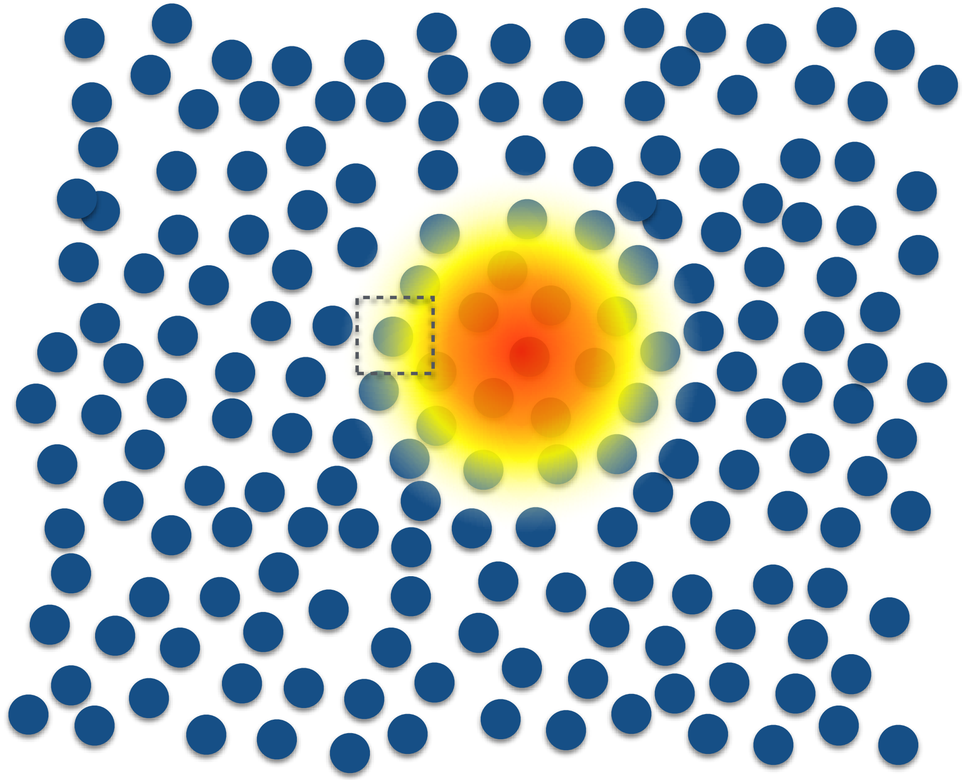
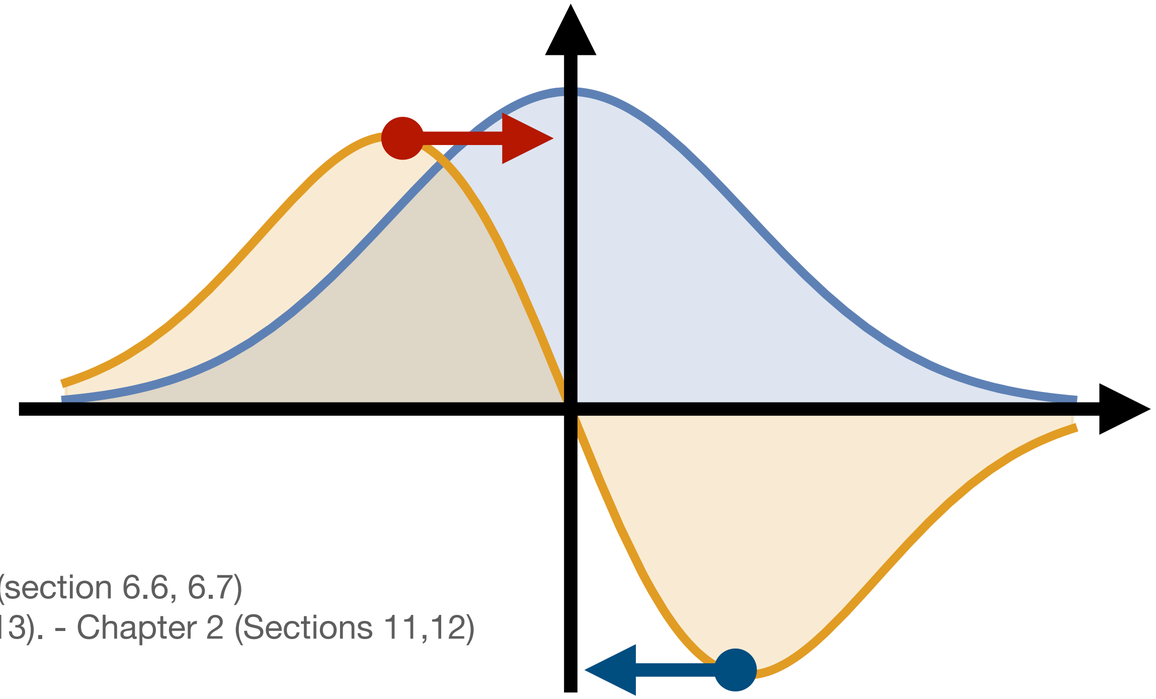
Origin of electrostriction



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

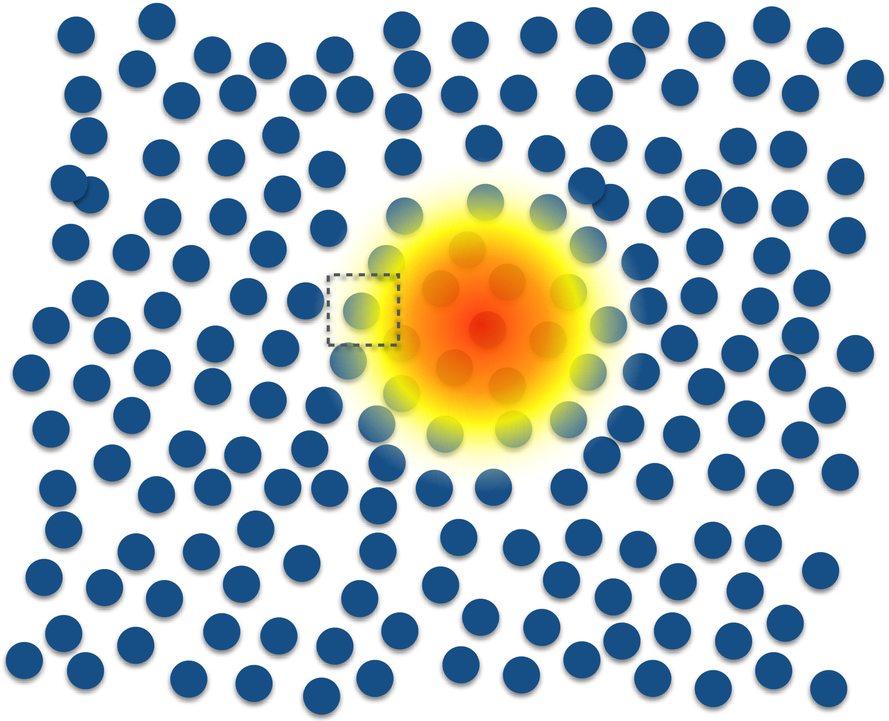
$$U = -\frac{1}{2}\epsilon_0 \alpha E^2$$

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



1. Panofsky, W. K. H. & Phillips, M. Classical Electricity and Magnetism: Chapter 6 (section 6.6, 6.7)
2. Landau, L. D. et al. Electrodynamics of Continuous Media. (Elsevier Science, 2013). - Chapter 2 (Sections 11,12)
3. Boyd, R. W. . Nonlinear Optics. (Elsevier Science, 2008).

Origin of electrostriction



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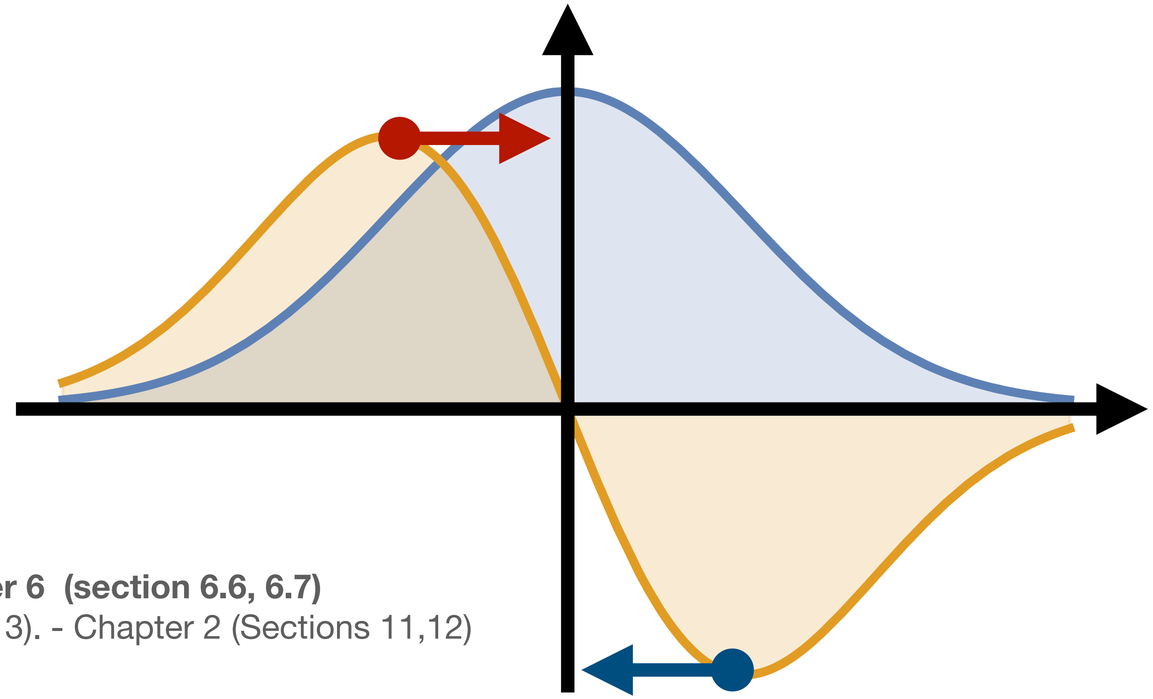
$$\mathbf{F}_v = \rho \mathbf{E} \underbrace{-\frac{\epsilon_0}{2} E^2 \nabla \kappa}_{\text{Radiation pressure}} + \underbrace{\frac{\epsilon_0}{2} \nabla \left(E^2 \frac{d\kappa}{d\rho_m} \rho_m \right)}_{\text{Electrostriction}}$$



1. **Panofsky, W. K. H. & Phillips, M. Classical Electricity and Magnetism: Chapter 6 (section 6.6, 6.7)**
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