1. 电子固有频率小于X射线频率 介质折射率接近于1

∴ X射线的折射率近似为1

2. 四面体边长为 $\frac{\sqrt{2}}{2}a$ 原子距离为 $\frac{\sqrt{2}}{4}a$

$$\cos\theta = -\frac{(\frac{\sqrt{2}}{2}a)^2+(\frac{\sqrt{2}}{2}a)^2-(\frac{\sqrt{2}}{4}a)^2}{2\times\frac{\sqrt{2}}{2}a\times\frac{\sqrt{2}}{2}a} = -\frac{1}{3} \quad \therefore \theta = 109.47^\circ$$

3. $$q^* = 3-\frac{8\lambda^2}{1+\lambda^2} = 0 \quad \therefore \lambda^2 = \frac{3}{5}$$

$$f_i = \frac{P_A-P_B}{P_A+P_B} = \frac{1-\lambda^2}{1+\lambda^2} = \frac{1}{4}$$