Optical mode
$$\frac{\sqrt{2\beta(\frac{1}{m_1} + \frac{1}{m_2})}}{\text{Acoustic}} \omega_2 = \sqrt{2\beta/m_1}$$

$$\omega_1 = \sqrt{2\beta/m_2}$$

$$\frac{\pi}{2a}$$

$$\frac{\pi}{2a}$$