

Quantum materials is an umbrella term in condensed matter physics that encompasses all materials whose essential properties cannot be described in terms of semiclassical particles and low-level quantum mechanics. These are materials that present strong electronic correlations or some type of electronic order, such as superconducting or magnetic orders, or materials whose electronic properties are linked to non-generic quantum effects – topological insulators, Dirac electron systems such as graphene, as well as systems whose collective properties are governed by genuinely quantum behavior, such as ultra-cold atoms, cold excitons, polaritons, and so forth. On the microscopic level, four fundamental degrees of freedom – that of charge, spin, orbit and lattice – become intertwined, resulting in complex electronic states; the concept of emergence is a common thread in the study of quantum materials.¹

In the present book, nine typical literatures about Quantum materials on international authoritative journals were selected to introduce the worldwide newest progress, which contains reviews or original researches on Quantum materials. We hope this book can demonstrate advances in Quantum materials as well as give references to the researchers, students and other related people.

The Editorial Board of Academic Archives
Scientific Research Publishing
April, 27 2023

¹ https://en.wikipedia.org/wiki/Quantum_materials