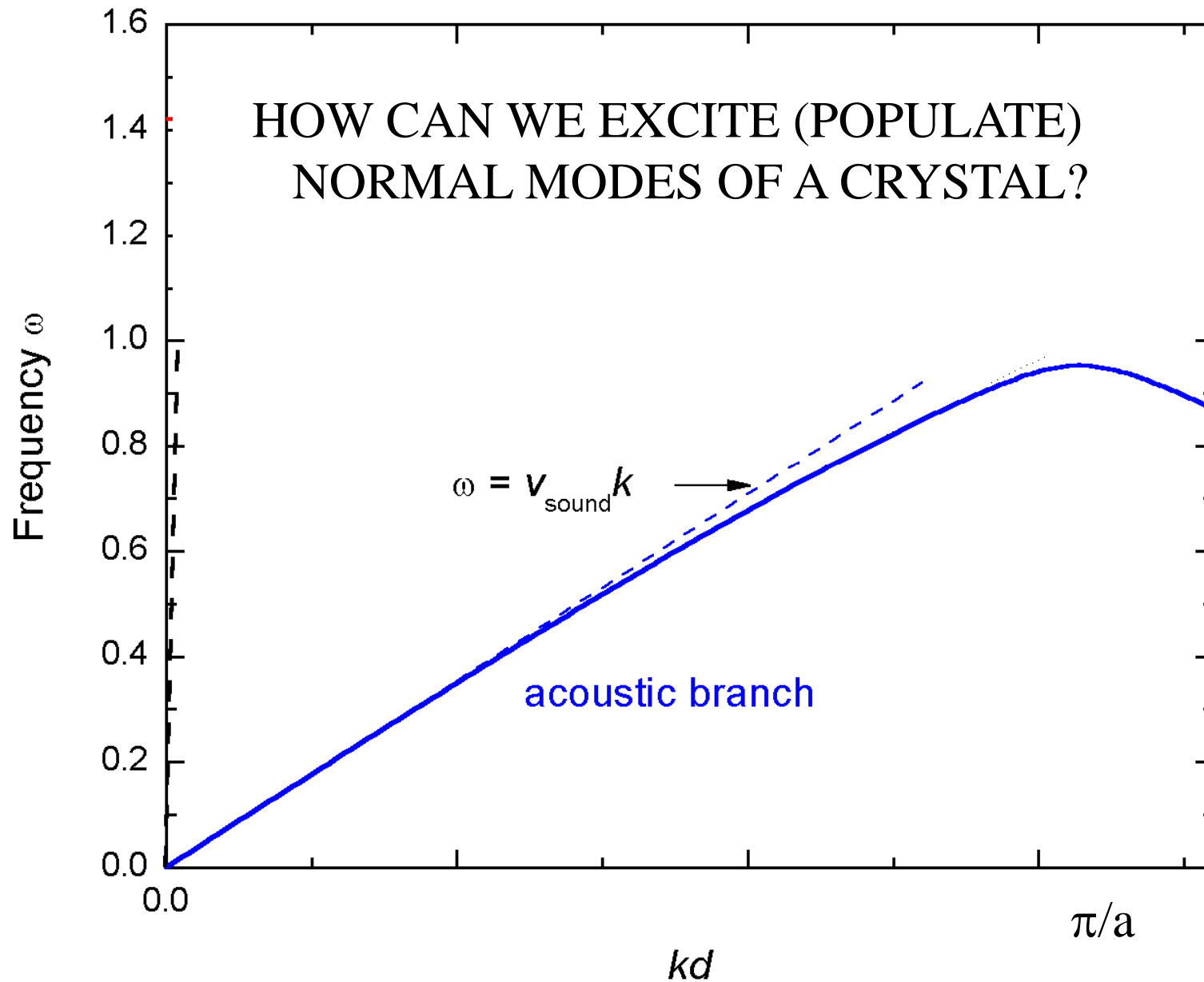


HOW CAN WE EXCITE (POPULATE) NORMAL MODES OF A CRYSTAL?



The 3 Distribution Functions

- Classical particles:

- Maxwell-Boltzmann: $f_{MB}(n, T) = \exp(-E(n)/k_B T)$

- Fermions (half-integer spins, e.g. electrons)

- Fermi-Dirac: $f_{FD}(n, T) = \frac{1}{\exp([E(n) - E_F]/k_B T) + 1}$

- Bosons (integer spins, e.g. photons, phonons)

- Bose-Einstein: $f_{BE}(n, T) = \frac{1}{\exp(E(n)/k_B T) - 1}$

