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Phys 343 project

Einstien and Debey Models for Solids

One of the First applications to statistical mechanics is the model Einstein formulated to calculate the heat capacity for solids, followed by a more sophisticated one by Debye.
Einstein assumed that the solid is made from simple harmonic oscillators with energy spectrum

$$\epsilon_n = \hbar\omega(n + \frac{1}{2})$$

He sued the statistical mechanics to derive a relation between the heat capacity and temperature. His model was close, but failed to coincide completely with empirical date. The model was later developed by Debey, including ' phonons' . This model was very accurate.
From the suggested readings, you shall summarise your understanding of these models in the following points.
1. Overview of the empirical relation between heat capacity and temperature.
2. Einstein model and its predictions.
3. Why this model was ' too simplified ?'.
4. Debey's Model.

You should include the references in your project
○ Mandl, Franz (1971). Statistical physics. Chichester: Wiley.
○ David Tong: Lectures on Statistical Physics (2012)
  `http://www.damtp.cam.ac.uk/user/tong/statphys.html`

Best Regards,

Dr Salwa Alsaleh