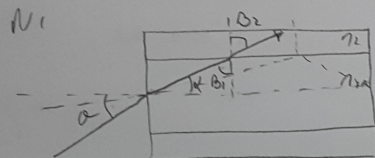


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Apertura numerica



$$n_1 \sin \alpha = n_2 \sin \theta$$

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

$$n_1 < n_2 > n_2$$

$$n_1 = 1$$

tengo que tomar $\theta_2 = 90^\circ$

$$n_1 \sin \theta_{ic} = n_2 \sin 90^\circ$$

$$\sin \theta_{ic} = \frac{n_2}{n_1}$$

Como α y θ_{ic} son complementarios

$$\sin^2 \alpha + \sin^2 \theta_{ic} = 1 \Rightarrow \sin^2 \alpha = 1 - \left(\frac{n_2}{n_1}\right)^2$$

$$\sin \alpha = n_1 \sin \theta$$

$$\sin^2 \alpha = \frac{n_1^2 - n_2^2}{n_1^2}$$

$$\sin \theta_c = \frac{\sqrt{n_1^2 - n_2^2}}{n_2}$$

$$\sin \theta_c = \sqrt{n_1^2 - n_2^2}$$

ángulo de aceptación

cono de aceptación

