

1. Record Nr.	UNINA9910506406203321
Autore	Ozdemir Servet
Titolo	Electronic properties of rhombohedral graphite // Servet Ozdemir
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-88307-8
Descrizione fisica	1 online resource (142 pages)
Collana	Springer Theses
Disciplina	662.92
Soggetti	Graphite Graphene Thin films
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Supervisor's Foreword -- Preface -- Acknowledgements -- Contents -- 1 Review of Rhombohedral Graphite -- 1.1 Introduction -- 1.2 Crystal Structure and Hexagonal Brillouin Zone of Graphene -- 1.3 Tight Binding Approximation of Graphene -- 1.3.1 Matrix Elements -- 1.4 Low Energy Bands -- 1.5 Linear Dispersion Relation and Massless Dirac Fermions -- 1.6 Pseudospin, Chirality, and Berry Phase -- 1.7 Tight Binding Model of AB-Stacked Bilayer Graphene -- 1.8 Low Energy Band Structure of Bilayer Graphene -- 1.9 Two Band Hamiltonian, Chirality, and Berry Phase in Bilayer Graphene -- 1.10 Tight Binding Model of ABC Stacked N-layer Graphene -- 1.11 Topological Arguments for Low Energy Flat Surface Bands -- 1.12 Landau Spectrum of ABC-Stacked Graphene Layers -- 1.13 Spontaneous Symmetry Broken States -- 1.14 Displacement Field Induced Gap and Screening Effects in Rhombohedral Stacks of Graphene -- 1.15 Trigonal Warping and Berry Phase of N in Rhombohedral Graphite -- 1.16 Flat Band Superconductivity in Rhombohedral Graphite -- 1.17 Stacking Faults on Rhombohedral Graphite Films -- 1.18 Identification of Rhombohedral Graphite -- 1.18.1 Raman Spectroscopy -- 1.18.2 Transmission Electron Microscopy -- 1.19 Density Functional Theory Predicted Magnetic Gap -- 1.20 Angular Resolved Photoemission Spectroscopy of Rhombohedral Graphite -- 1.21 Shear Stress

and Doping Induced Stacking Order Control -- 1.22 Summary --
References -- 2 Fundamentals of Electron Transport -- 2.1
Introduction -- 2.2 Effective Mass, Mobility, and Electrical Conductivity
-- 2.3 Ohms Law Using Boltzmann Transport Equation -- 2.4 Quasi
Fermi Level Separation and Diffusive Electron Transport Viewpoint --
2.5 Hall Effect in a Two-Dimensional System in the Presence of Non-
quantising Magnetic Field -- 2.6 Multi-band Transport.
2.7 Hall Effect in a Two-Dimensional System in the Presence
of Quantising Magnetic Field -- 2.8 Hall Effects in the Absence
of Magnetic Field -- 2.8.1 Anomalous Hall Effect -- 2.8.2 Spin Hall
Effect -- 2.8.3 Valley Hall Effect -- 2.9 Localization Effects
in Disordered Mesoscopic Systems -- 2.9.1 Classical Picture
of Diffusion and Localization -- 2.9.2 Weak Localization -- 2.9.3 Weak
Anti-localization -- References -- 3 Experimental Technicalities -- 3.1
Fabrication of van der Waals Heterostructures -- 3.2 Measurement
Electronics -- 3.2.1 Phase Sensitive Detection and Lock in Amplifier --
3.3 Measurement Geometry and Electrostatic Gating -- 3.4
Temperature Control -- 3.4.1 Sorption Pump-Controlled Helium-3
Cooling -- 3.4.2 Helium-3/Helium-4 Mixture Dilution Fridge -- 3.5
Magnetic Field -- 3.6 Summary -- References -- 4 Bulk Versus Surface
Conduction in Rhombohedral Graphite Films -- 4.1 Introduction -- 4.2
Temperature Dependence of Zero Gate Resistivity -- 4.3 Multi Carrier-
Type Transport -- 4.4 Semiconductor-Metal Transition -- 4.5 Summary
-- References -- 5 Landau Level Spectroscopy of Rhombohedral
Graphite Films -- 5.1 Introduction -- 5.2 Single Gated Landau Fan
Maps -- 5.3 Implied Low Energy Band Structure -- 5.4 Discussion --
5.5 Summary -- References -- 6 Spontaneous Gap Opening in at
Charge Neutrality Point of Rhombohedral Graphite Films -- 6.1
Introduction -- 6.2 Thermal Activation Gap Accompanied
by Topological Currents -- 6.3 DC Characterisation of the Gapped
Resistive State -- 6.4 Magnetic Field Dependence -- 6.5 Hysteretic
Behaviour -- 6.6 Summary -- References -- 7 Displacement Field
Induced Band Gap Opening in Rhombohedral Graphite Films -- 7.1
Introduction -- 7.2 Displacement Field Induced Resistivity Increase --
7.3 Absence of a Gap Opening for Graphite Films of Mixed Stacking.
7.4 Non-local Signal Due to Displacement Field Induced Gap Opening
-- 7.5 Summary -- References -- 8 Three Dimensional Quantum
Interference of Bulk Electrons -- 8.1 Introduction -- 8.2 Magnetic Field
Rotation of a 9-Layer Film -- 8.3 Magnetic Field Rotation of a 14-Layer
Film -- 8.4 Summary -- References -- 9 Summary -- Curriculum Vitae
-- Servet Ozdemir -- Employment History -- Education -- Publications
-- Talks and Presentations -- Awards.
