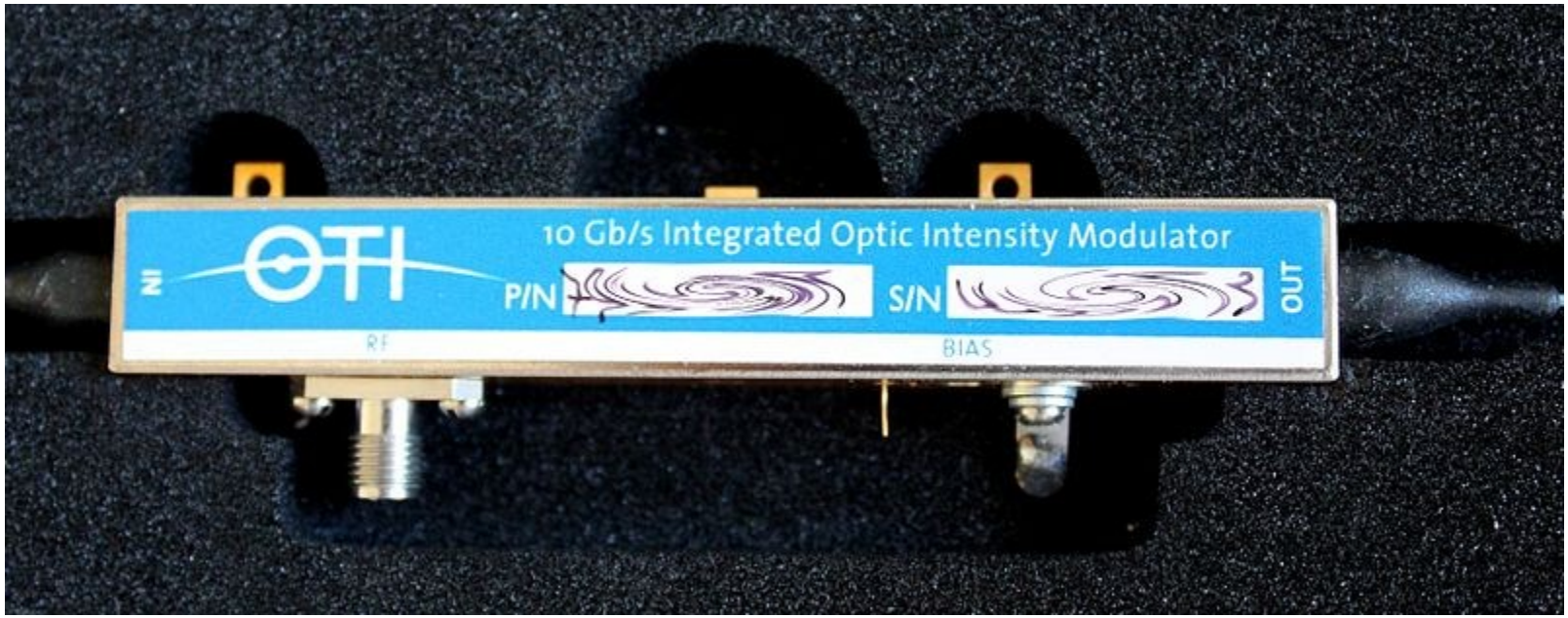

INTENSITY (rel.)
1.0
0.5
0.0
z
x


INTENSITY (rel.)
1.0
0.5
0.0
z
x

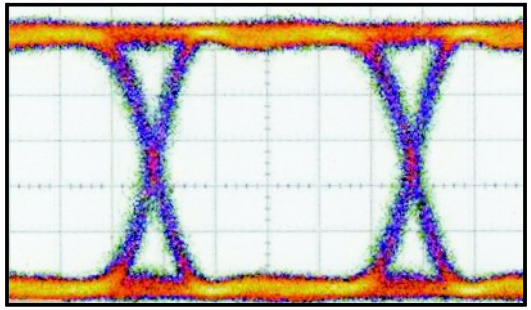


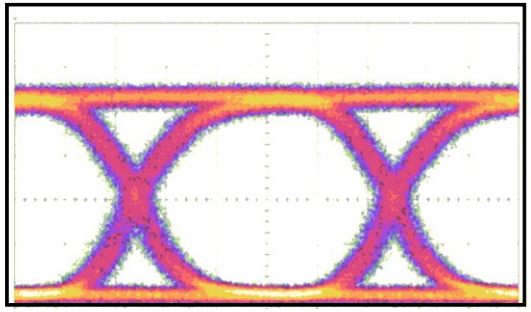

P_{out}/P_{ing}
1
0.5
Punto di polarizzazione
V_π
$2V_\pi$
V_D
$V_D(t)$
t
$P_{out}(t)/P_{ing}$
t

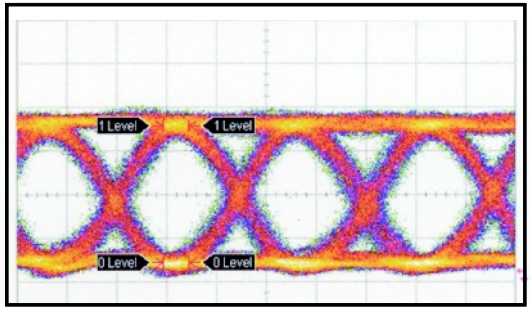



IN
OTI
10 Gb/s Integrated Optic Intensity Modulator
P/N
S/N
OUT
RF
BIAS

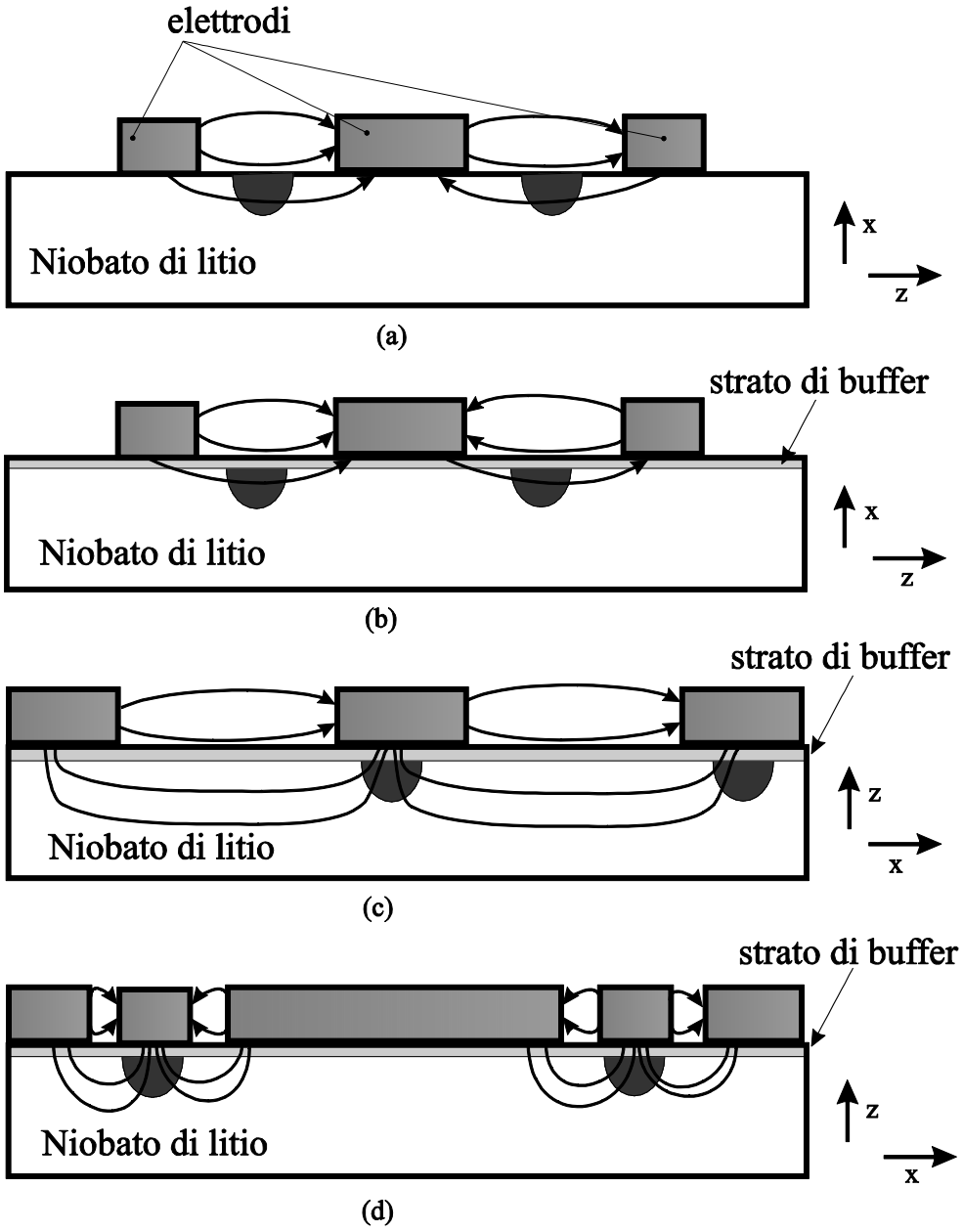
10Gb/s, 20Gb/s, 40Gb/s



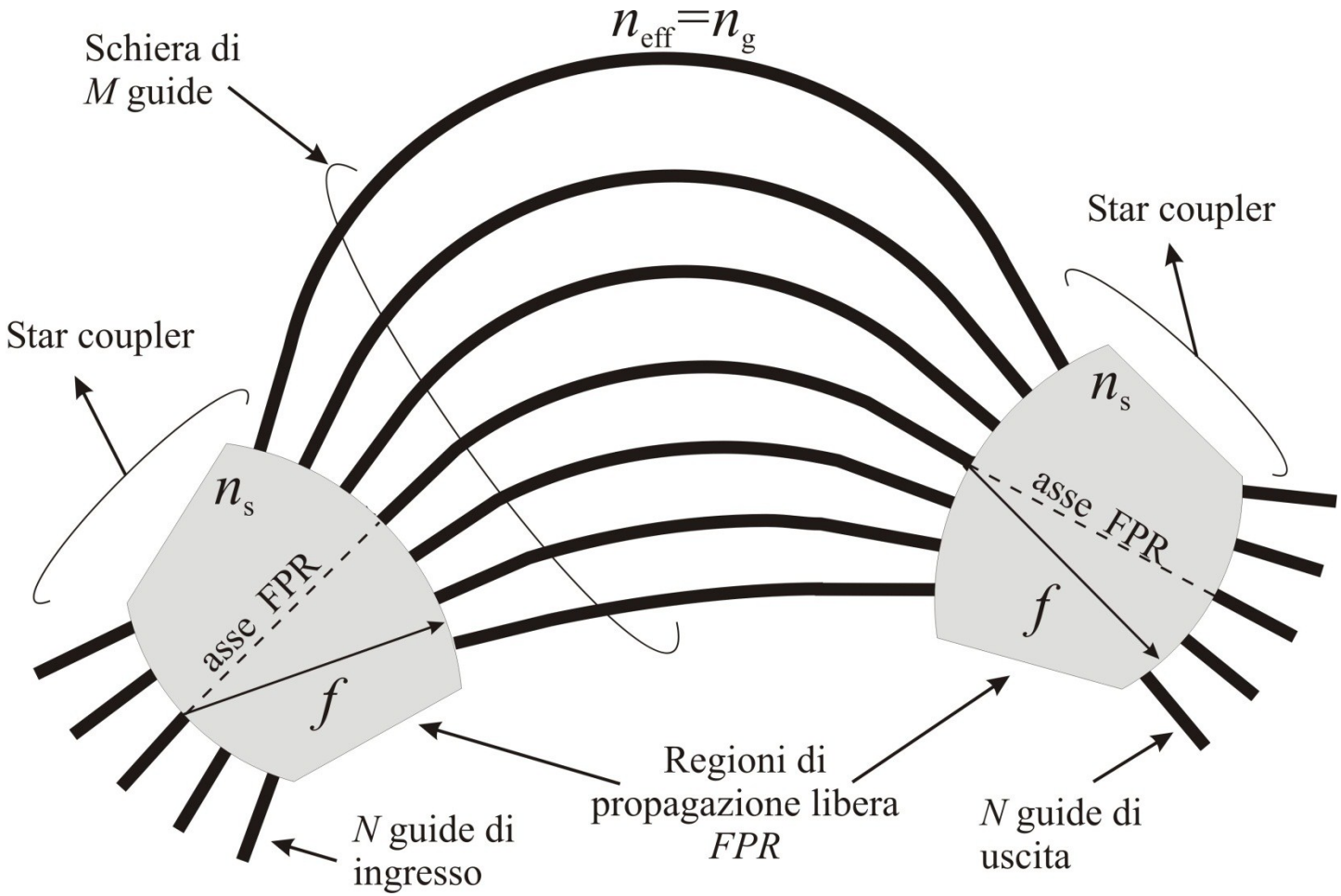
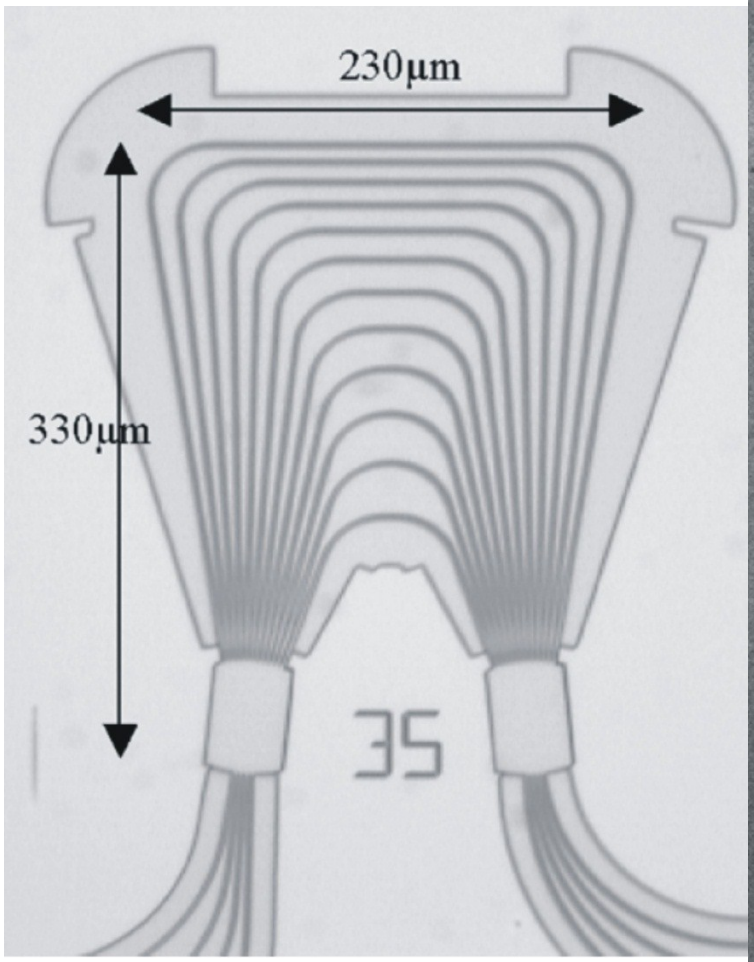
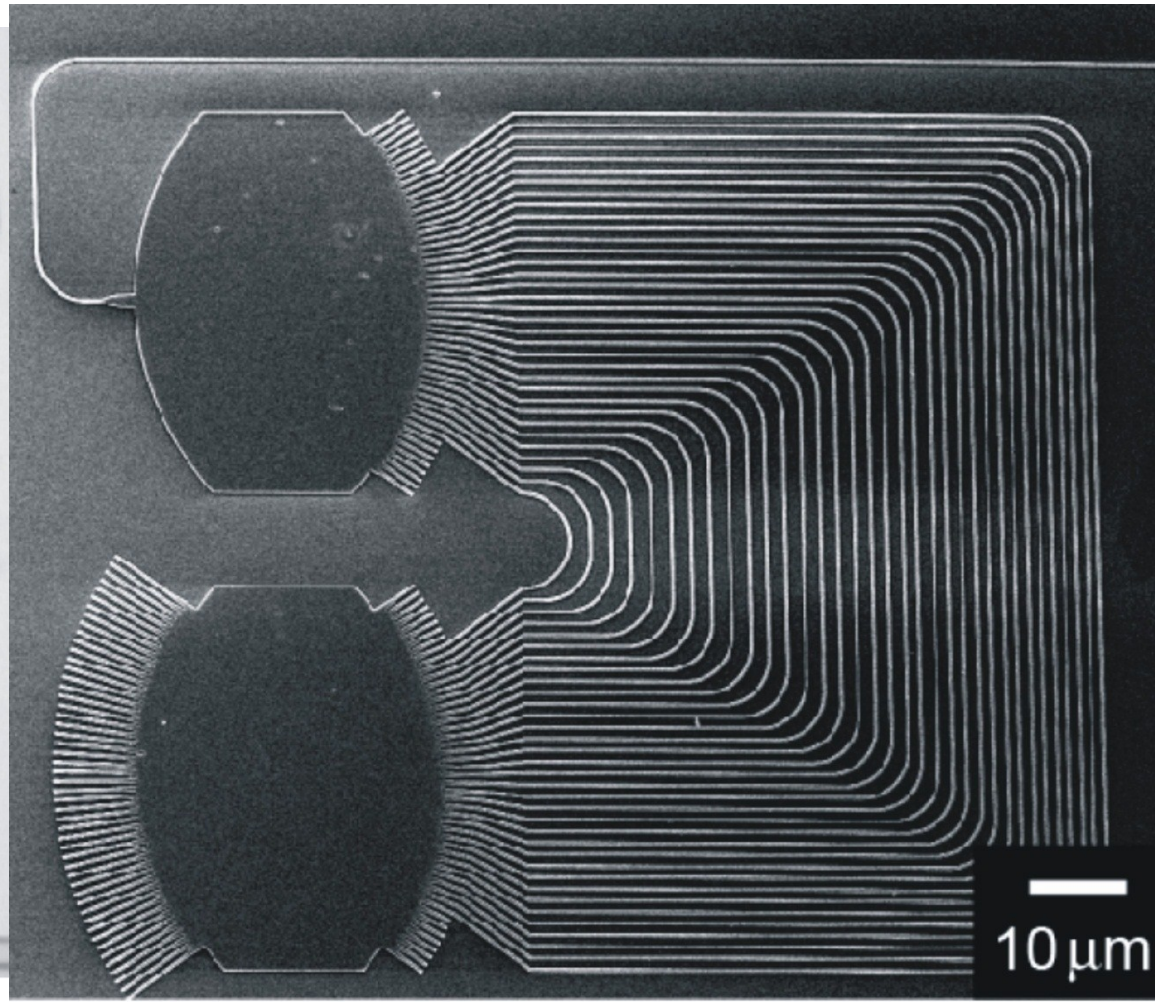




$LiNbO_3$ - Configurazioni elettrodi



Arrayed Waveguide Grating



AWG con tecnologia InP e SOI