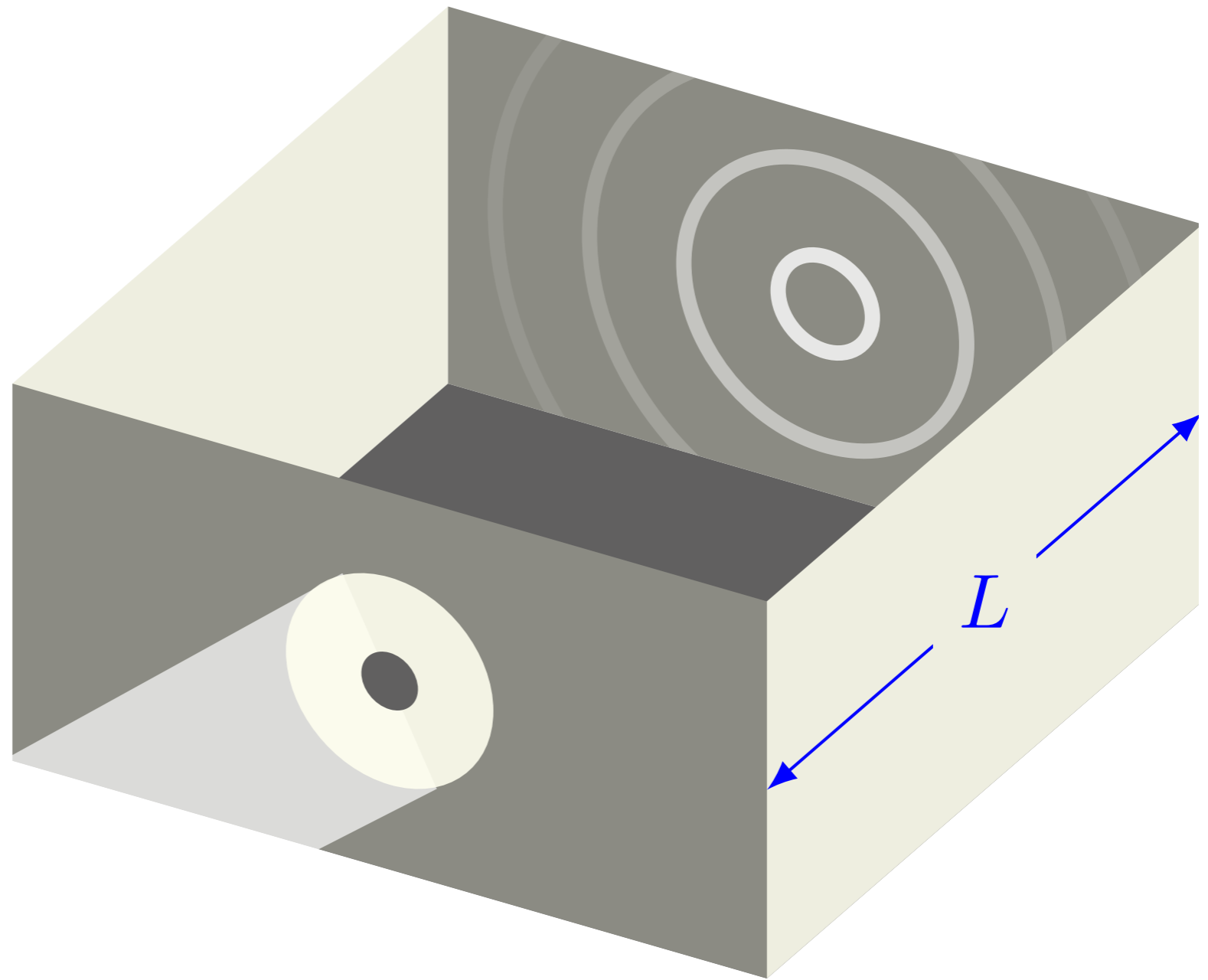


Física IV

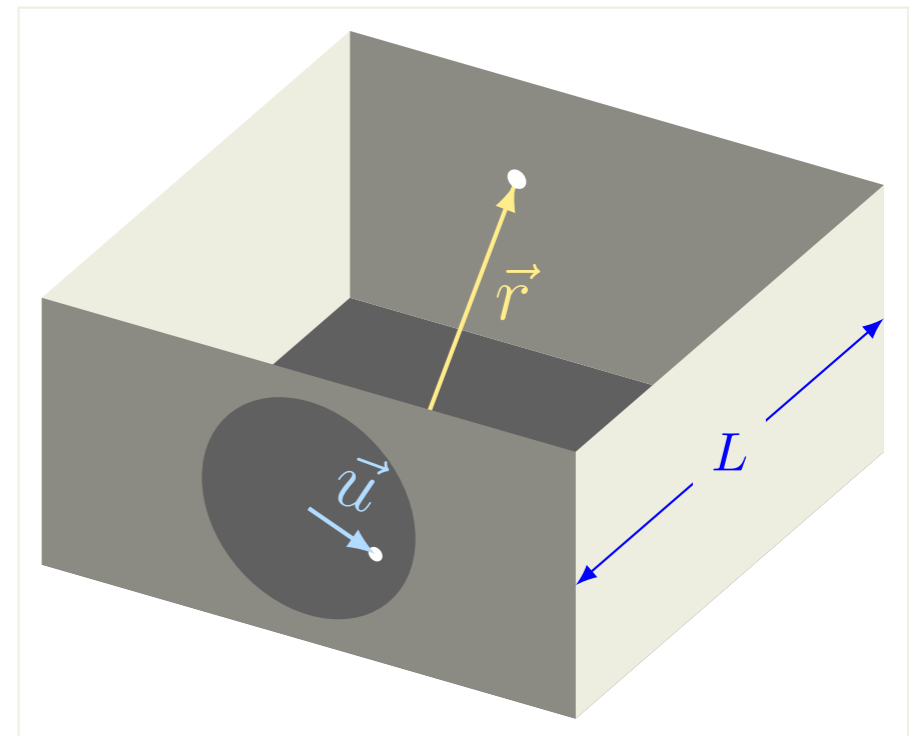
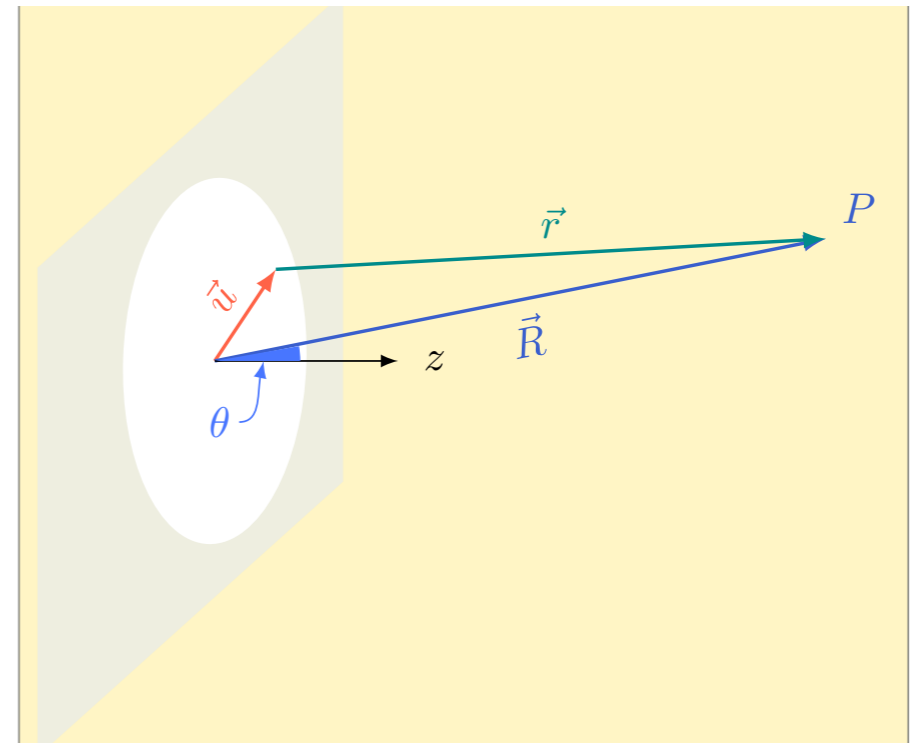
24 novembro 2020
Ótica

Difração



Difração

$$E(P) = \frac{E(O)\cos\theta}{S} \int_S \frac{\cos(kr - \omega t)}{kr} d^2u$$



Difração

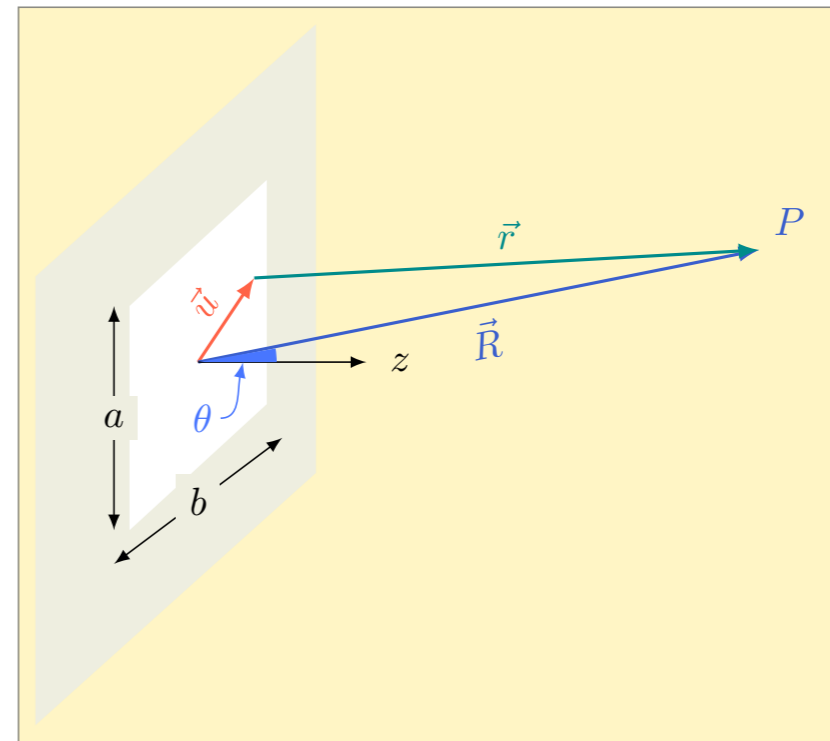
Abertura retangular

$$E(P) = E(O) \cos \theta \frac{\cos(kR - \omega t)}{kRS} \int_S \cos(k\hat{R} \cdot \vec{u}) d^2u$$

$$\vec{k} \equiv k\hat{R}$$

$$E(P) = E(O) \cos \theta \frac{\cos(kR - \omega t)}{kR} \frac{\sin(k_x a)}{k_x a} \frac{\sin(k_y b)}{k_y b}$$

$$\Rightarrow I(P) = I_{max} \frac{\cos^2 \theta}{R^2} \left(\frac{\sin(k_x a)}{k_x} \right)^2 \left(\frac{\sin(k_y b)}{k_y} \right)^2$$



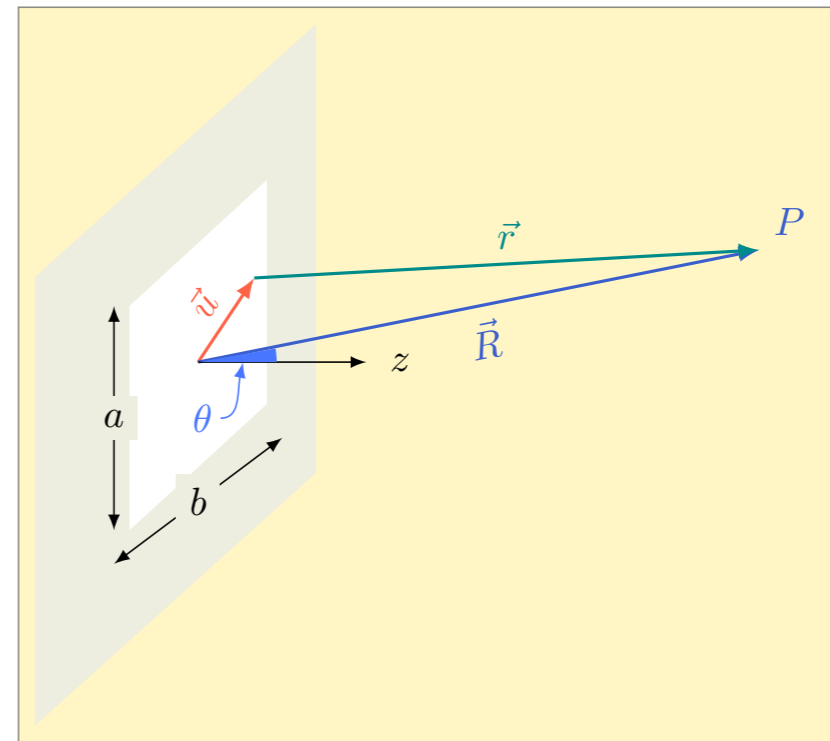
Difração

Abertura retangular

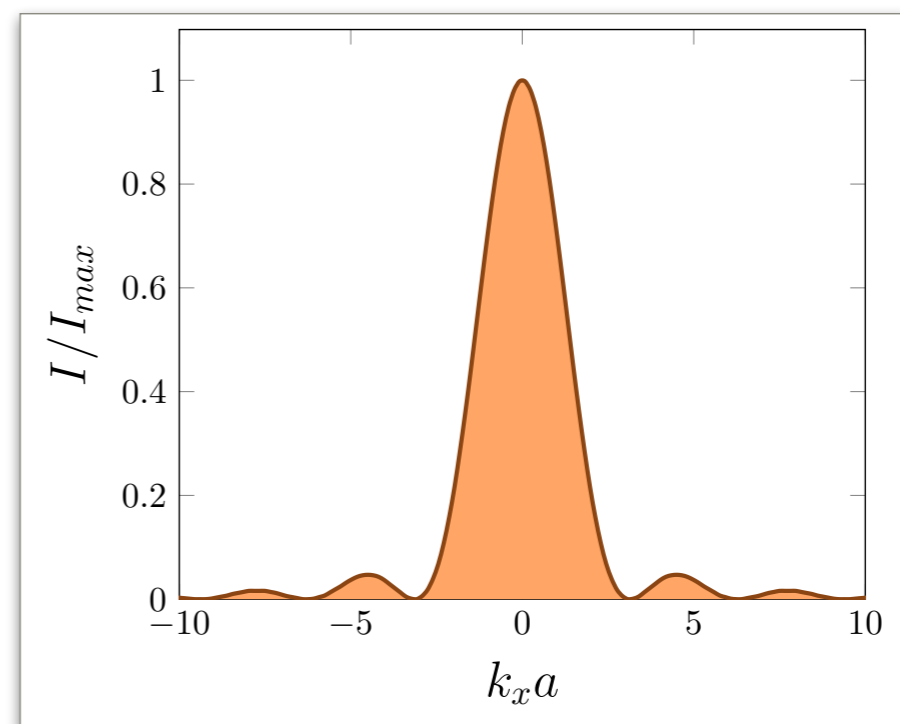
$$E(P) = E(O) \cos \theta \frac{\cos(kR - \omega t)}{kRS} \int_S \cos(k\hat{R} \cdot \vec{u}) d^2u$$

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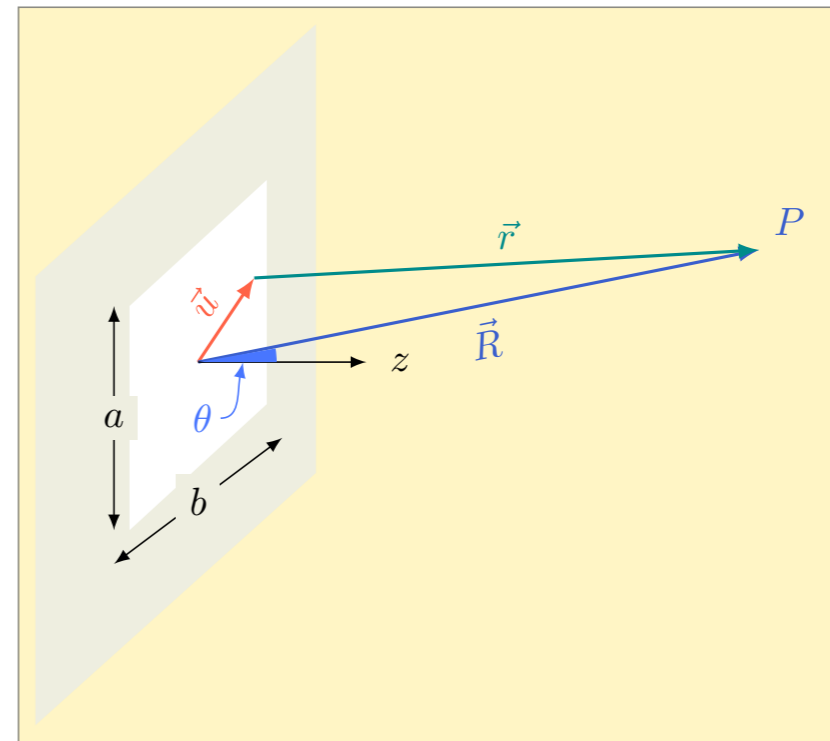
Difração

Abertura retangular

$$E(P) = E(O) \cos \theta \frac{\cos(kR - \omega t)}{kRS} \int_S \cos(k\hat{R} \cdot \vec{u}) d^2u$$

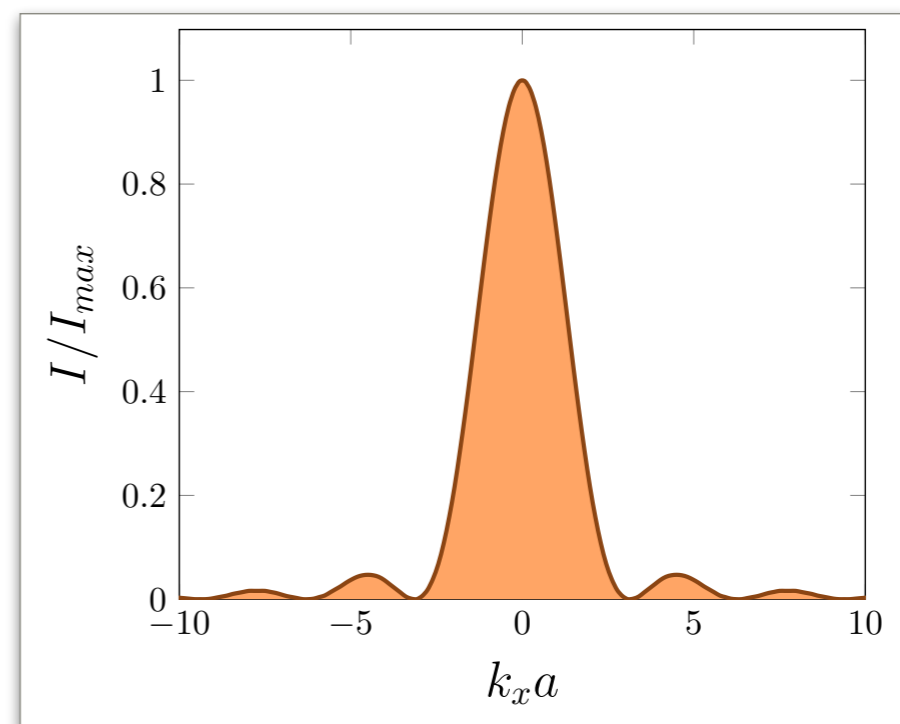
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Quanto menor
for a (ou b),
maiores os
ângulos



Difração

Abertura retangular

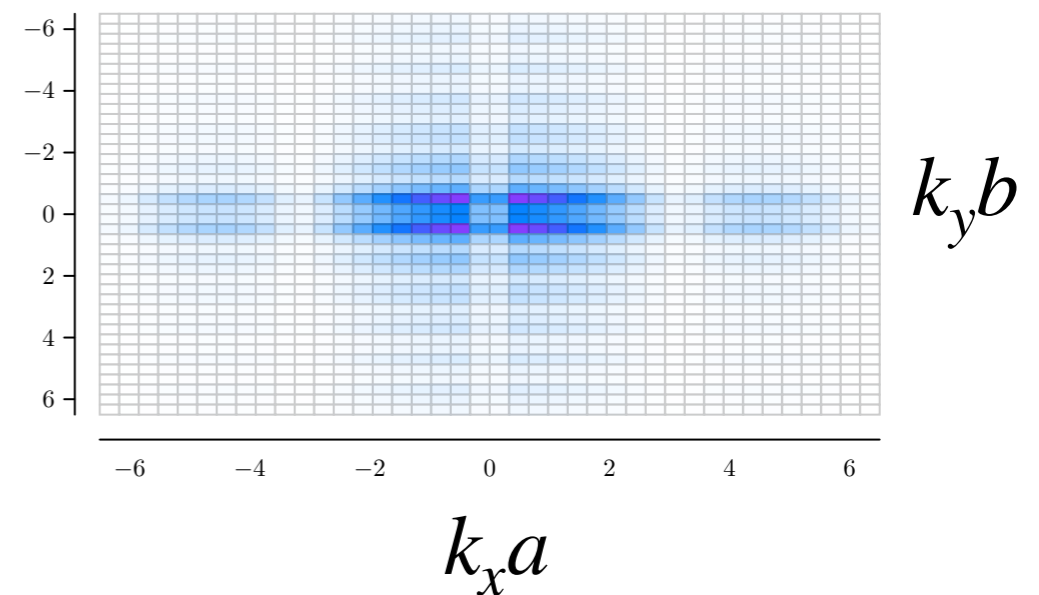
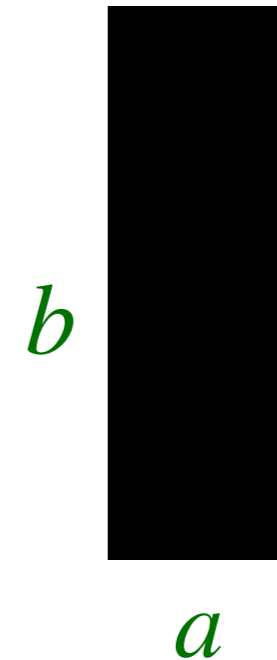
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Quanto menor
for a (ou b),
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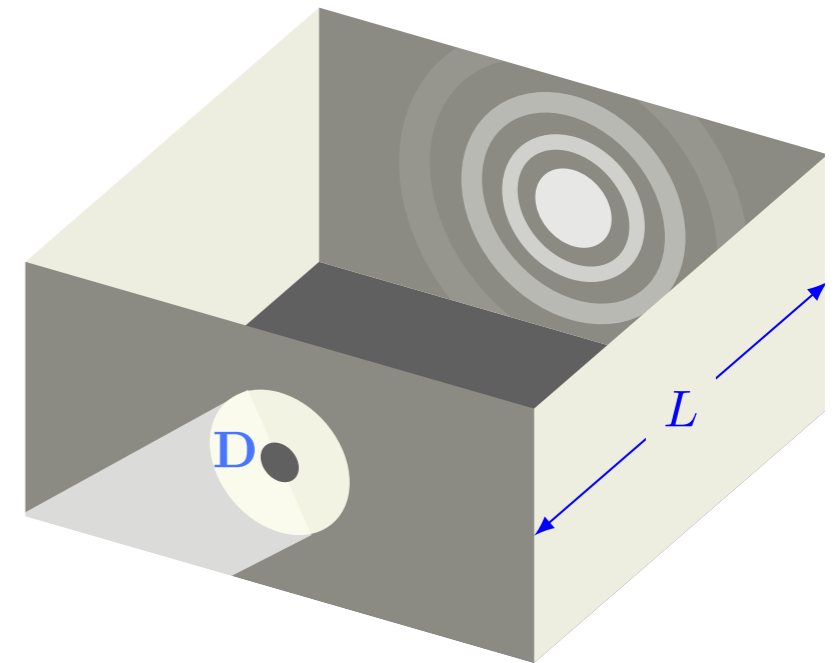


Difração

Condições de Fraunhofer

$$L\lambda \gg D^2$$

$$E(P) = \frac{E(O)\cos\theta}{S} \int_S \frac{\cos(kr - \omega t)}{kr} d^2u$$



Condições de Fresnel

$$L \approx D$$

