

1. Record Nr.	UNINA9910616385303321
Autore	Weston Astrid
Titolo	Atomic and electronic properties of 2D moire interfaces // Astrid Weston
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	9783031120930 9783031120923
Descrizione fisica	1 online resource (148 pages)
Collana	Springer Theses
Disciplina	181.07
Soggetti	Atomic theory Superlattices as materials
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Supervisor's Foreword -- Abstract -- Acknowledgements -- Contents -- Abbreviations -- 1 Thesis Outline -- References -- 2 Introduction to 2-Dimensional Materials and Moiré Superlattices -- 2.1 2-Dimensional Materials -- 2.1.1 Graphene -- 2.1.2 Hexagonal Boron Nitride -- 2.1.3 Transition Metal Dichalcogenides -- 2.2 Moiré Superlattices -- 2.2.1 Graphene and Hexagonal Boron Nitride -- 2.2.2 Twisted Bilayer Graphene -- 2.2.3 Twisted Bilayer TMDs -- 2.3 Summary -- References -- 3 Fabrication Techniques -- 3.1 Introduction -- 3.2 Mechanical Exfoliation and Crystal Identification -- 3.3 PMMA Dry Transfer Technique -- 3.4 Fabrication of Twisted Bilayer Heterostructures -- 3.5 Contamination and Air-Sensitivity in vdWs Heterostructures -- 3.6 Fabrication of Electrical Contacts -- 3.6.1 Shadow Mask Contacts -- 3.6.2 Electron Beam Lithography Contacts -- 3.6.3 Electron Beam Metal Deposition -- 3.7 Summary -- References -- 4 Characterisation Techniques -- 4.1 Scanning Probe Microscopy -- 4.1.1 Contact Mode -- 4.1.2 Tapping Mode -- 4.1.3 Electrical SPM Modes -- 4.1.4 AFM Image Processing -- 4.2 Electron Microscopy -- 4.2.1 Principles of Electron-Matter Interaction -- 4.2.2 Scanning Electron Microscopy -- 4.2.3 SEM Image Processing -- 4.2.4 Scanning Transmission Electron Microscopy -- 4.2.5 Atomic Resolution STEM Image Processing -- 4.2.6 Electron Beam Induced Effects -- 4.3

Summary -- References -- 5 Atomic Structure of Reconstructed Lattices of Twisted Bilayer TMDs -- 5.1 Sample Fabrication -- 5.2 Dark Field LAADF-STEM -- 5.3 Atomic Resolution HAADF-STEM -- 5.4 Multi-scale Modelling of Atomic Structure -- 5.5 Summary -- References -- 6 Electrical Properties of Reconstructed Lattices of Twisted Bilayer TMDs -- 6.1 Conductive-AFM Study of TMD Homobilayers -- 6.1.1 3R-Type Twisted Homobilayers -- 6.1.2 2H-Type Twisted Homobilayers. 6.2 Kelvin Probe Force Microscopy Studies of 3R-Type Twisted Bilayer MoS<sub>2</sub> -- 6.3 Scanning Electron Microscopy Studies of 3R-Type Twisted Bilayer MoS<sub>2</sub> -- 6.4 Electron Tunnelling in 3R-Type Twisted Bilayer MoS<sub>2</sub> -- 6.4.1 Reference 2H Bilayer MoS<sub>2</sub> Tunnelling Device -- 6.4.2 3R-Type Twisted Bilayer MoS<sub>2</sub> Tunnelling Devices -- 6.4.3 Ferroelectric Devices with Hall Bar Geometry -- 6.5 Summary -- References -- 7 Final Conclusions and Future Outlooks.

---