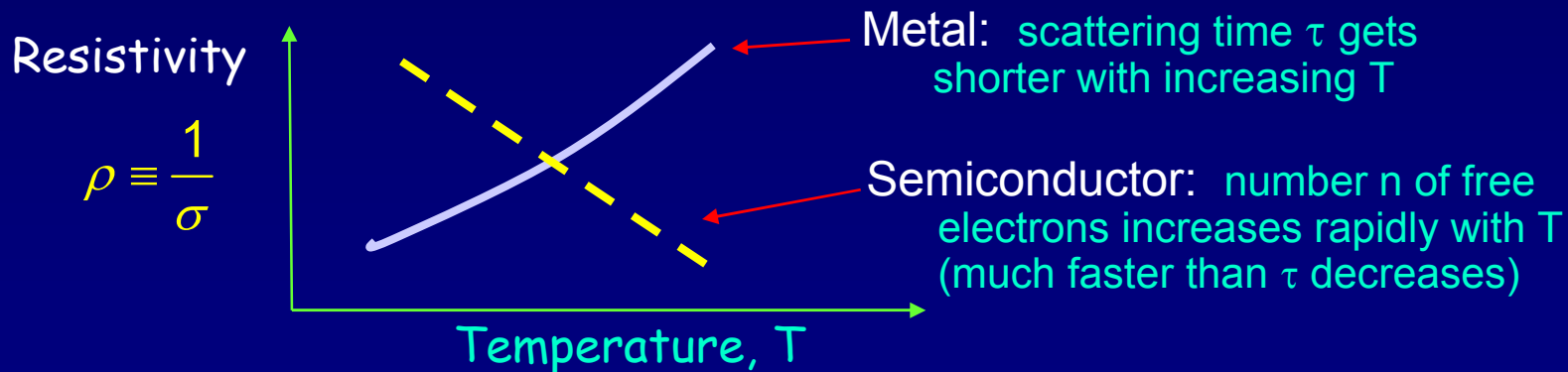


Silicon (3)

- At $T = 0$, the bonding states in Si are completely filled, and the anti-bonding states are completely empty. A small (1.1 eV) energy gap separates the bonding and anti-bonding states: Si is a semiconductor.
- The electrons in a filled band cannot contribute to conduction, because with reasonable E fields they cannot be promoted to a higher kinetic energy. Therefore, at $T = 0$, Si is an insulator. At higher temperatures, however, electrons are thermally promoted into the conduction band:



This graph only shows trends. A semiconductor has much higher resistance than a metal.