

Óptica e Ondas eletromagnéticas

A 3D rendering of a blue glass prism. A white light beam enters from the left, passes through the prism, and is dispersed into a rainbow spectrum of colors (red, orange, yellow, green, cyan, blue, purple) exiting to the right. The prism is set against a dark background with a light blue gradient at the bottom.

Instituto Federal do Paraná
Licenciatura em Física
6º período

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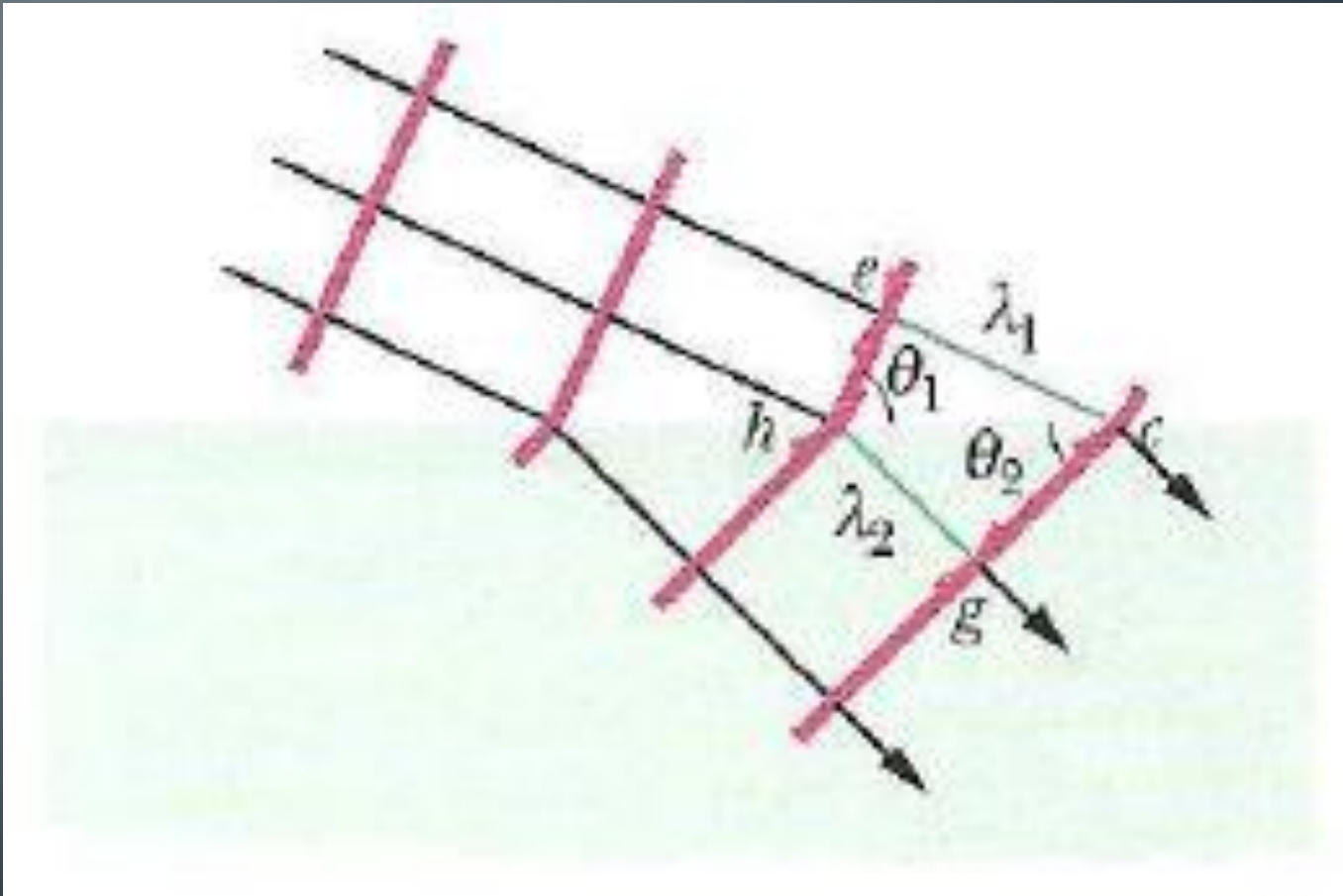
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Dedução da lei de refração

$$n = \frac{c}{v}$$

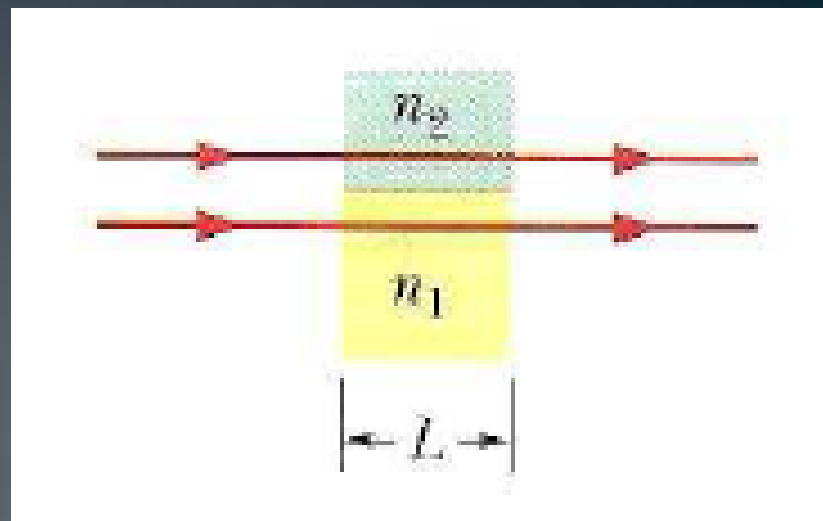
- Refração: mudança de velocidade no meio
- Várias frentes de onda

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$



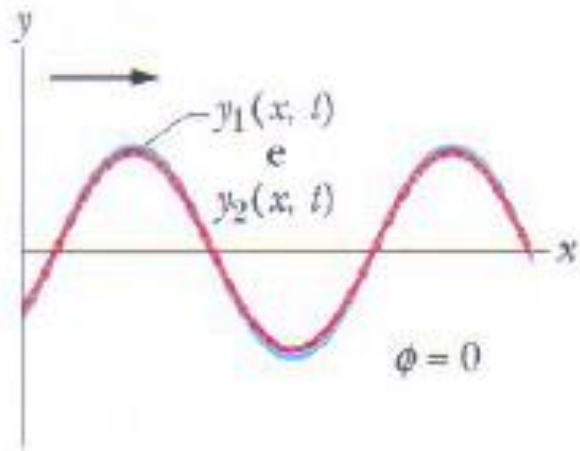
Diferença de fase

$$N_2 - N_1 = \frac{L}{\lambda} (n_2 - n_1)$$

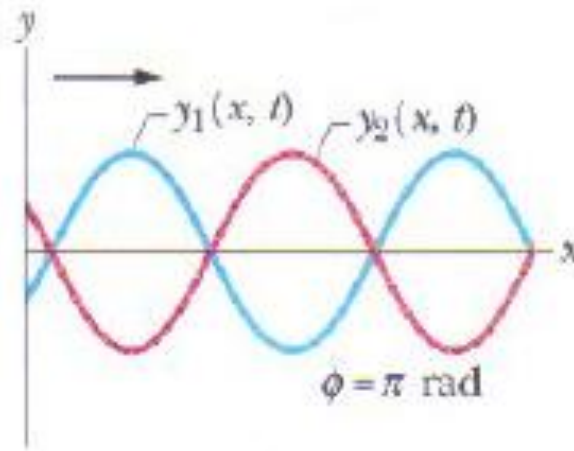


- Diferença efetiva de fase: fração decimal
- 0,5: interferência destrutiva
- 0 ou 1: interferência construtiva
- 0,6: interferência intermediária (mais próxima da destrutiva)

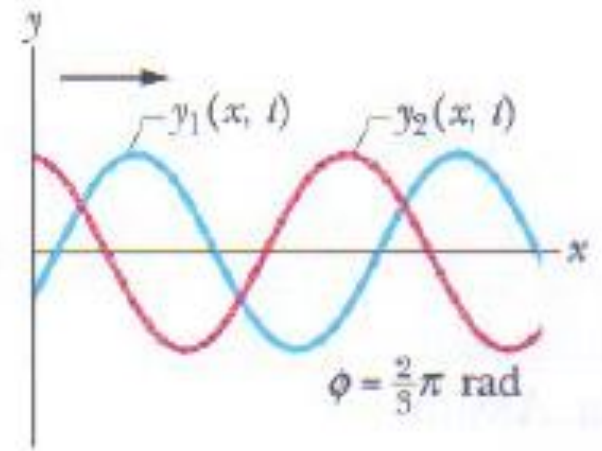
Princípio de superposição de ondas



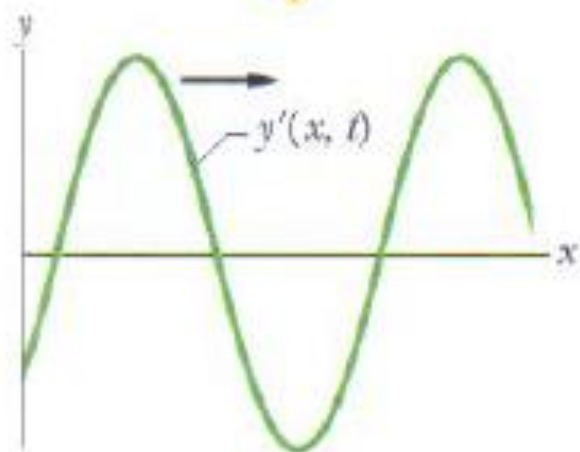
(a)



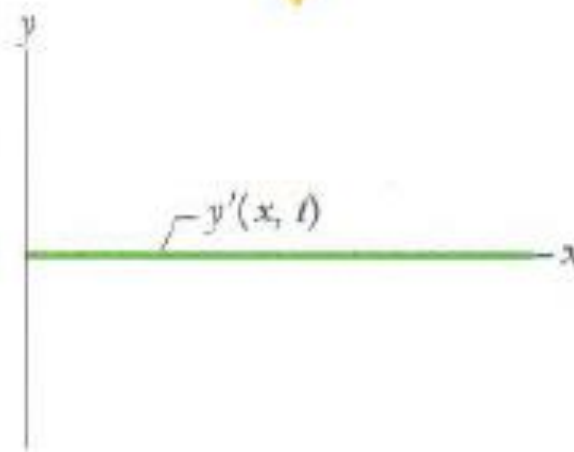
(b)



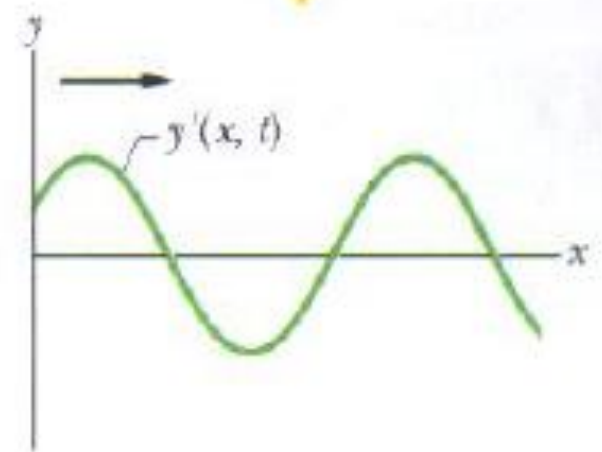
(c)



(d)



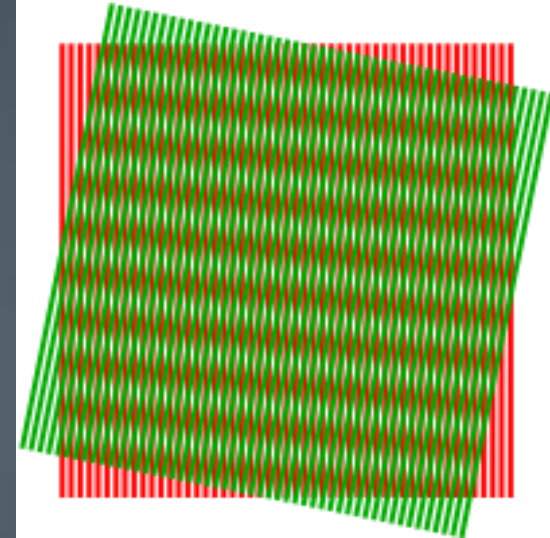
(e)



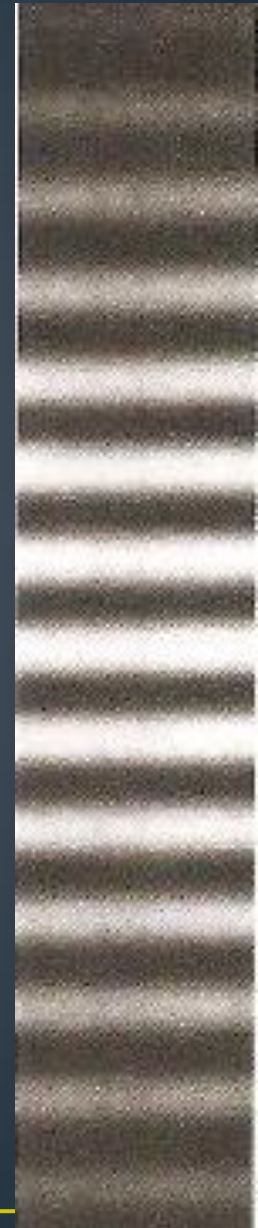
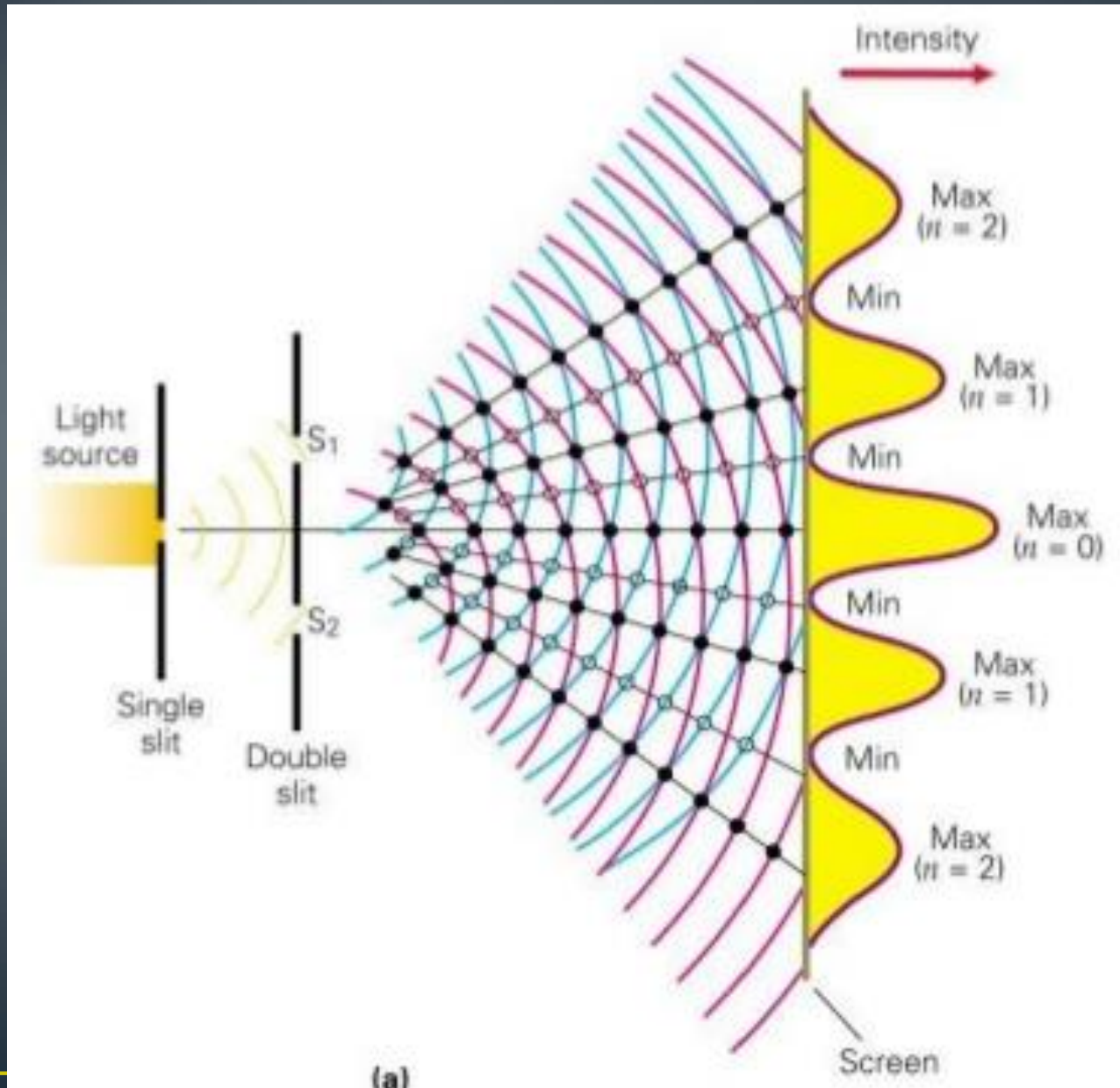
(f)

Interferência de ondas

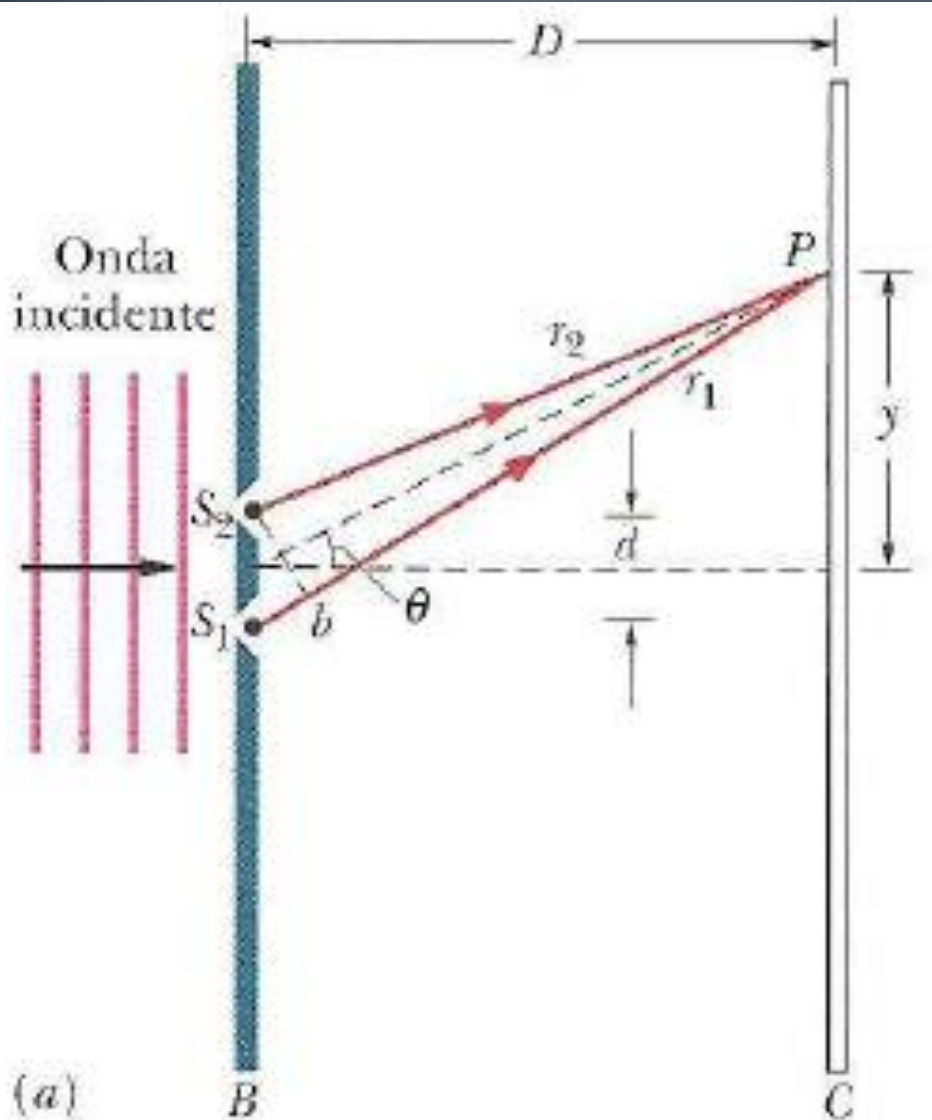
- Ondas superpostas interferem para produzir uma **onda resultante** e um **padrão de interferência**



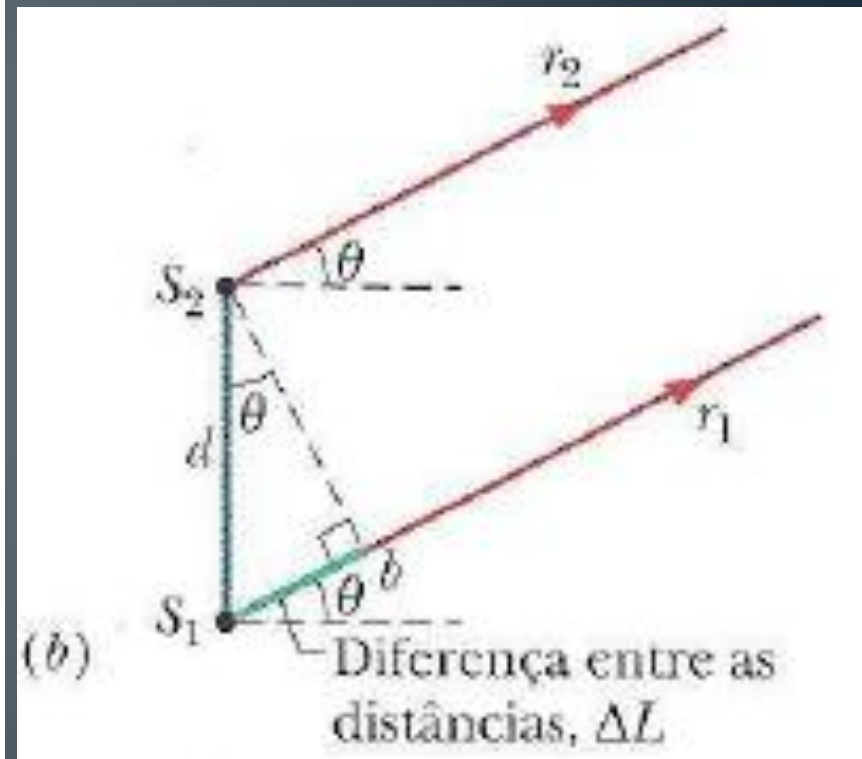
Experimento de Young - dupla fenda (1801)



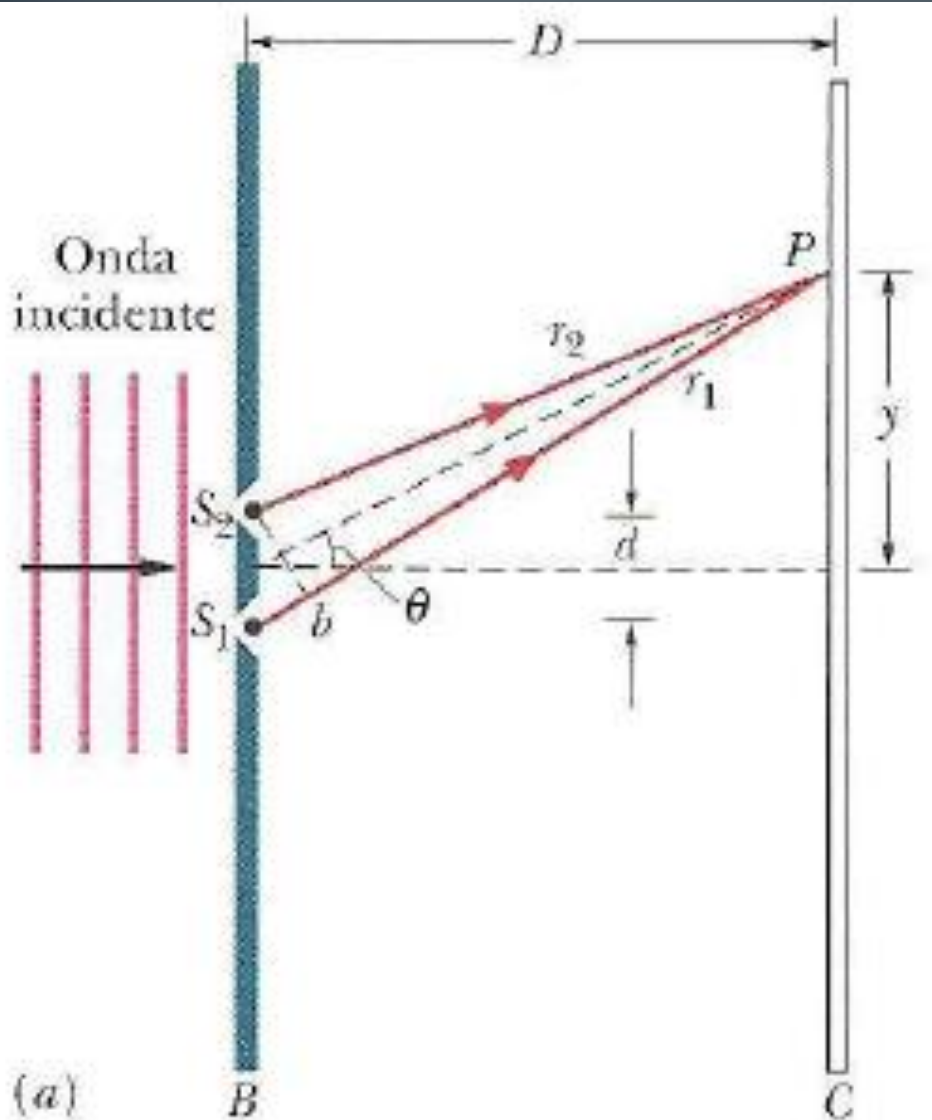
Localização das franjas



Para $D \gg d$:



Localização das franjas



- Interferência construtiva (máximos de intensidade):

$$\Delta L = m\lambda$$

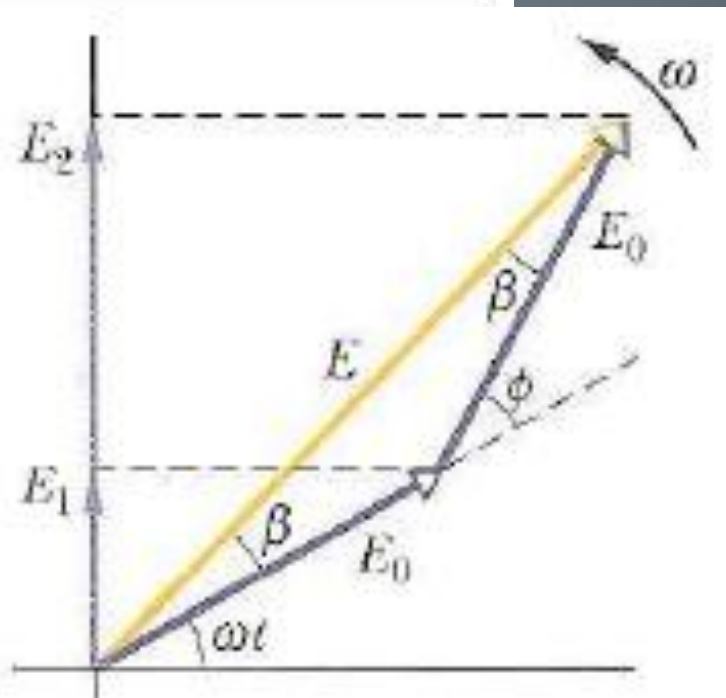
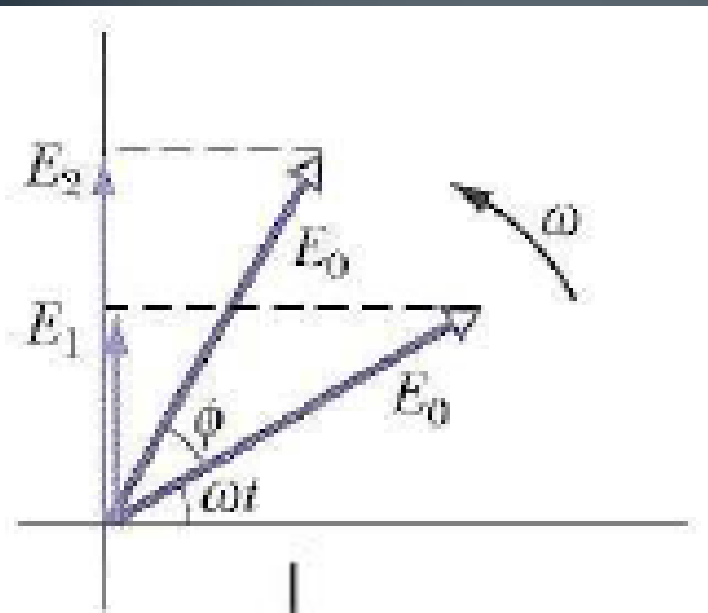
$$m=0,1,2,\dots$$

- Interferência destrutiva (mínimos de intensidade):

$$\Delta L = \left(m + \frac{1}{2}\right)\lambda$$

$$m=0,1,2,\dots$$

Intensidade das franjas de interferência



Método dos fasores

- Considerar $t=0$
- Determinar as componentes horizontal e vertical
- Determinar a amplitude da onda resultante
- Determinar o ângulo entre E_r e E_1

Lista de exercícios (Entrega 20/11)

- Halliday, D.; Resnick, R.; Walker, J. Fundamentos de Física 4, Rio de Janeiro: LTC, 2009 – 8ª edição
- Exercícios cap. 35:
- Problemas:
pags. 101 a 103, exs. 10, 12, 24, 31, 85, 88