

Telephoto - Thin Lens Design

$$f_e = 200 \text{ mm}$$

$$\text{BFD} = 50 \text{ mm}$$

then $\phi = .005 / \text{mm}$

$$d' = \delta' = \text{BFD} - f' = -150 \text{ mm}$$

$$\phi = \phi_1 + \phi_2 - \phi_1 \phi_2 x$$

$$d' = \delta' = -\phi_1 / \phi x$$

$$\phi_1 = -\phi \delta' / x$$

$$\phi = -\phi \delta' / x + \phi_2 + \phi \phi_2 \delta'$$

$$\phi_2 = \frac{\phi + \phi \delta' / x}{1 + \phi \delta'}$$

For a given x , values for ϕ_1 and ϕ_2 will be defined.

Pick a x

$$\underline{x = 50 \text{ mm}}$$

$$\phi_2 = -.040 / \text{mm}$$

$$f_2 = -25 \text{ mm}$$

$$\phi_1 = .015 / \text{mm}$$

$$f_1 = 66.67 \text{ mm}$$

$$\underline{x = 100 \text{ mm}}$$

$$\phi_2 = -.010 / \text{mm}$$

$$f_2 = -100 \text{ mm}$$

$$\phi_1 = .0075$$

$$f_1 = 133.33$$

A bigger spacing requires less power in the lenses.