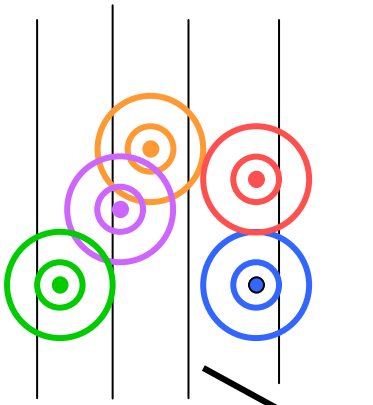
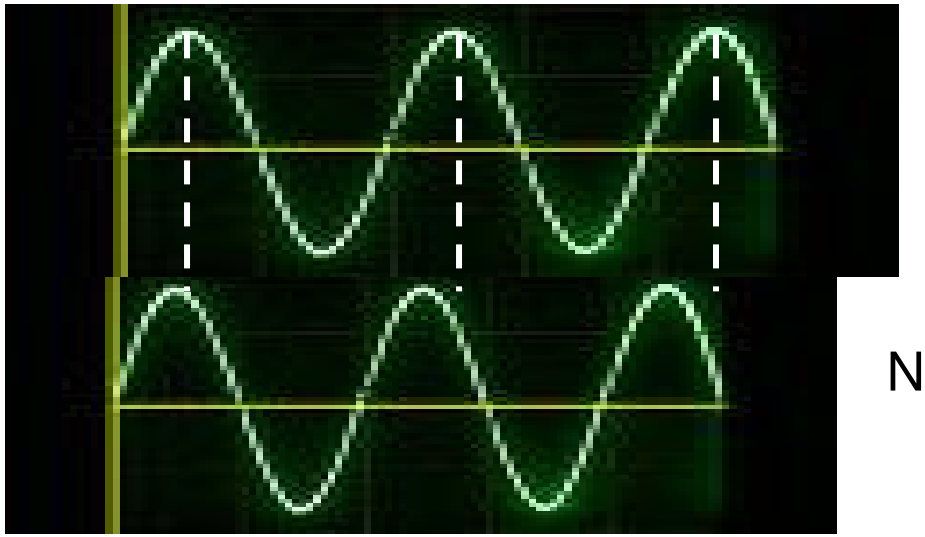
Index of Refraction is many scatterers



Transmitted plus scattered

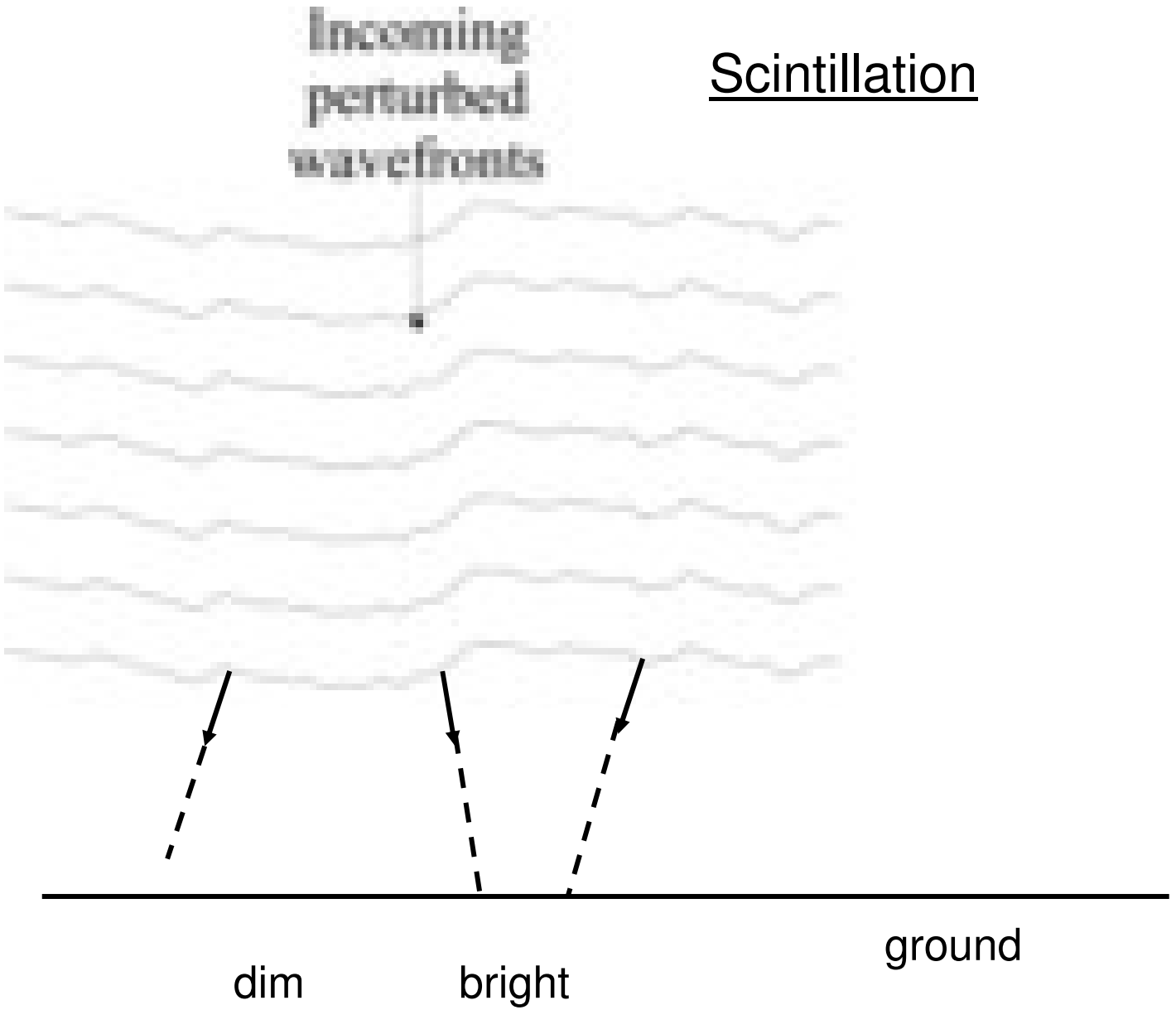
Scattered radiation cancels out

All energy ends up in forward direction with phase shift proportional to distance

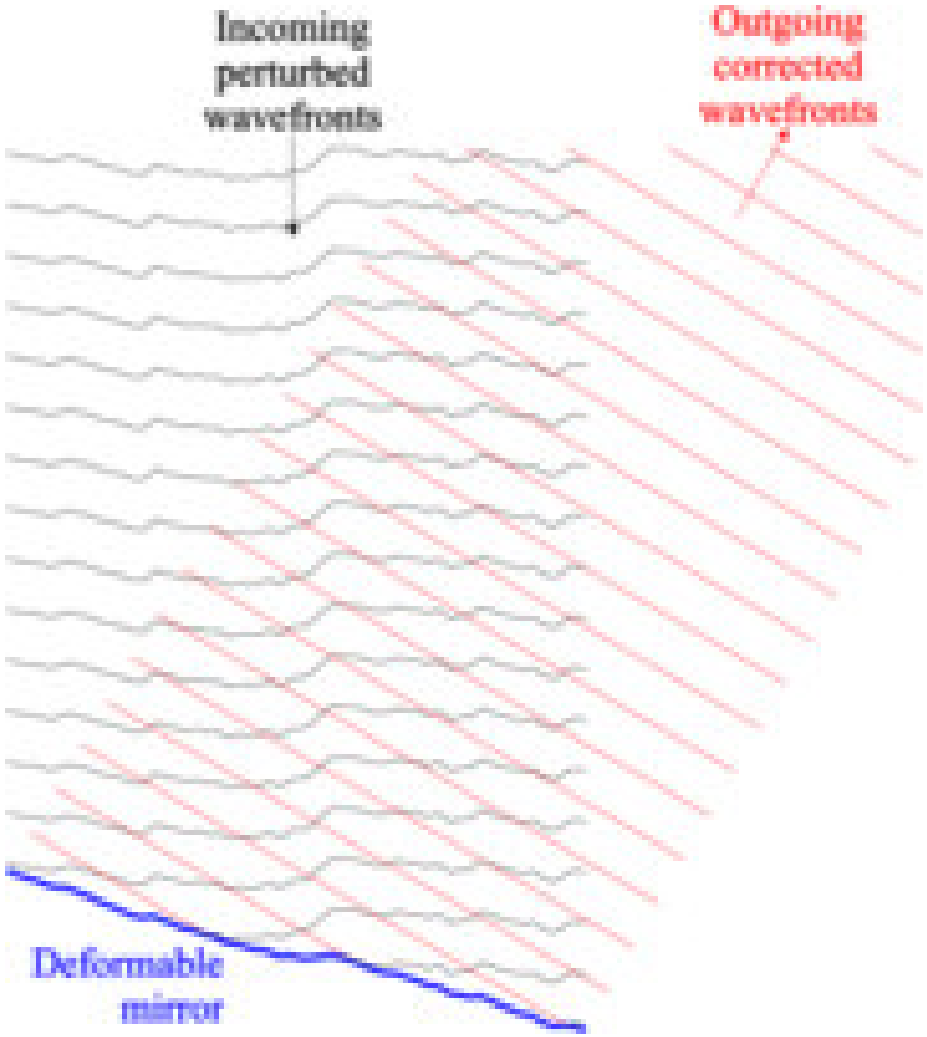


New wavelength

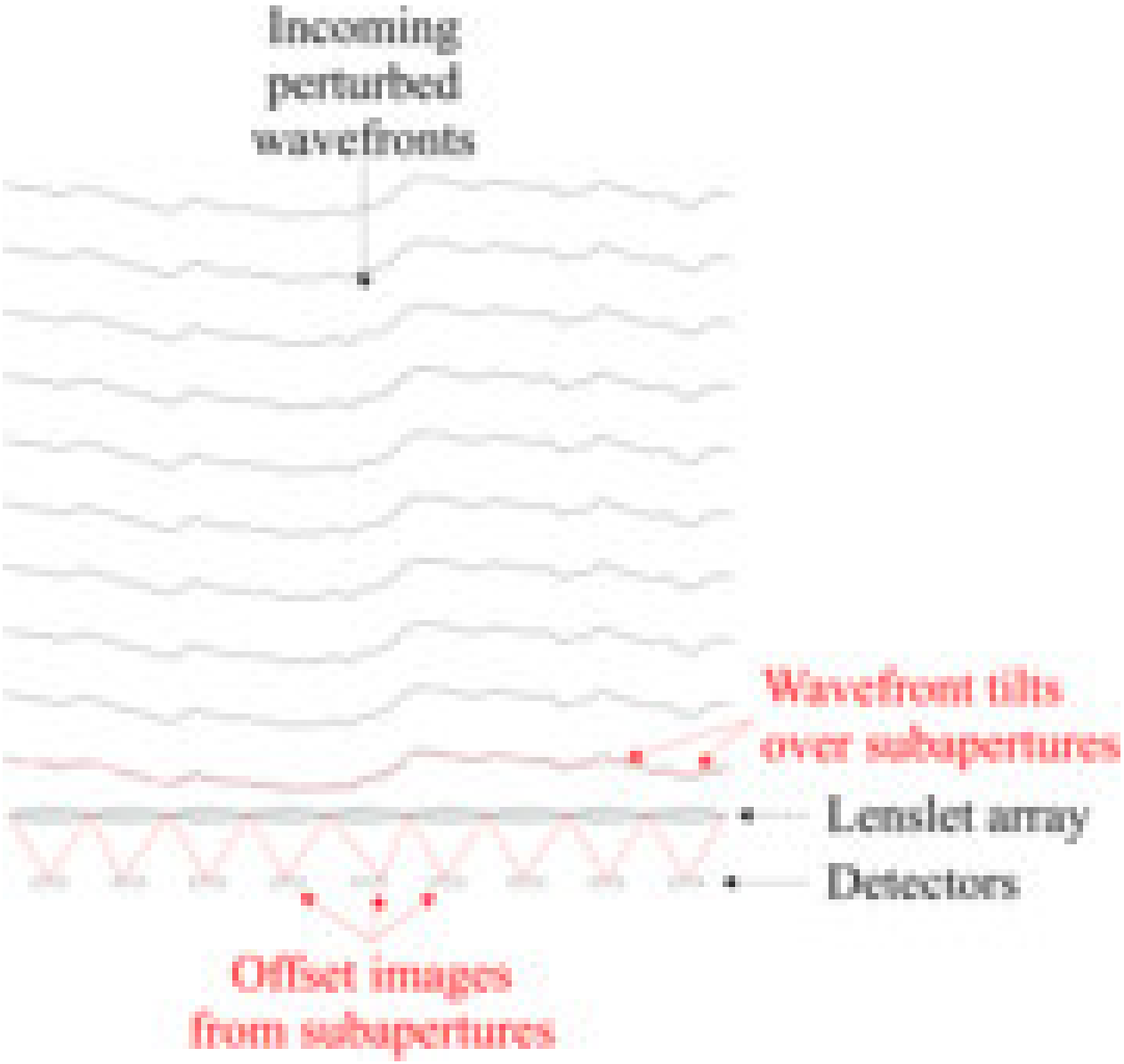
Scintillation



Adaptive Optics



Adaptive Optics



Adaptive Optics

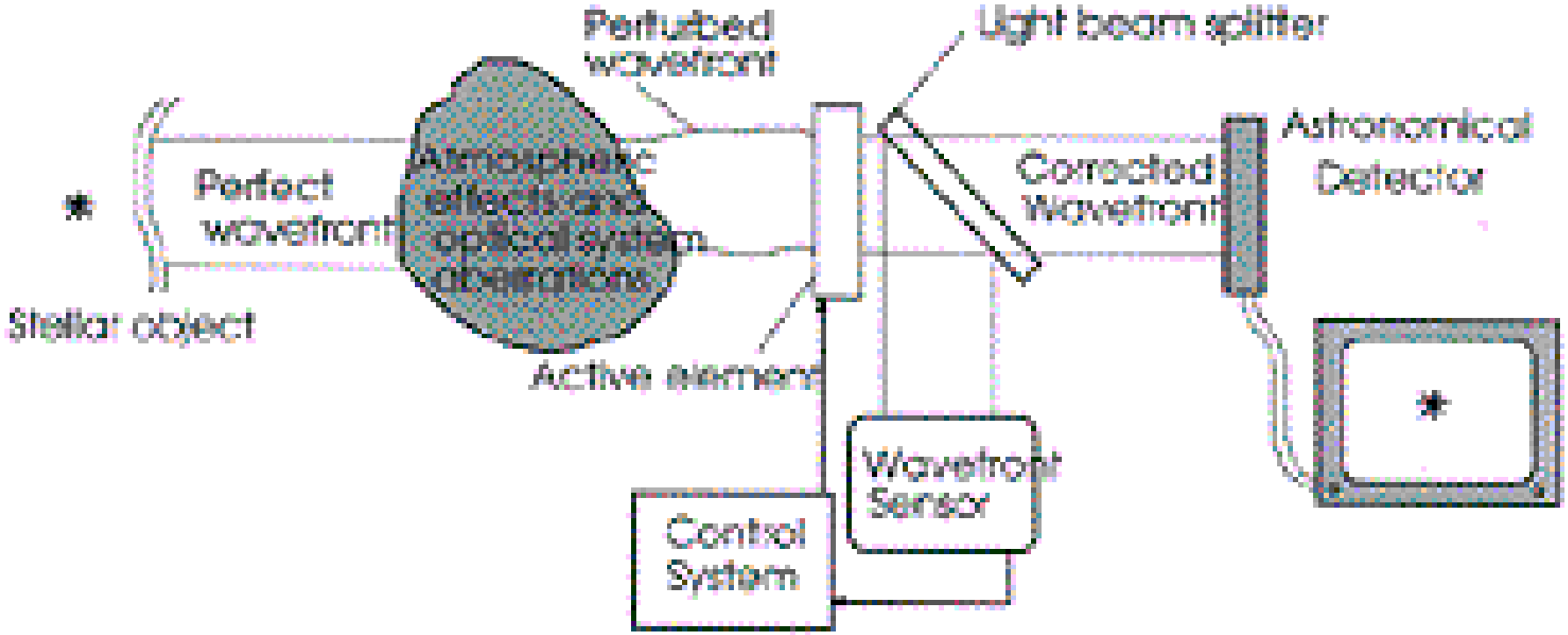
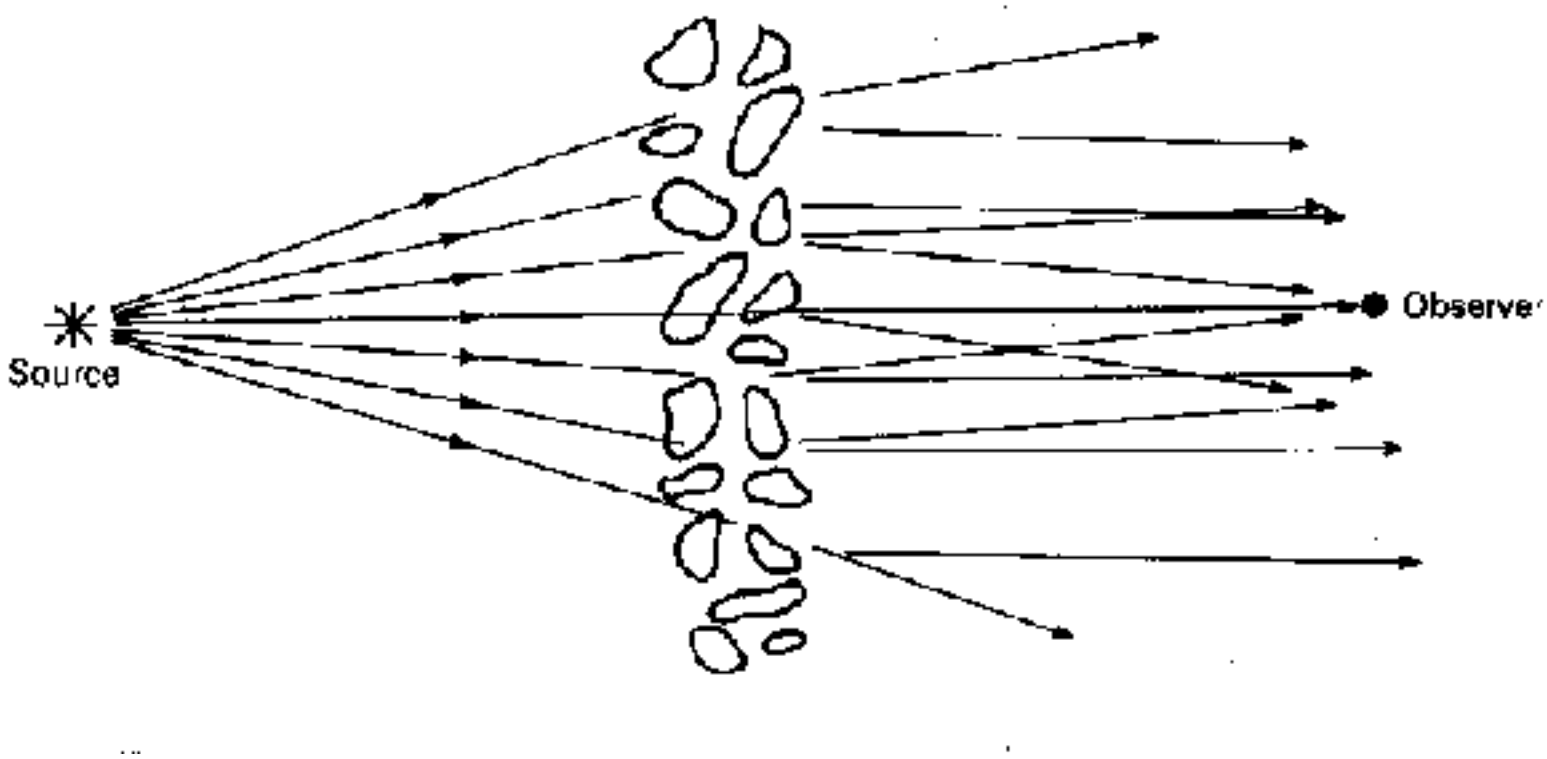
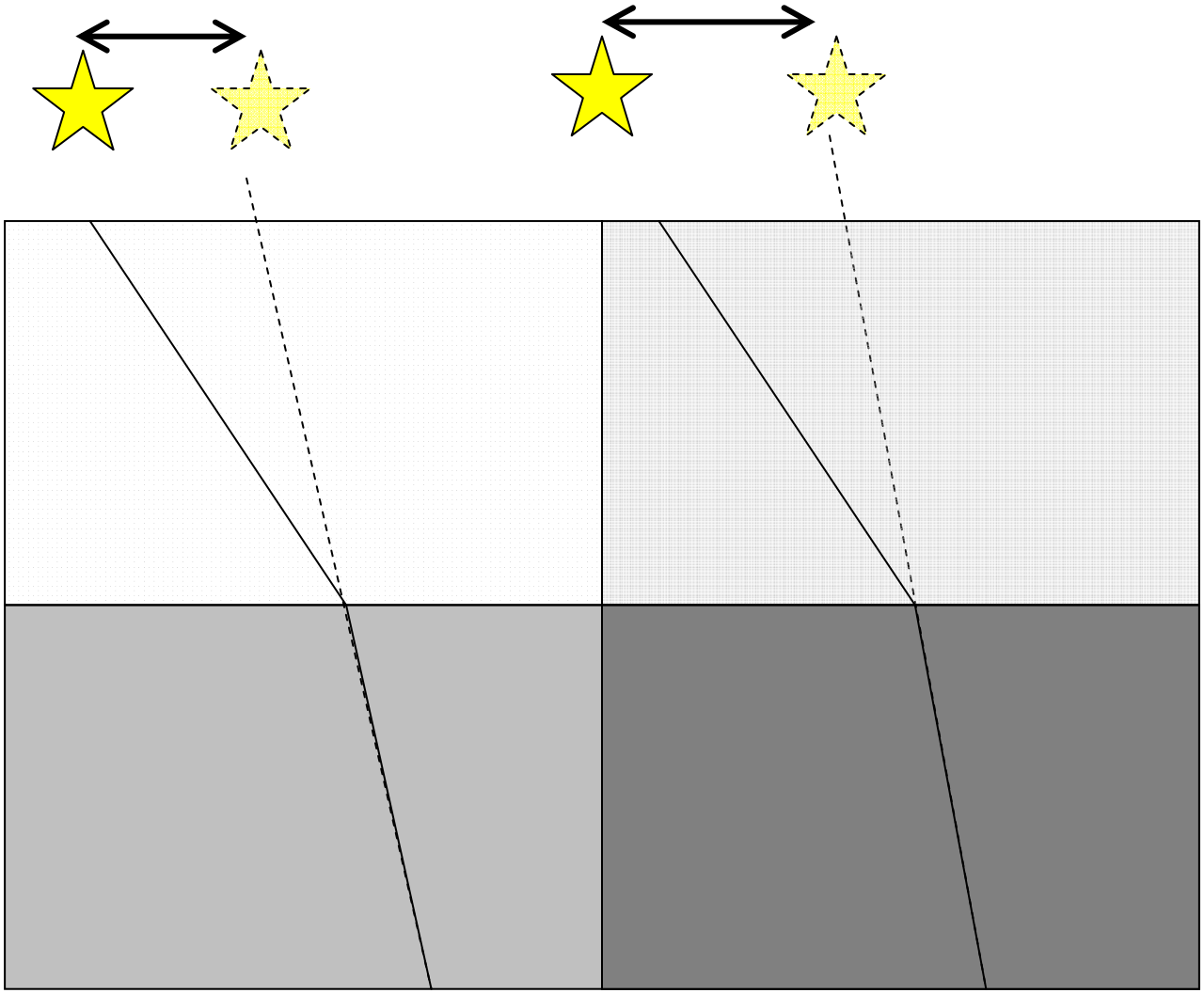


Figure 2: The principle of Active and Adaptive Optics

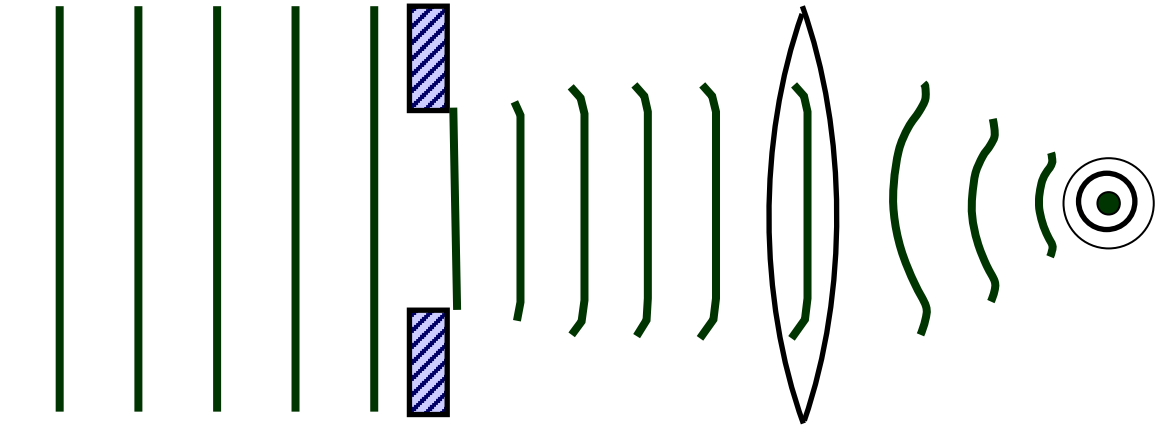
Scintillation

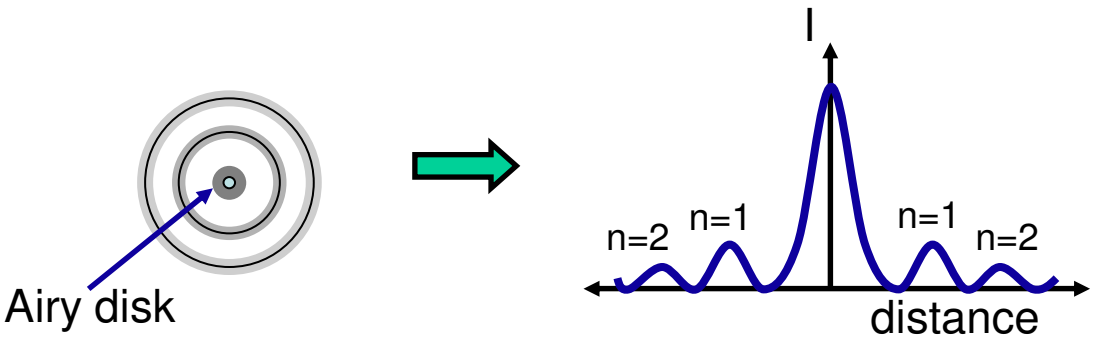


Refractive Scintillation

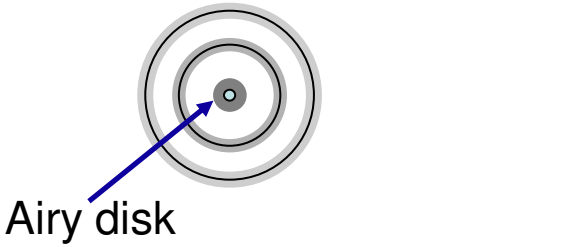


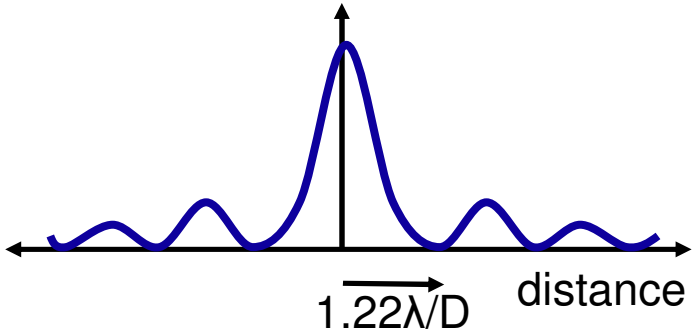
Diffraction and resolution

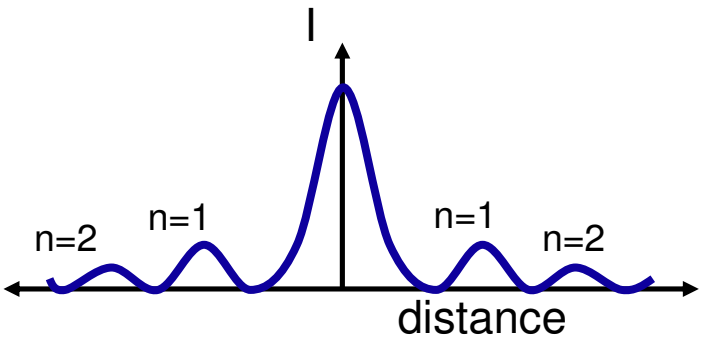




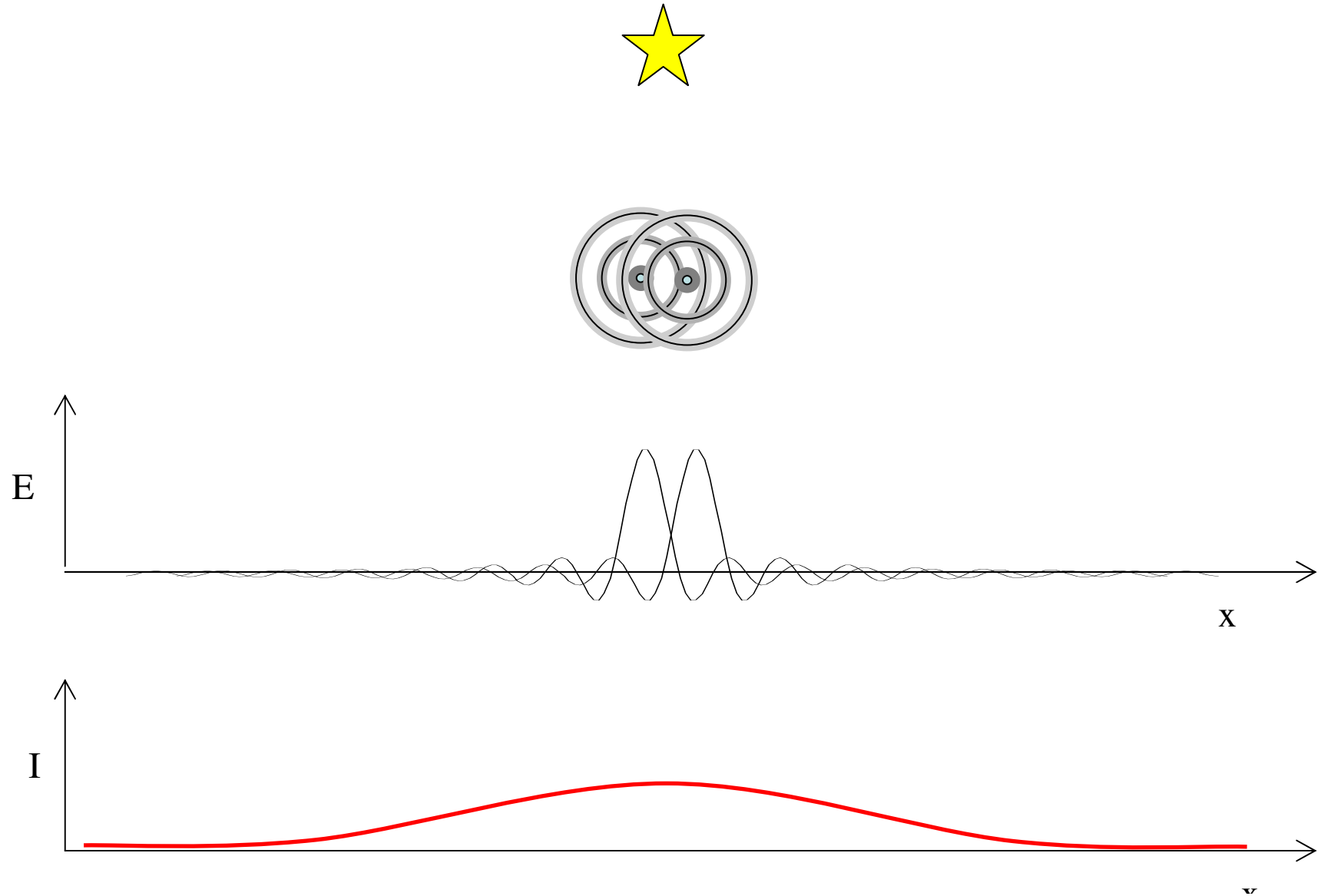
Diffractive Scintillation



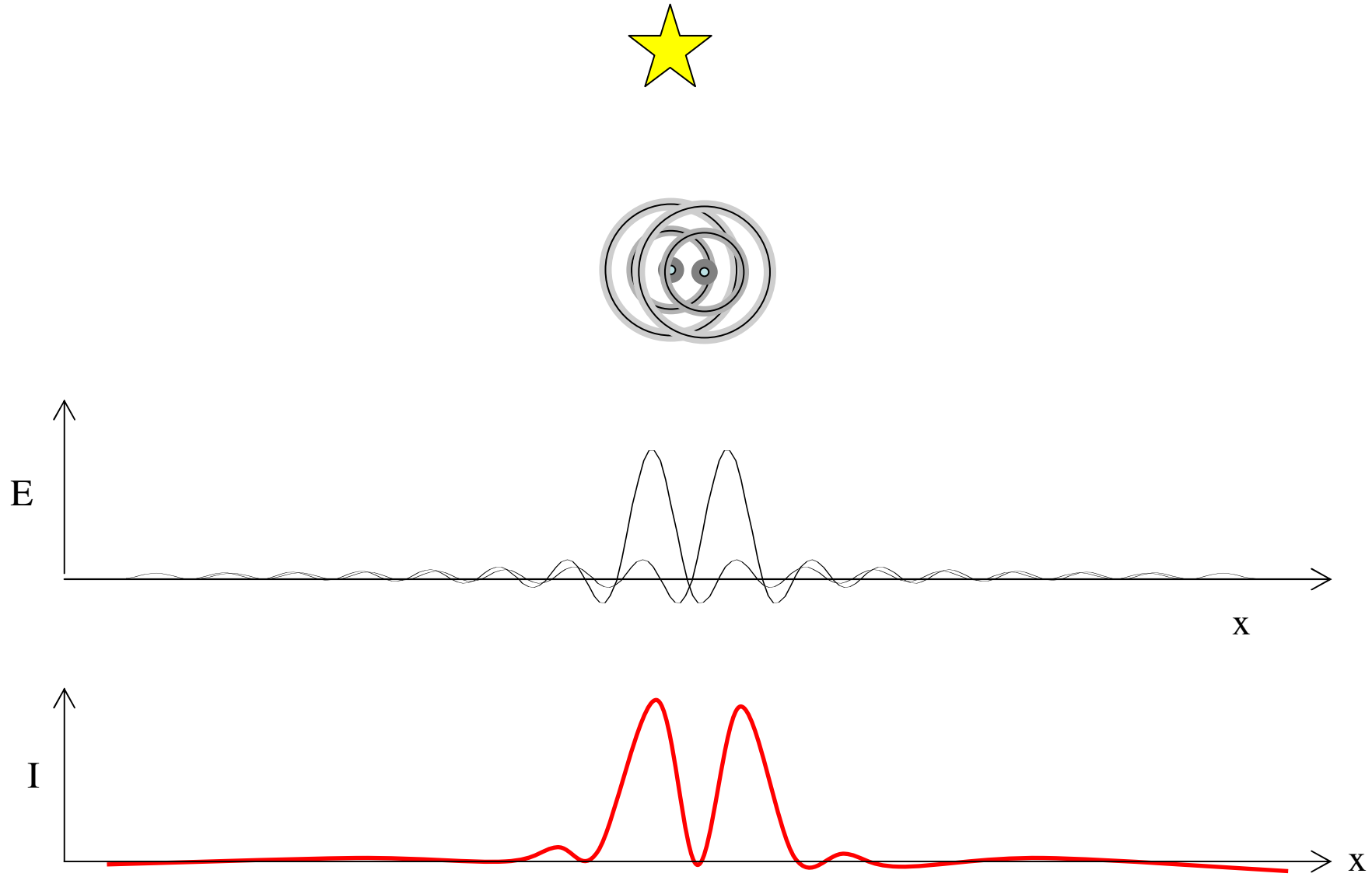




Diffractive Scintillation



Diffractive Scintillation

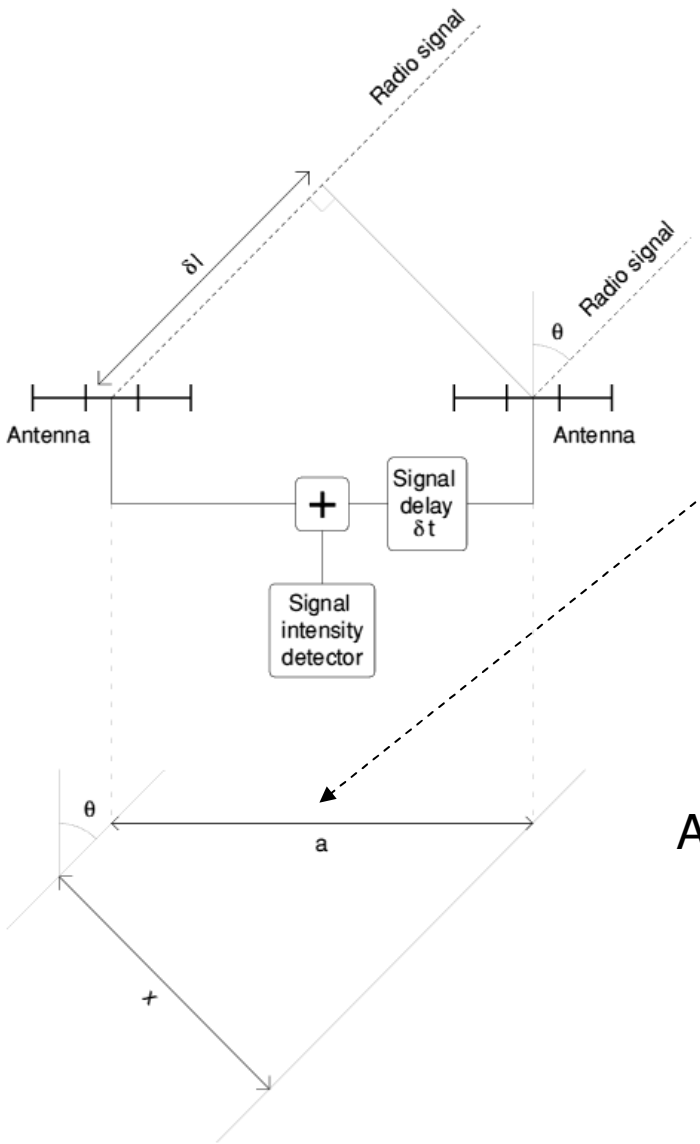


For a rarified gas

$$\langle e^{i\varphi_i} e^{i\varphi_j} \rangle = 0 \qquad \text{When } i \neq j$$

$$\langle \left| \sum A_i \; e^{i\Theta_i} \right|^2 \rangle = \langle \sum A_i^2 \rangle$$

Interferometery and aperture synthesis



$$\Delta\phi = \frac{2\pi c \Delta t}{\lambda}$$

$$= \frac{2\pi}{\lambda}\left|\Delta\tilde{x}\right|\sin\theta$$

$$\cong \frac{2\pi}{\lambda}\left|\Delta\tilde{x}\right|\tilde{\theta}$$

$$\tilde{\Delta} \equiv \begin{pmatrix} 2\pi\frac{\Delta\tilde{x}}{\lambda} \\ 2\pi\frac{\Delta\tilde{y}}{\lambda} \end{pmatrix}$$

$$\tilde{\theta} = \begin{pmatrix} \theta_x \\ \theta_y \end{pmatrix}$$

At separation Δ, the signal is proportional to:

$$\int e^{iA\tilde{\theta}} I\left(\tilde{\theta}\right) d^2\tilde{\theta}$$

http://www.geocities.com/capecanaveral/2309/page3.html?200711