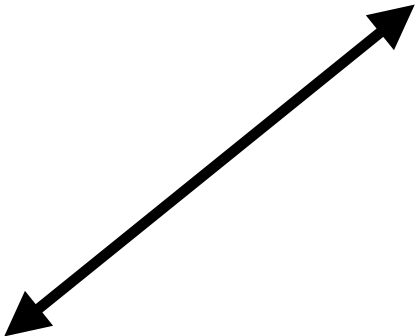


nac





nac

Mechanical modes

4

4



Wombat 2022, Erlangen, June 14th 2022. Gustav Wiederhake.



$$n_{ac} = 2\pi/q$$

Elastic wave equation

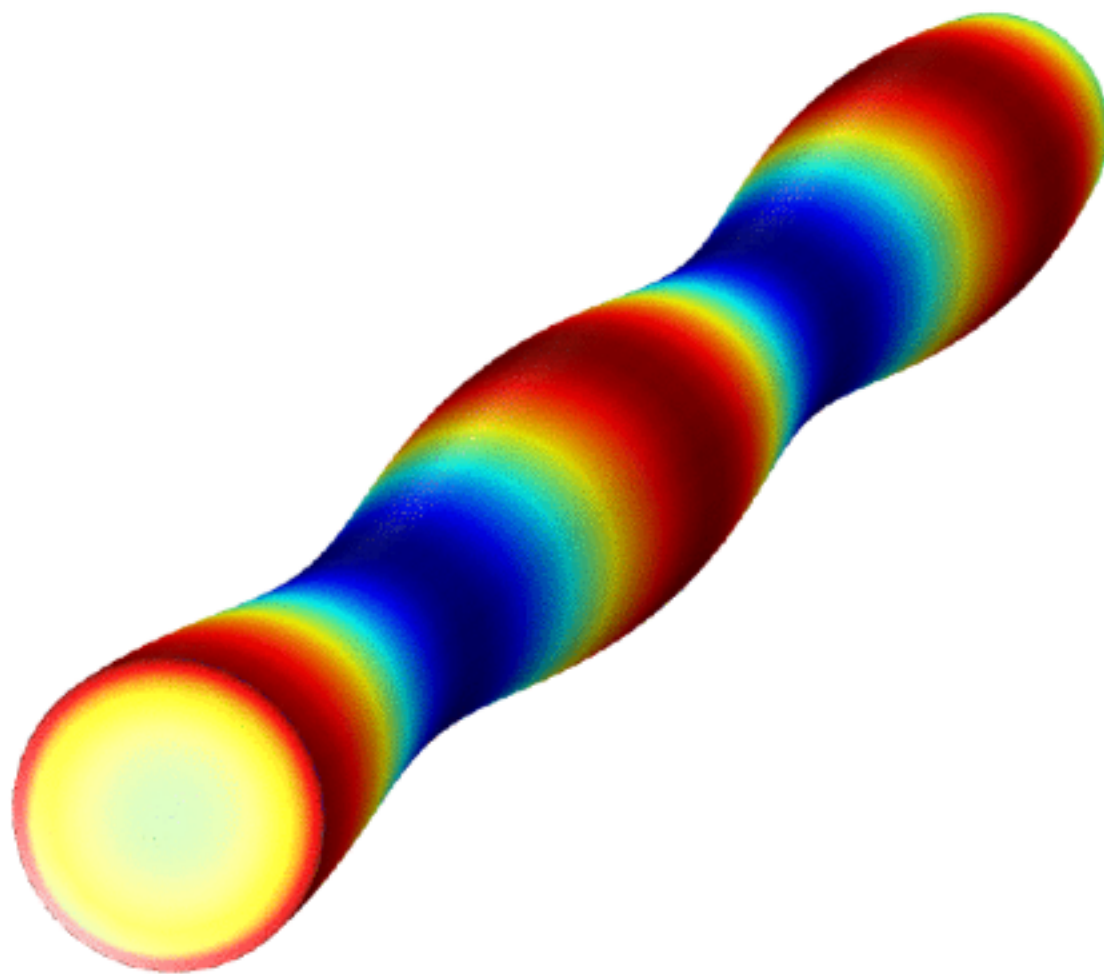
$$\left[(\lambda + 2\mu) + \eta_{11} \frac{\partial}{\partial t} \right] \nabla (\nabla \cdot \boldsymbol{U}) - \left[\mu + \eta_{44} \frac{\partial}{\partial t} \right] \nabla \times \nabla \times \boldsymbol{U} = \rho \frac{\partial^2 \boldsymbol{U}}{\partial t^2}$$

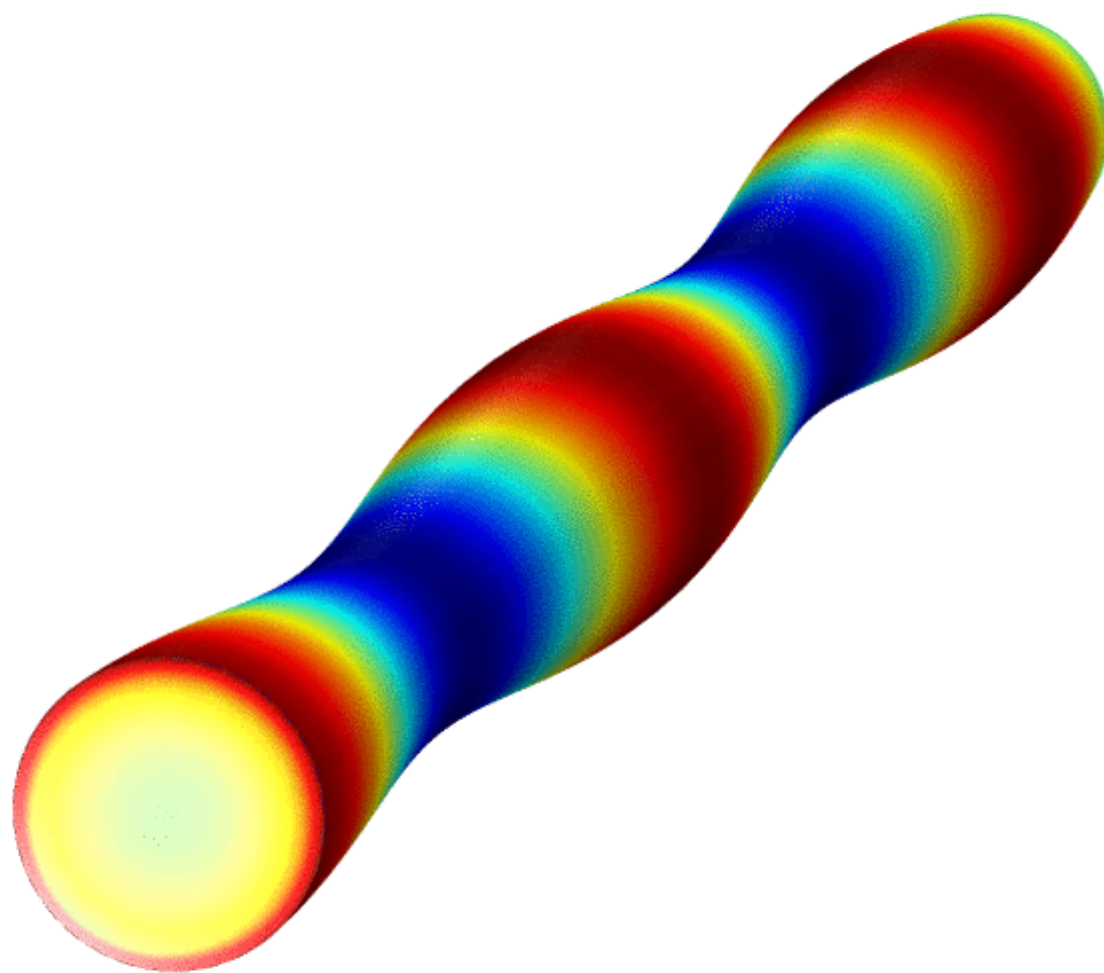
longitudinal waves ($\nabla \times \mathbf{u} = 0$)

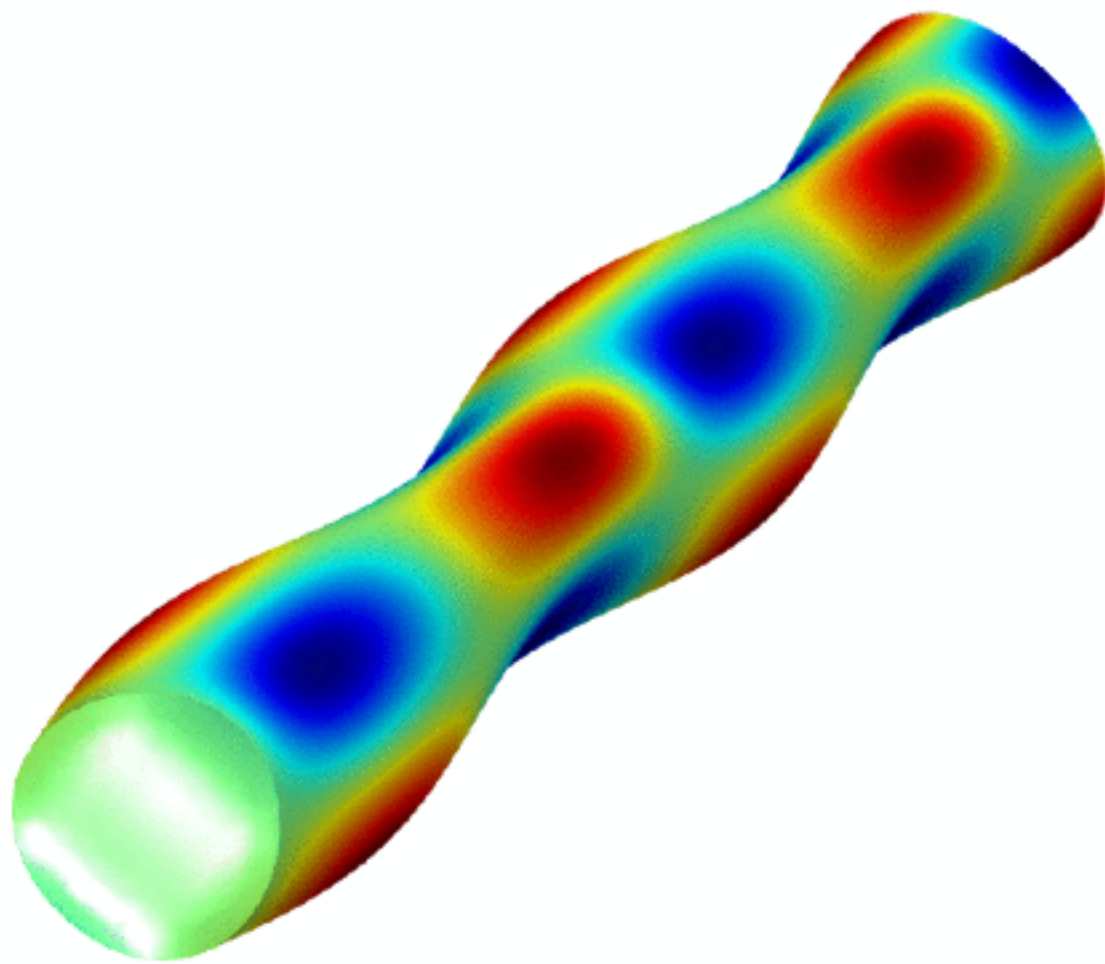
shear-only ($\nabla \cdot \mathbf{u} = 0$)

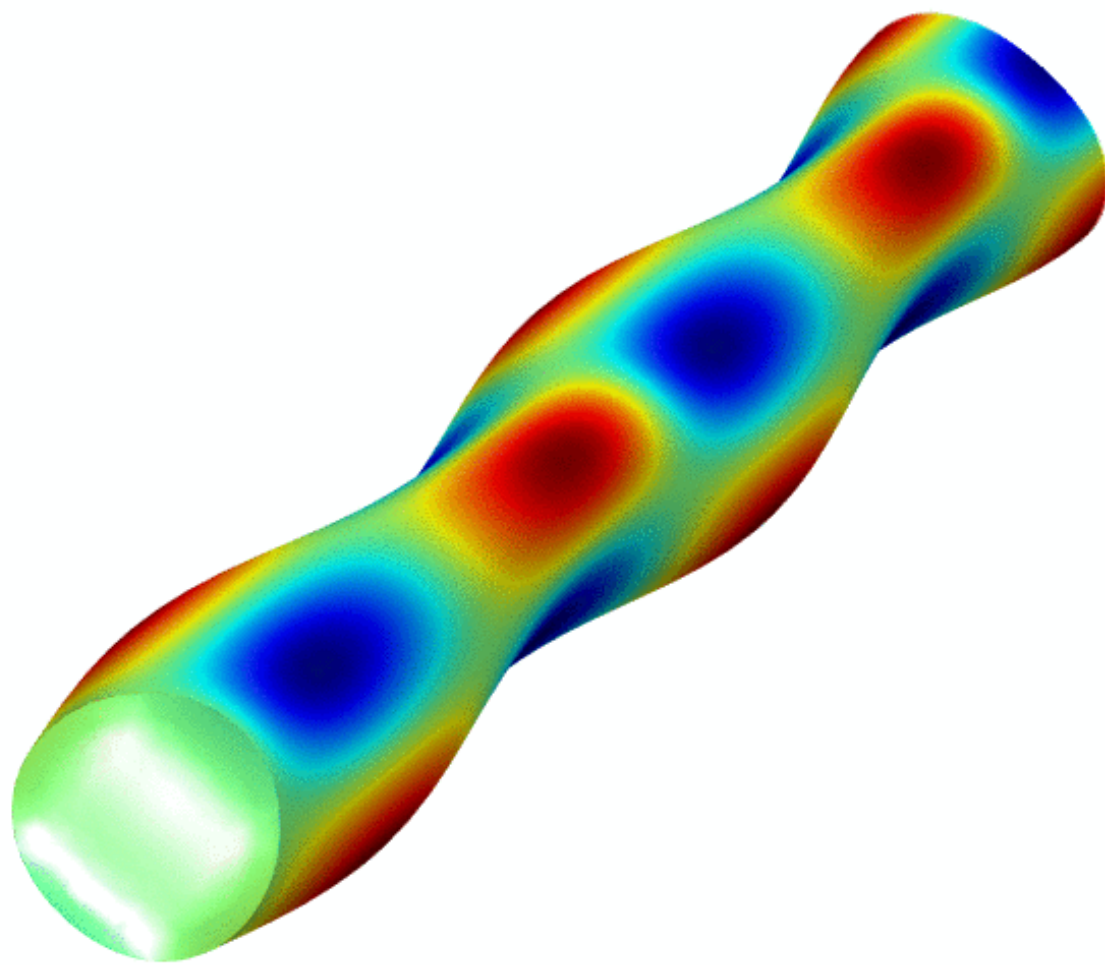














Mechanical modes

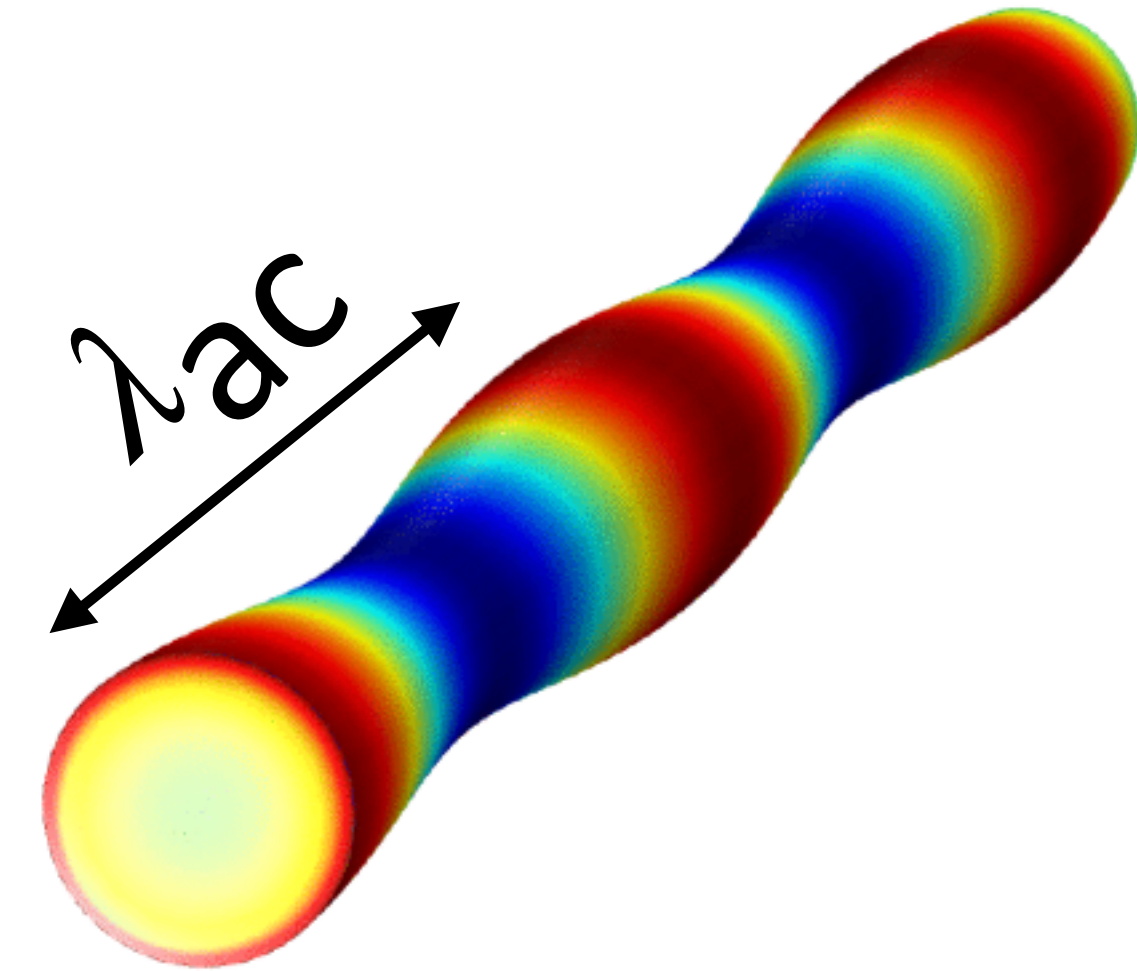
$$\left[(\lambda + 2\mu) + \eta_{11} \frac{\partial}{\partial t} \right] \nabla (\nabla \cdot \mathbf{U}) - \left[\mu + \eta_{44} \frac{\partial}{\partial t} \right] \nabla \times \nabla \times \mathbf{U} = \rho \frac{\partial^2 \mathbf{U}}{\partial t^2}$$

longitudinal waves ($\nabla \times \mathbf{u} = 0$)

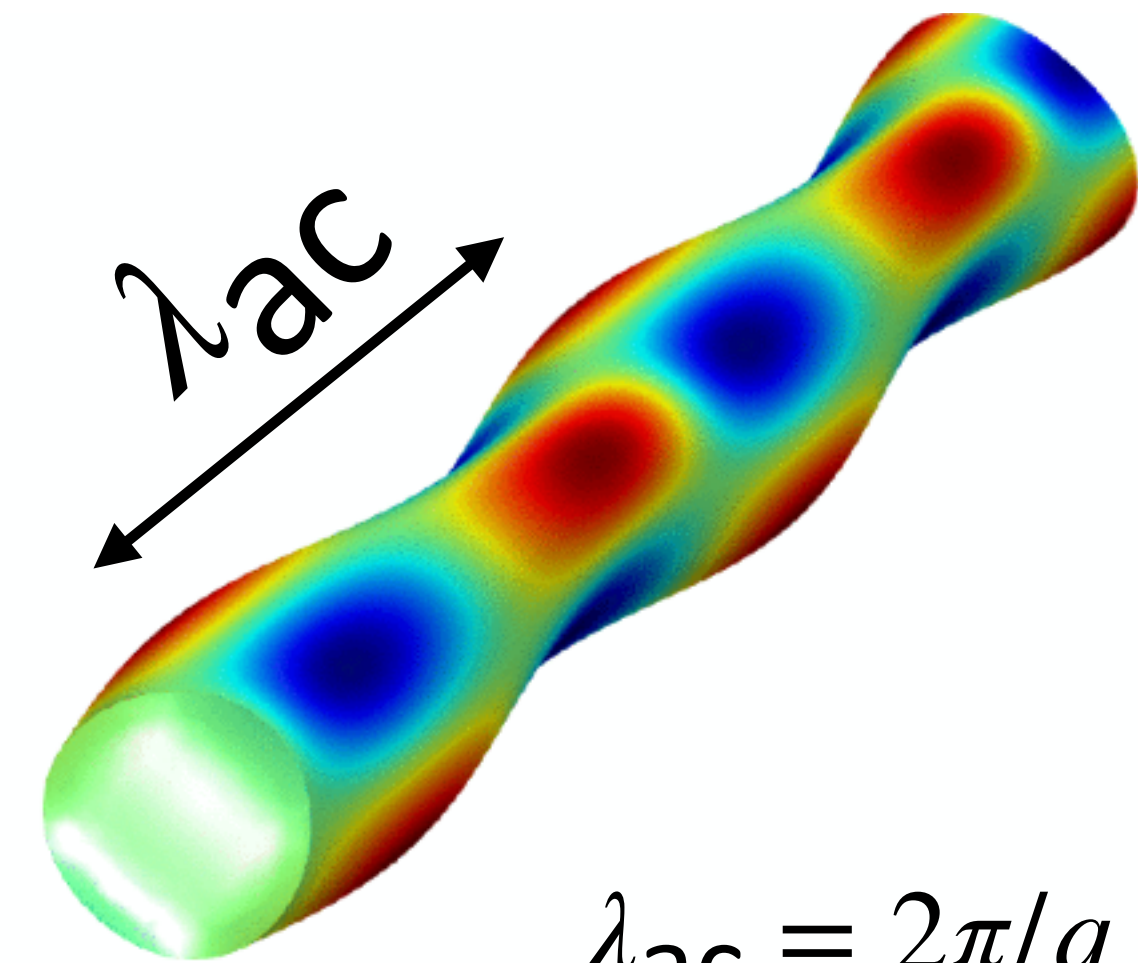
shear-only ($\nabla \cdot \mathbf{u} = 0$)

Elastic wave equation

Radial mode



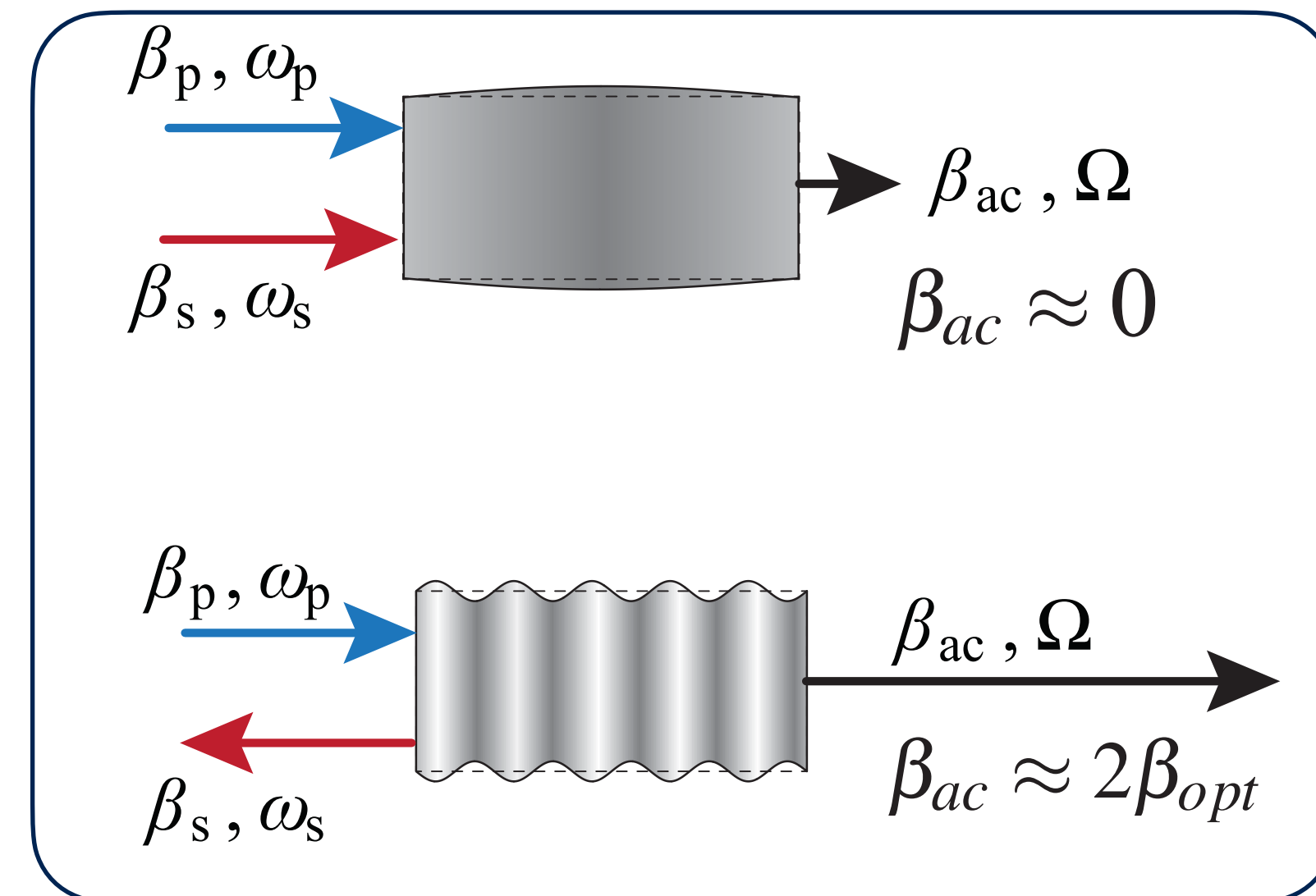
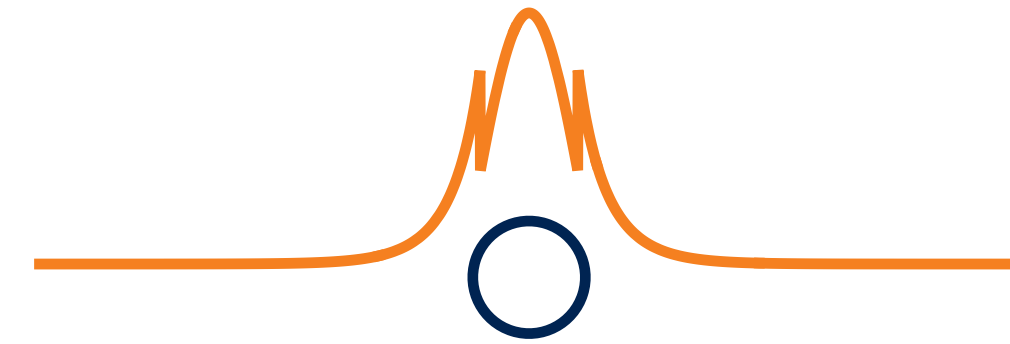
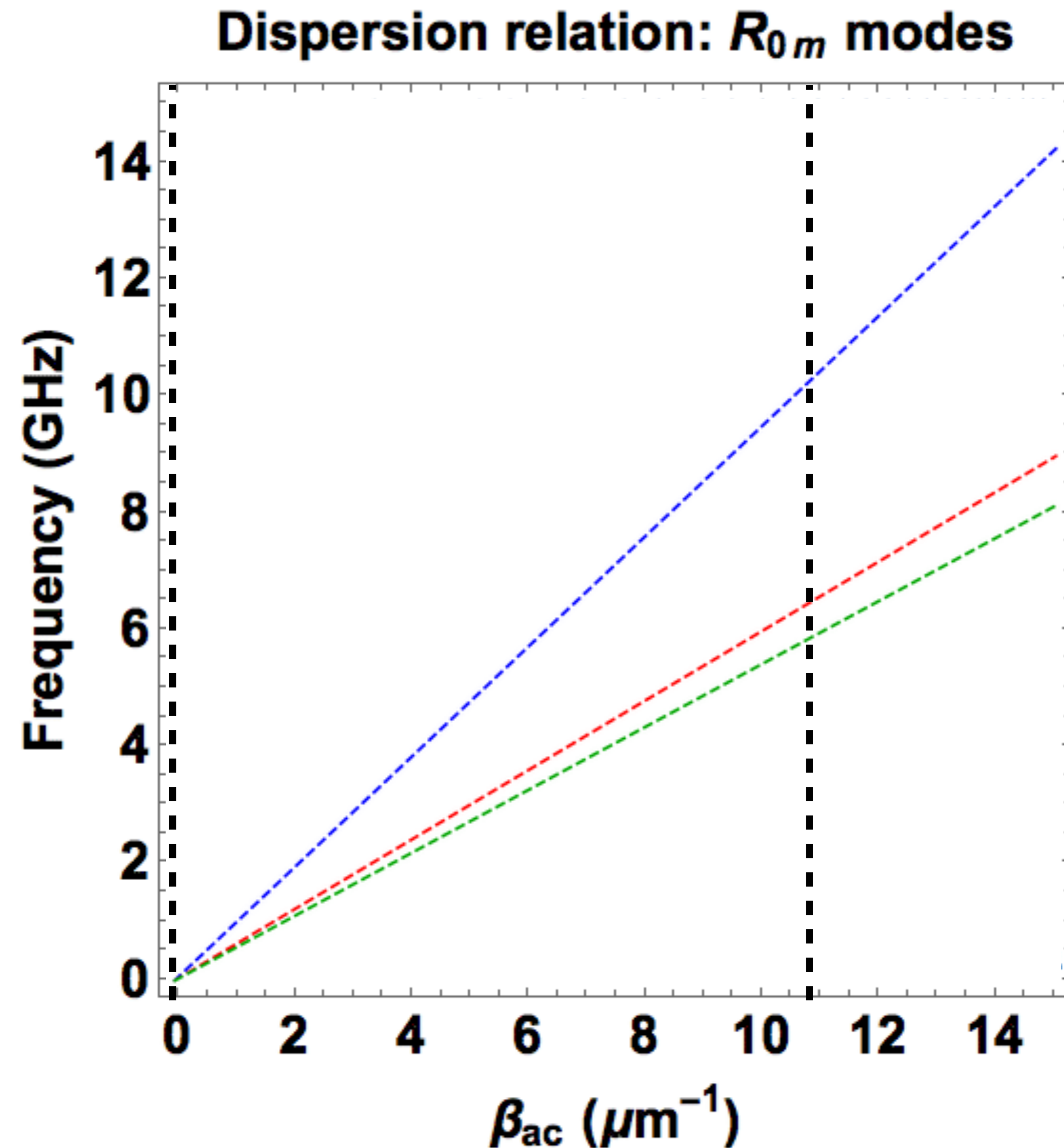
Torsional mode



$$\lambda_{ac} = 2\pi/q$$



Light-sound interaction: Brillouin scattering



Phase matching for Stokes scattering