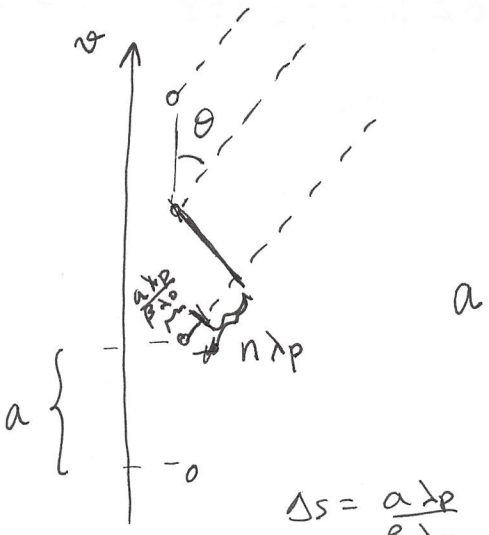
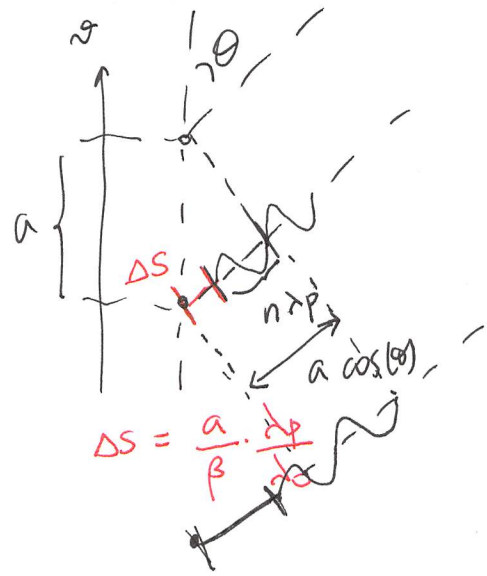
06/03/2023



$$\Delta s = \frac{a\,\lambda_p}{\beta\,\lambda_0}$$



$$\Delta s = \frac{a}{\beta}\cdot\frac{\lambda_p}{\lambda_0}$$

$$a\cos(\theta) = n\lambda_p + \Delta s \quad \hookrightarrow \quad n\lambda_p = a\cos(\theta) - \Delta s$$

$$\theta = \arccos\left(\frac{n\lambda_p}{a} + \frac{\Delta s}{a}\right) = \arccos\left(\frac{n\lambda_p}{a} + \frac{1}{\beta}\cdot\frac{\lambda_p}{\lambda_0}\right)$$

$$= \arccos\left[\lambda_p\left(\frac{n}{a} + \frac{1}{\beta\lambda_0}\right)\right]$$

Light: $n\lambda = \frac{a}{\beta} - a\cos(\theta)$

$$\vec{K}_{n//} = \left(\frac{\omega}{v} - \frac{2n\pi}{a},\ k_y\right) = k_p\left(\cos(\theta_n), \sin(\theta_n)\right)^0$$

$$\cos(\theta_n) = \left(\frac{\omega}{v} - \frac{2n\pi}{a}\right)\frac{\lambda_p}{2\pi}$$

$$= \lambda_p\left(\frac{\omega c}{2\pi v c} - \frac{n}{a}\right)$$

$$= \lambda_p\left(\frac{k_0}{2\pi\beta} - \frac{n}{a}\right)$$

$$= \lambda_p\left(\frac{1}{\lambda_0\beta} - \frac{n}{a}\right)$$

$$\sin(\theta_n) = \frac{k_y}{k_p} \qquad k_j^n = \sqrt{k_p^2 - k_{nn}^2}$$

$$e^{i(-k_x + \omega/v)a_j} = e^{i\left((-2k_x + \omega/v)ja\right)} = 2\pi j n$$

$$(k_x + \frac{\omega}{v})ja = 2\pi$$

$$\Rightarrow -k_x a_j = 2\pi n - \frac{\omega a_j}{v}$$

$$\Rightarrow k_x = \frac{\omega}{v} + \frac{2\pi n}{a_j}$$