

2D van der Waals heterostructures: state-of-the-art & perspectives

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1. Review of mesoscopic physics in vdW systems
 - 1.1. vdW materials as a versatile platform for nanoelectronics
 - 1.2. Quantum Hall insulators beyond the quantum wells
 - 1.3. The emerging 2D long range orderings
2. Synthesis and Fabrication of vdW thin films
 - 2.1. Exfoliation of vdW crystals
 - 2.2. Large scale growth of 2D functional thin films
 - 2.3. Dry transfer methods for vertically stacked vdW hybrids
 - 2.4. Automations for high yield vdW vertical heterostructures
3. Nanoelectronic devices and their emergent quantum properties
 - 3.1. Room temperature electrical properties
 - 3.2. Twistronics and their topological properties
 - 3.3. Optical properties in vdW heterostructures
 - 3.4. Quantum simulators made of vdW heterosystems
4. Brief intro to future applications of vdW materials
 - 4.1. The flat semiconductors instead of Si
 - 4.2. Physical, chemical, and biological applications