

Chapter 21 – Failures of the Static Lattice Model

Specific heat: only linear in T at low temperatures, T^3 above 10K, still higher constant.

Thermal expansion: can not explain insulators ($\exp(-E_G/kBT)$)

Temperature dependence of relaxation time

Failure of Wiedeman-Franz law at intermediate temperatures

Superconductivity

Thermal conductivity of insulators

Transmission of sound

Reflection of ionic crystals far below energy gap

Inelastic scattering of light (small energy shifts)

Width of X-ray scattering peaks

Inelastic neutron scattering