





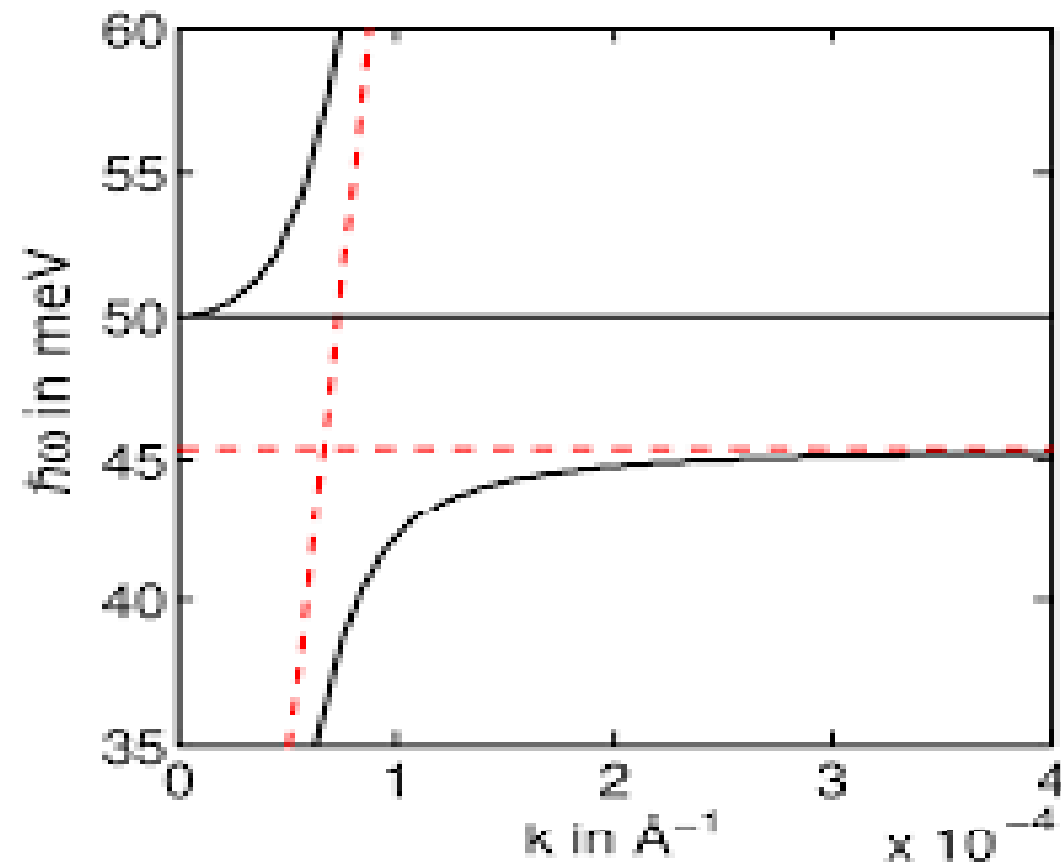
POLARITONS



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- Polaritons are quasiparticles.
 - Resulting from strong coupling of electromagnetic waves with an electric or magnetic dipole.
 - The quantum of the coupled phonon-photon transverse wave field is called a polariton.

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- At resonance the phonon-photon coupling entirely changes the character of the propagation and forbidden band.
 - By resonance a condition in which the frequencies and wave vectors of both waves are approximately equal.
 - Longitudinal phonons do not couple to transverse photons in the bulk crystal.

- The red lines are the uncoupled phonon and photon
- The black lines are the coupled phonon-photon



LST RELATION

- ▶ The ratio of natural frequency of the longitudinal optic vibrations to the natural frequency of the transverse optic vibration.
- ▶ Its is equal to the ratio of static dielectric constant and high frequency limit of dielectric function.

$$\frac{\omega_L^2}{\omega_T^2} = \frac{\epsilon(0)}{\epsilon(\infty)}$$

- ▶ The result is Lyddane-Sachs-Teller relation.



THANK U