Very Very long Title of the Presentation that is so long that it will not fit in one line and will be wrapped to the next line

Subtitle of the Presentation that is also very long and will be wrapped to the next line if it is too long

author 1
author 2
author 3

Sample University

Outline

more topics that are not listed here but will be discussed in the presentation.

Band Theory

- **Band theory** : electrons in solids are not bound to individual atoms, but are shared by many atoms
- **Fermi energy** : highest energy level occupied at absolute zero temperature
- **Valence band** : band of energy levels occupied by electrons
- **Conduction band** :

- Metals have lot of electrons near Fermi energy
- Resistivity increases with temperature due to **defects, lattice vibration**

  - **Defects** : impurities, vacancies, dislocations
  - **Lattice**

Resistivity of Metals

- **Drude theory** : metals are good electrical conductors because electrons can move nearly freely between the atoms in solids
- conductivity: $\sigma \propto \tau \Rightarrow \rho \propto \tau^{-1}$

  τ : average lifetime of the electron between collision with other **electrons, impurities, lattice**

$$\tau^{-1} = \tau_{\text{imp}}^{-1} + \tau_{\text{el-el}}^{-1} + \tau_{\text{el-ph}}^{-1}$$

$$\rho = \rho_0 + aT^2 + bT^5$$

Resistivity increases with Temperature

Future Plan

- Strong coupling between lead and impurity
- Non-equilibrium effects
- Ferromagnetic RKKY (?)
- Generalize to multi-impurity

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Thank You.