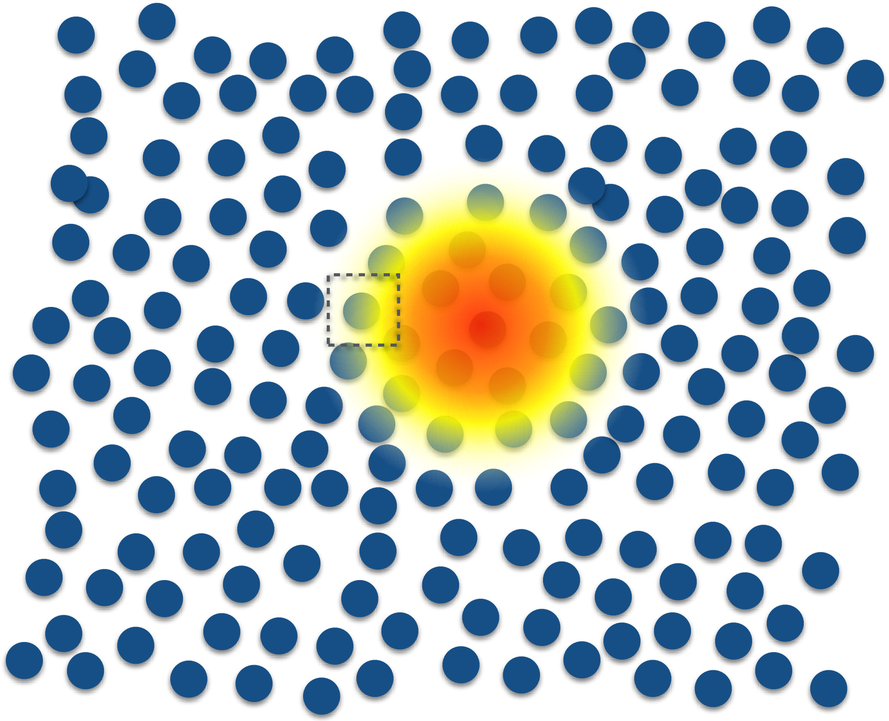
Origin of electrostriction

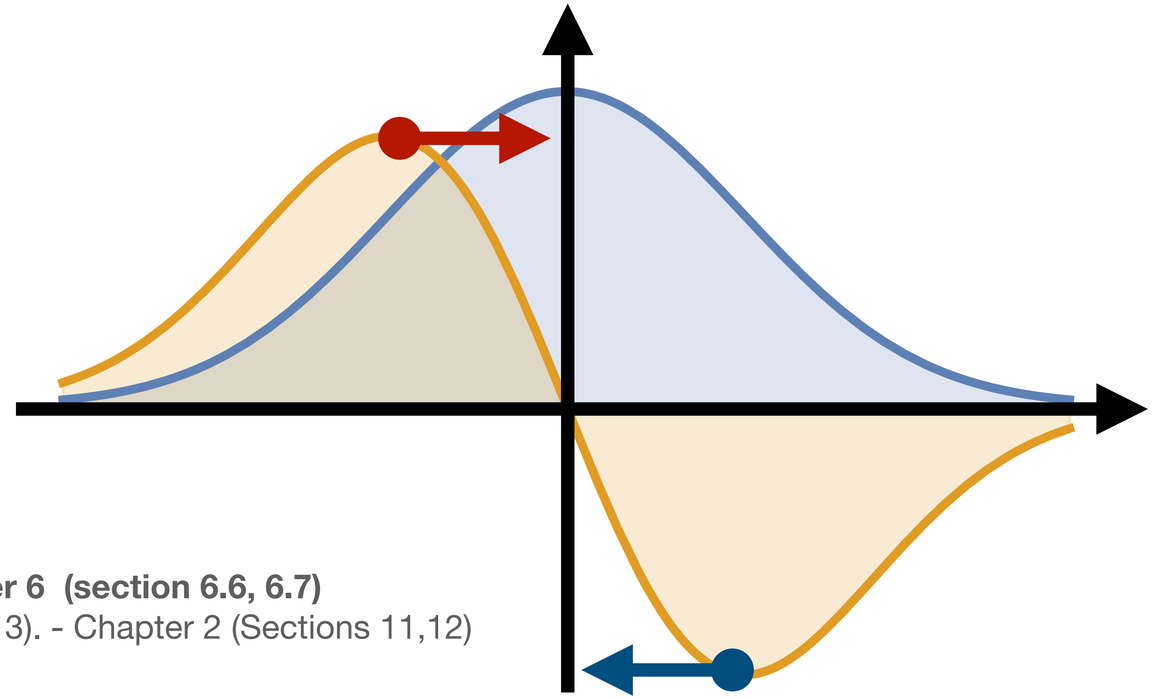


Energy stored in a single dipole $p = \epsilon_0 \alpha E$ (α is the polarizability):

$$U = -\frac{1}{2}\epsilon_0 \alpha E^2$$

$$F = -\nabla U = \frac{1}{2}\epsilon_0 \alpha \nabla E^2$$

$$\mathbf{F}_v = \rho \mathbf{E} \underbrace{-\frac{\epsilon_0}{2} E^2 \nabla \kappa}_{\text{Radiation pressure}} + \underbrace{\frac{\epsilon_0}{2} \nabla \left(E^2 \frac{d\kappa}{d\rho_m} \rho_m \right)}_{\text{Electrostriction}}$$



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3. Boyd, R. W. . Nonlinear Optics. (Elsevier Science, 2008).

Outline

- Introduction to Brillouin Scattering
- Mechanical modes
- Optical modes
- Harnessing Brillouin interaction
- Optomechanical cavities
- Final remarks