

NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Physics - NOC:Bonds and Bands in Solids

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Co-ordinating Institute - IISc - Bangalore

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Born-Oppenheimer approximation
Lecture 2 - Self-consistent field (SCF) method
Lecture 3 - Simple MO Theory of Hydrogen Molecule
Lecture 4 - Bloch's theorem
Lecture 5 - Tight binding approximation
Lecture 6 - Energy band theory - 1
Lecture 7 - Energy band theory - 2
Lecture 8 - Density of states
Lecture 9 - Energy band theory - 3
Lecture 10 - Energy band theory - 4
Lecture 11 - Drude's classical free electron model - 1
Lecture 12 - Drude's classical free electron model - 2
Lecture 13 - Drude's classical free electron model - 3
Lecture 14 - Drude's classical free electron model - 4
Lecture 15 - Sommerfeld's quantum free electron model
Lecture 16 - Specific heat of Fermi gas
Lecture 17 - Energy dispersion relation in a periodic potential - 1
Lecture 18 - Energy dispersion relation in a periodic potential - 2
Lecture 19 - Brief overview of space groups and constant energy surface in 2D
Lecture 20 - Energy band and effective mass
Lecture 21 - Effective mass
Lecture 22 - k p perturbation method
Lecture 23 - Revisiting Bloch's theorem and tight binding functions
Lecture 24 - Symmetries in crystal Hamiltonian - 1
Lecture 25 - Symmetries in crystal Hamiltonian - 2
Lecture 26 - Tight binding method - 1
Lecture 27 - Tight binding method - 2
Lecture 28 - Tight binding method - 3
Lecture 29 - Plane wave method

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- Lecture 30 - Pseudo potential method
- Lecture 31 - Cellular method of energy band calculation
- Lecture 32 - Muffin tin potential and APW functions
- Lecture 33 - Augmented plane wave method of energy band calculation - 1
- Lecture 34 - Augmented plane wave method of energy band calculation - 2
- Lecture 35 - Green's function method of energy band calculation - 1
- Lecture 36 - Green's function method of energy band calculation - 2
- Lecture 37 - Cyclotron resonance technique
- Lecture 38 - De Haas-van Alphen effect
- Lecture 39 - De Haas-van Alphen effect conclusion. Introduction to point impurity effect on band structure
- Lecture 40 - Point impurity in crystal
- Lecture 41 - Friedel Oscillations
- Lecture 42 - Lindhard dielectric constant
- Lecture 43 - Dielectric anomaly. Crystal momentum
- Lecture 44 - Spatial and time reversal symmetries in crystals
- Lecture 45 - Time reversal symmetry (Continued...)
- Lecture 46 - Spin orbit interaction
- Lecture 47 - Disordered solids and transport in disordered solids
- Lecture 48 - Optical properties of semiconductors
- Lecture 49 - Excitonic states in semiconductors
- Lecture 50 - Excitonic states in semiconductors (Continued...)
- Lecture 51 - Molecular orbital calculation - I
- Lecture 52 - Mott-Hubbard transition
- Lecture 53 - Hubbard model
- Lecture 54 - Electron repulsion and magnetic exchange
- Lecture 55 - Beyond on-site electron repulsions; Pariser-Parr-Pople model
- Lecture 56 - Electron-hole symmetry and Pairing theorem. Solitons
- Lecture 57 - Density waves in 1-d systems and Lattice vibrations - I
- Lecture 58 - Lattice vibrations - II
- Lecture 59 - Lattice vibrations - III
- Lecture 60 - Lattice vibrations - IV