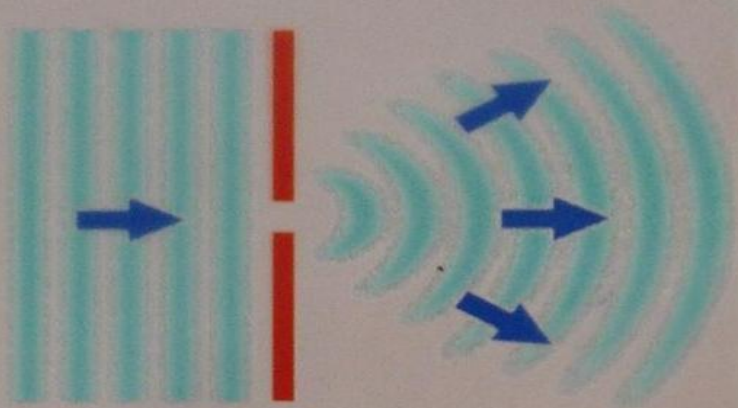
DIFRAÇÃO E INTERFERÊNCIA: EQUAÇÃO DA FENDA DUPLA E FENDA SIMPLES

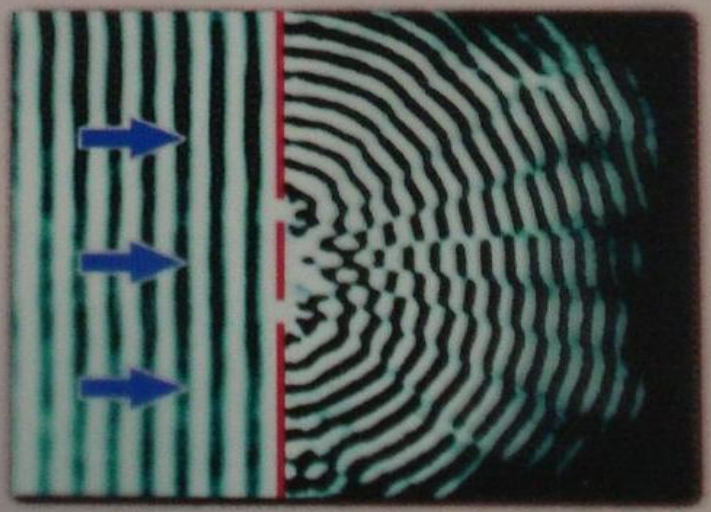
DIFRAÇÃO

Desvio da onda (luz) ao passar por pequenas fendas ou obstáculos.



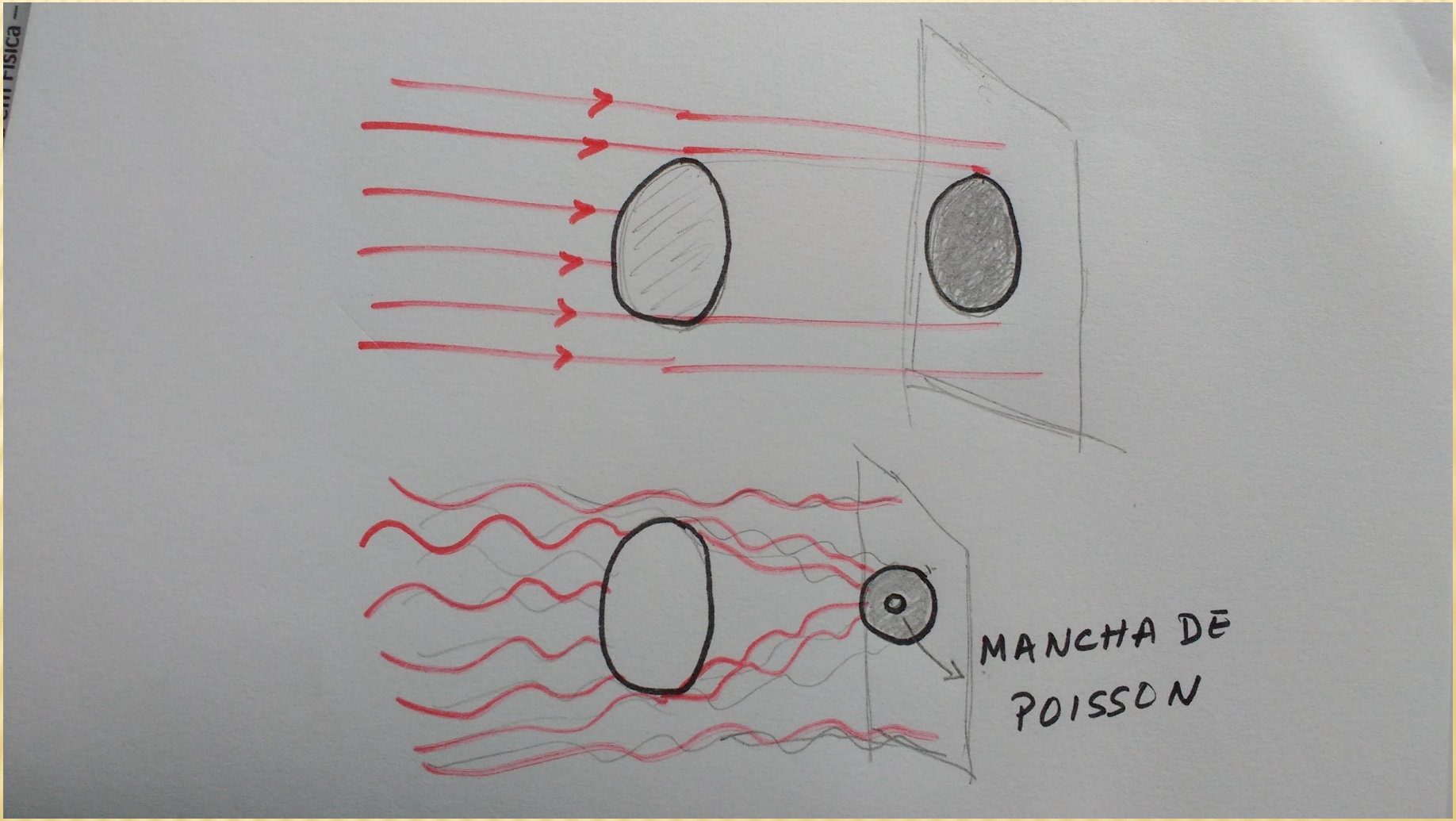
INTERFERÊNCIA

As ondas que difratam em S1 e S2 se interferem formando pontos de máxima e mínima intensidade.

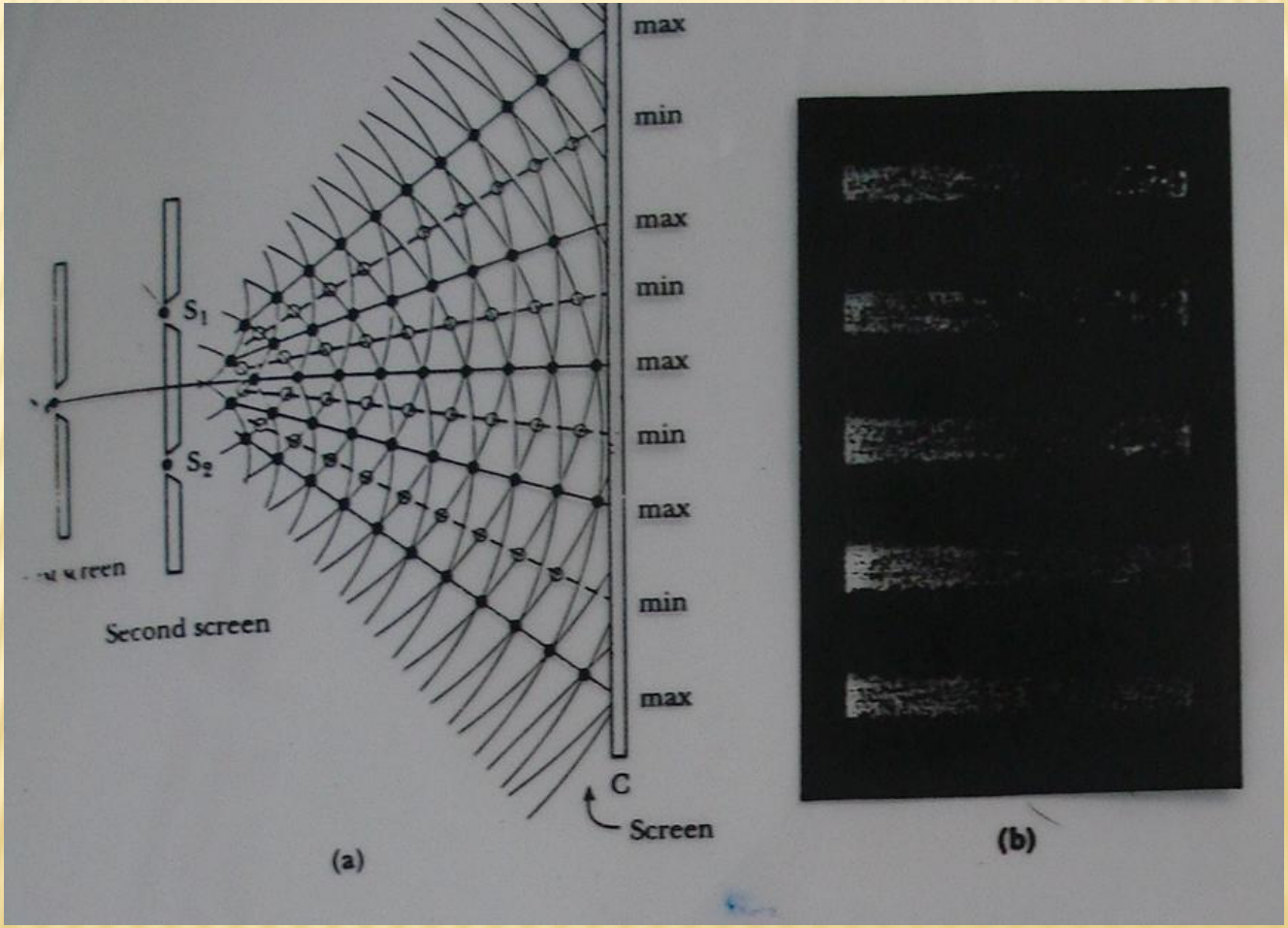


EXEMPLO DE DIFRAÇÃO E INTERFERÊNCIA: MANCHA DE POISSON

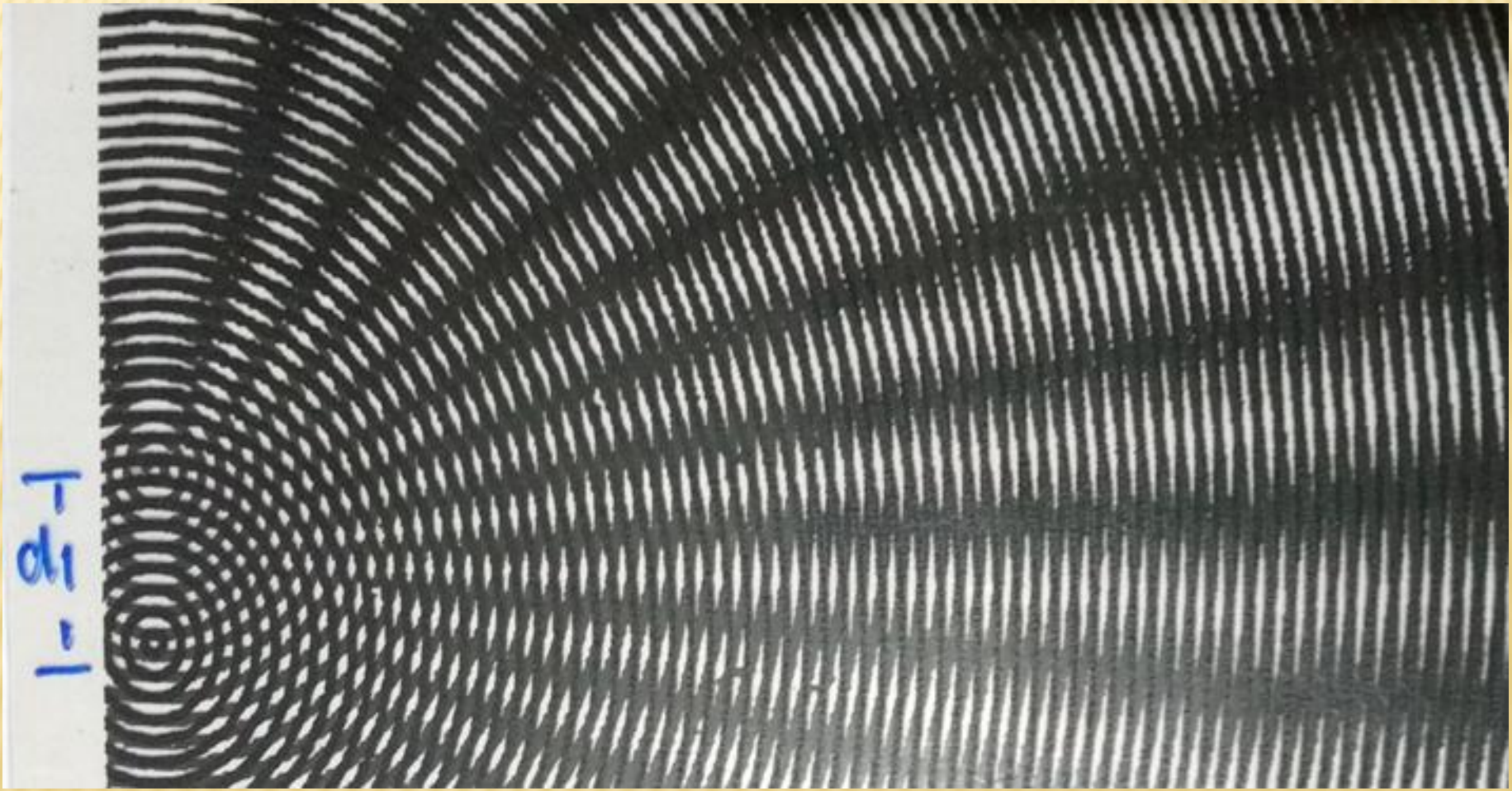

15 11:12


MANCHA DE
POISSON

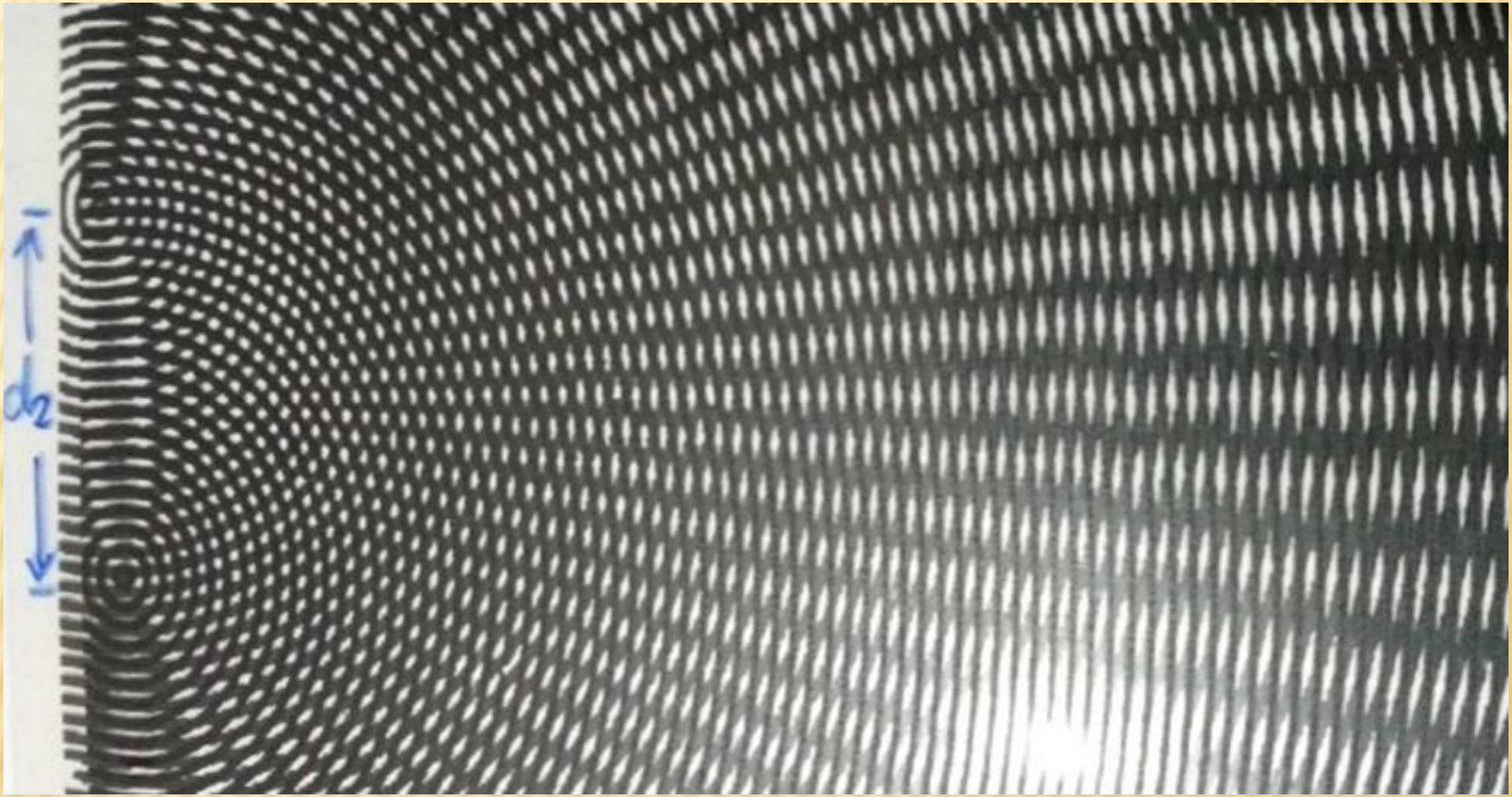
EXEMPLO DE DIFRAÇÃO E INTERFERÊNCIA: FENDA DUPLA



FENDA DUPLA (D1)



FENDA DUPLA (D2)



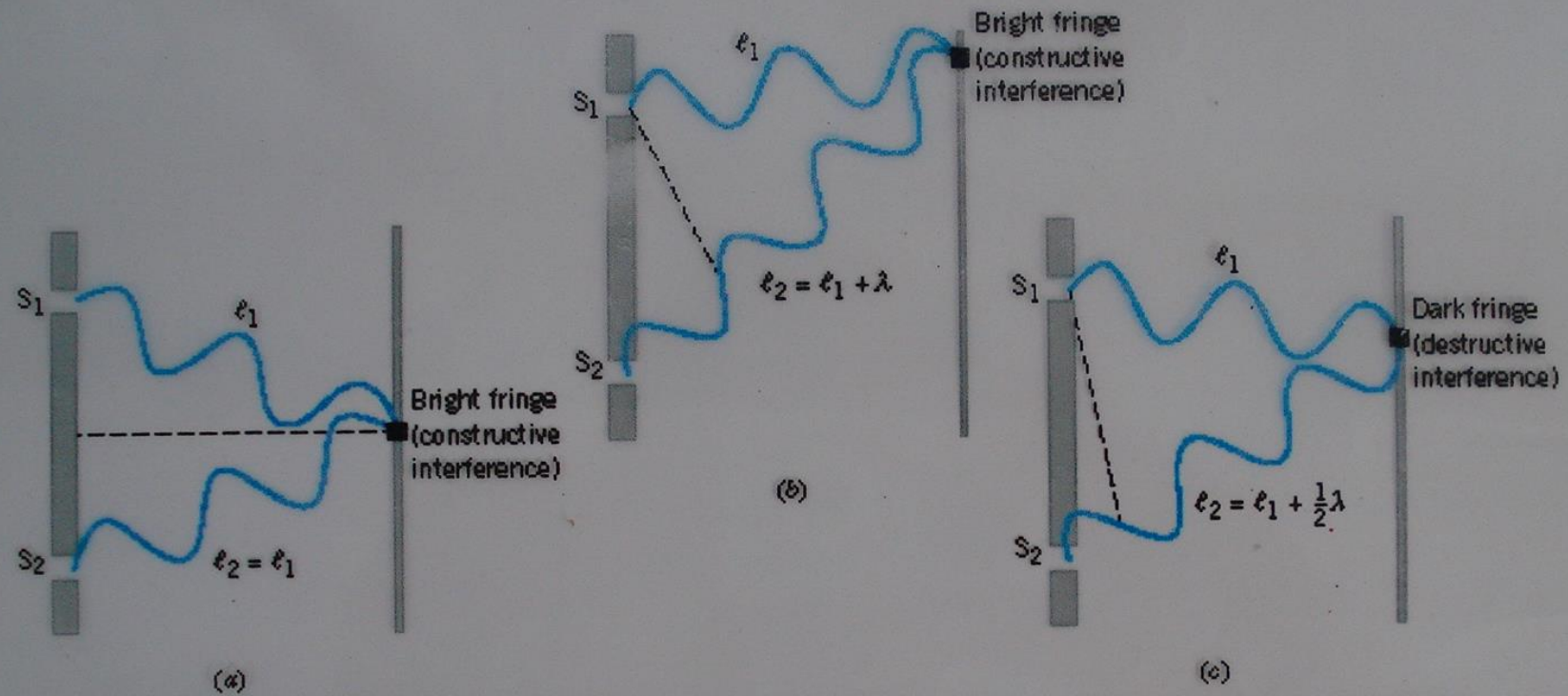
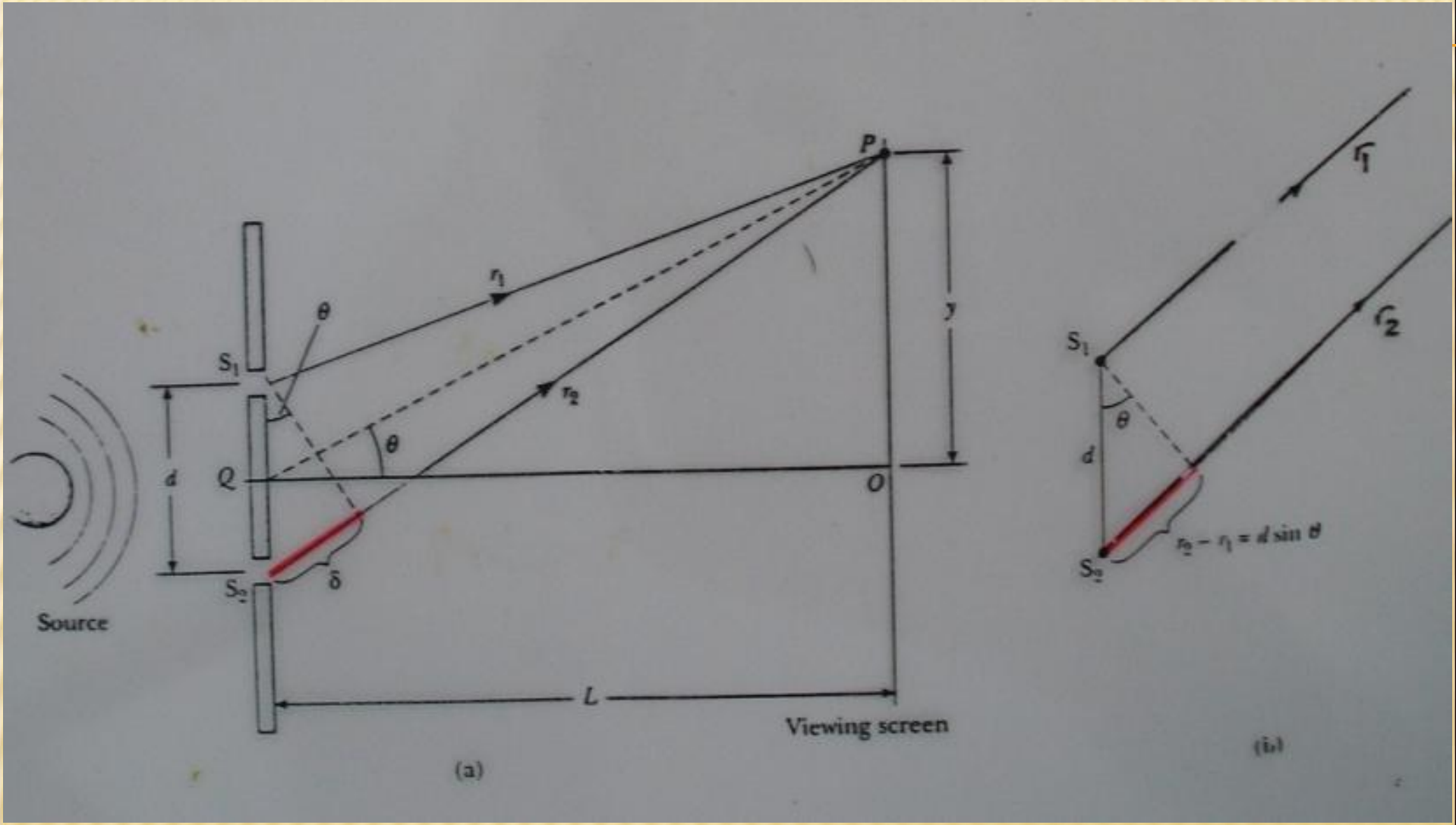
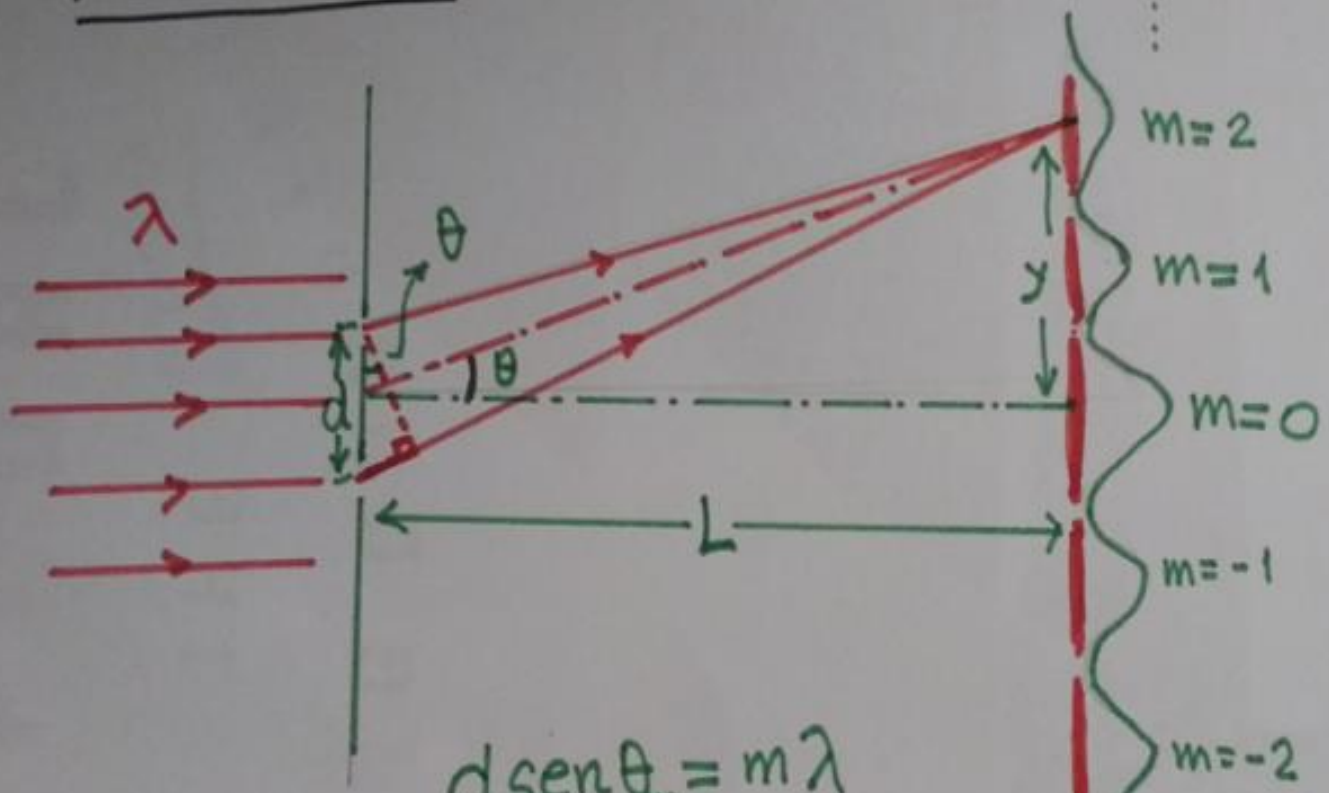


Figure 27.6 The waves from slits S_1 and S_2 interfere constructively (parts *a* and *b*) or destructively (part *c*) on the screen, depending on the difference in distances between the slits and the screen. The slit widths and the distance between the slits have been exaggerated for clarity.


P
r_1
r_2
θ
S_1
S_2
d
Q
O
y
δ
Source
L
Viewing screen
(a)
r_1
r_2
S_1
S_2
θ
d
$r_2 - r_1 = d \sin \theta$

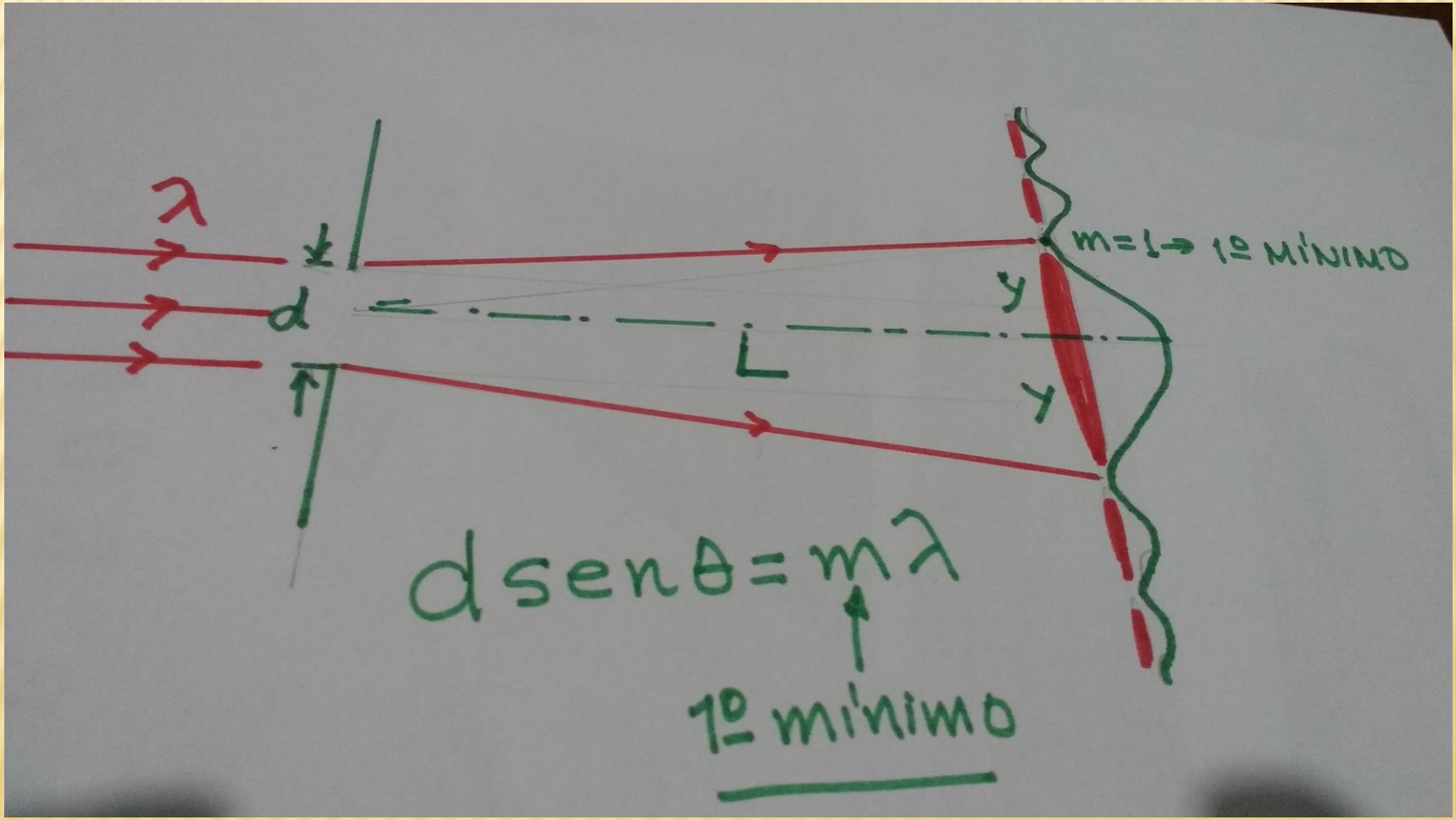
FENDA DUPLA

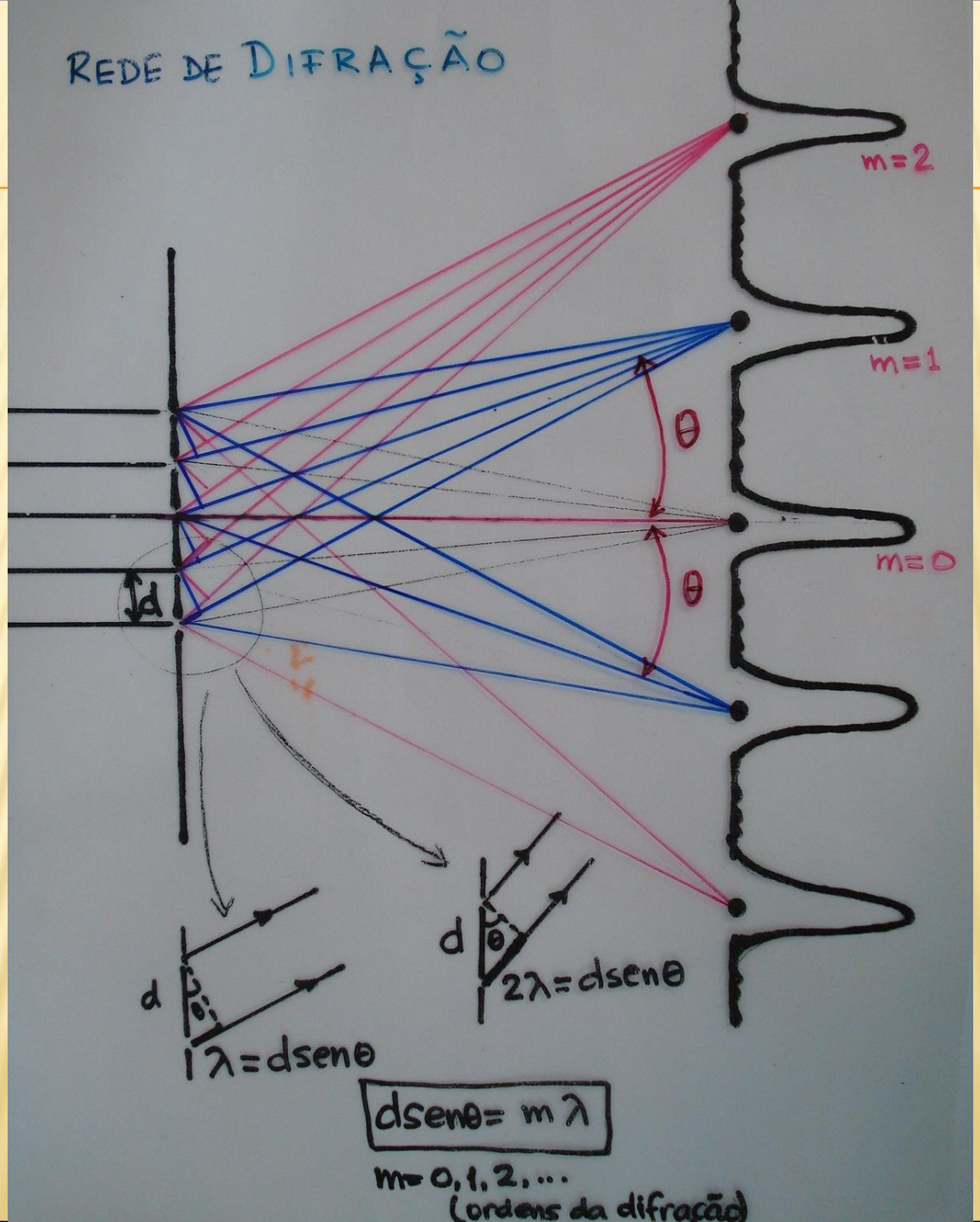


$$d.\text{sen}\,\theta_m = m\lambda$$

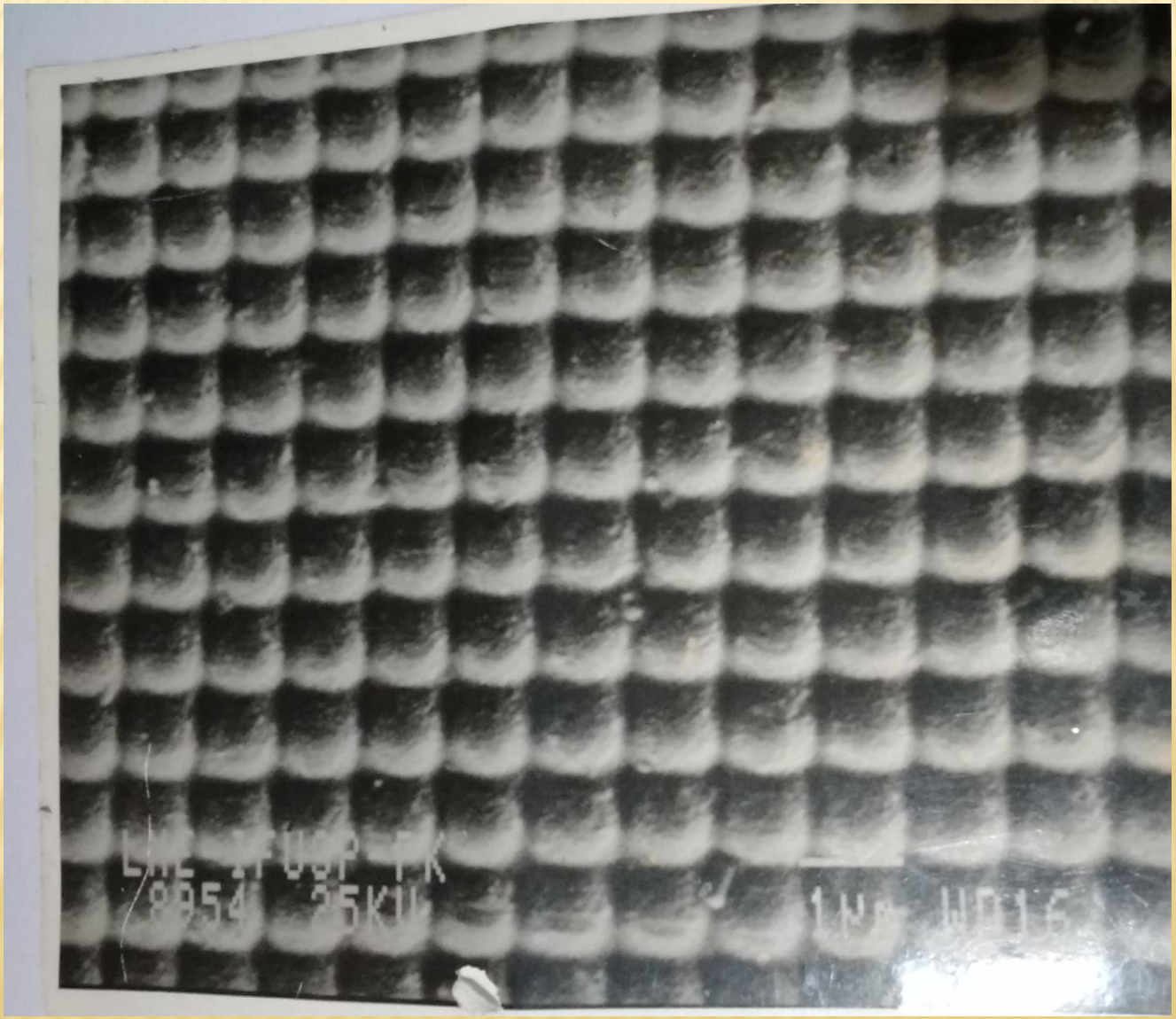
d → largura da fenda
λ → comprimento de onda
m → ordem da franja (construtiva)
θ → localização da franja.

FENDA ÚNICA




REDE DE DIFRAÇÃO
m=2
m=1
m=0
θ
θ
d
d
θ
λ=dsenθ
d
θ
2λ=dsenθ
dsenθ= mλ
m= 0, 1, 2, ...
(ordens da difração)

REDE DE DIFRAÇÃO – 1 MICRON



REDE DE DIFRAÇÃO – 1 MICRON

DESAFIO – DETERMINAR O DIÂMETRO DO FIO DE CABELO DA SEGUINTE FIGURA:

Dados: laser de He-Ne; comprimento de onda: 0,633 micrometro, fio de cabelo a 290cm da tela.