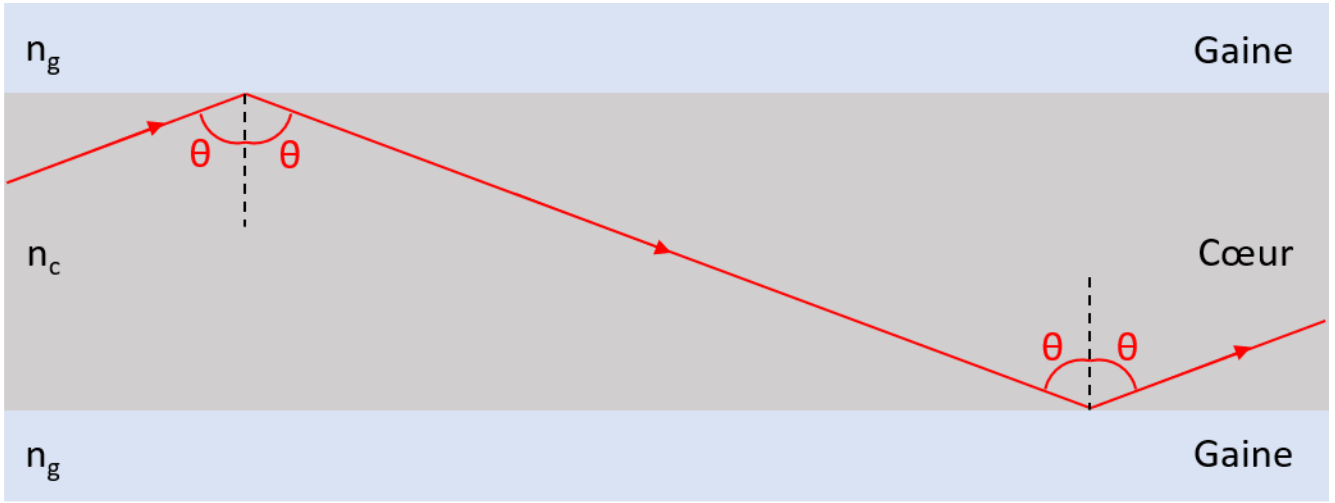
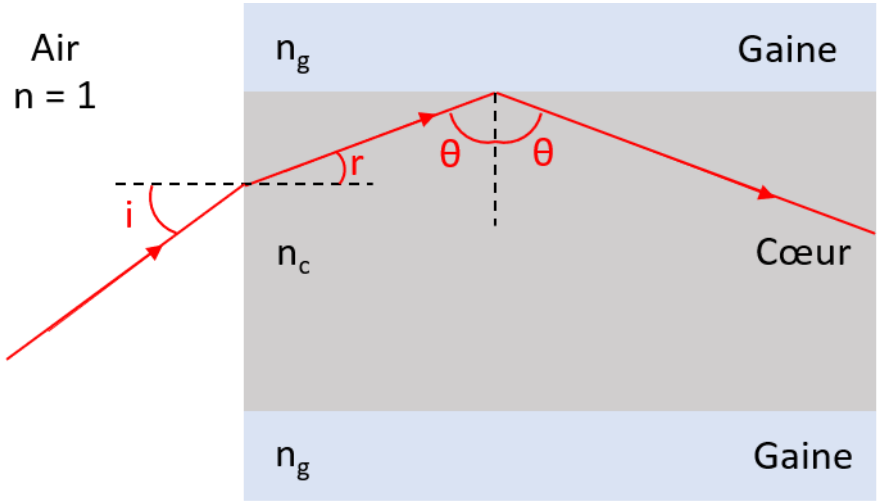
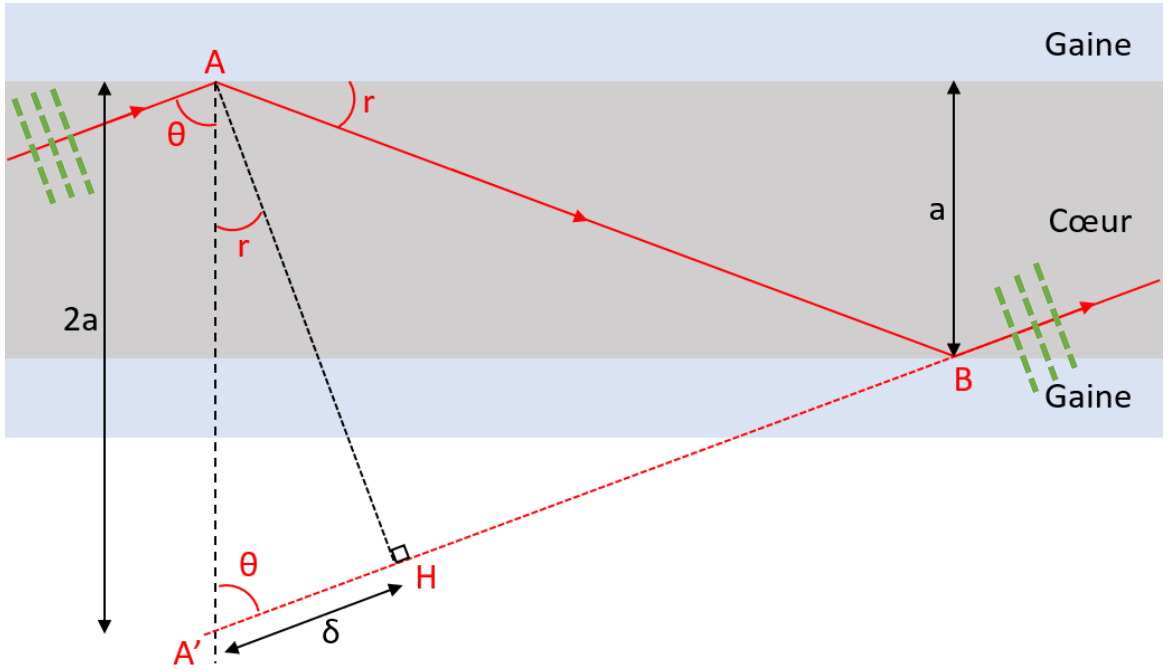
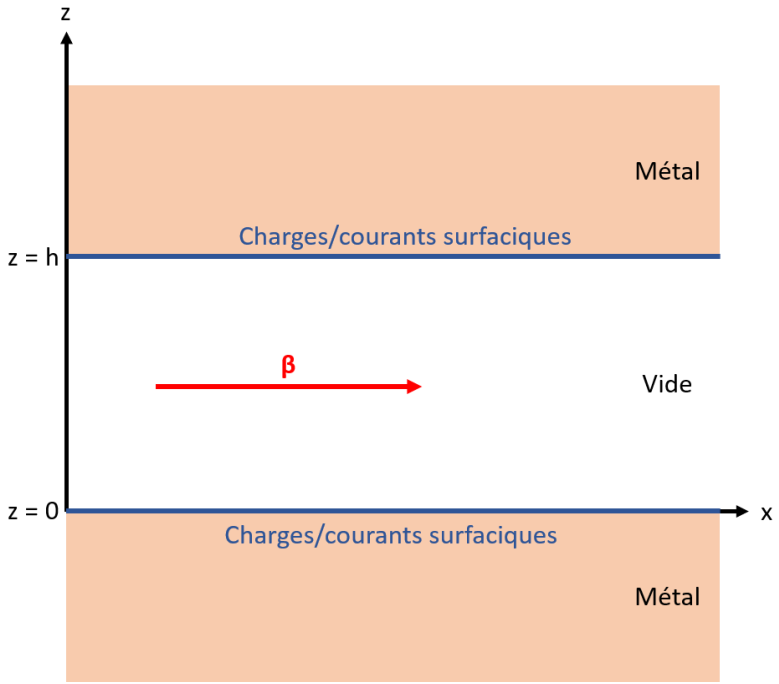

n_g
Gaine
θ
θ
n_c
Cœur
θ
θ
n_g
Gaine


Air
n = 1
n_g
Gaine
r
θ
θ
i
n_c
Cœur
n_g
Gaine


Gaine
A
θ
r
r
a
Cœur
2a
B
Gaine
θ
H
A'
δ

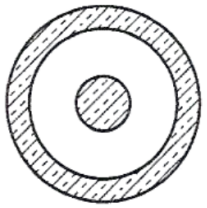
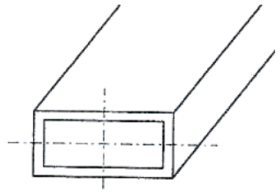
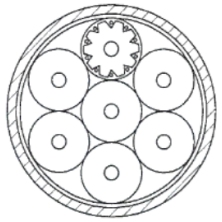

z
Métal
Charges/courants surfaciques
z = h
β
Vide
z = 0
x
Charges/courants surfaciques
Métal

$$\begin{cases} \partial_x B_x + \partial_z B_z = 0 \\ \partial_z B_x - \partial_x B_z = \dfrac{1}{c^2}\partial_t E_y \\ -\partial_z E_y = -\partial_t B_x \\ \partial_x E_y = -\partial_t B_z \end{cases}$$

Onde TE

$$\begin{cases} \partial_x E_x + \partial_z E_z = 0 \\ \partial_z E_x - \partial_x E_z = -\partial_t B_y \\ -\partial_z B_y = \dfrac{1}{c^2}\partial_t E_x \\ \partial_x B_y = \dfrac{1}{c^2}\partial_t E_z \end{cases}$$

Onde TM

	Ligne bifilaire	Ligne coaxiale	Guide d'ondes	Fibre optique
Vue en coupe				
Fréquence d'utilisation	10^9 Hz	10^{10} GHz	3 - 90 GHz	10^{14} Hz
Bande passante	Très faible	12 - 60 MHz	10 GHz	1 GHz
Modes	-	TE, TM, TEM	TE, TM	-
Atténuation	-	-	-0.1 dB/m	-0.01 dB/m
Débit de données	1 communication téléphonique par ligne	Plusieurs centaines de communications	-	10^{10} bits/s