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Nota di contenuto	Introduction -- Experimental Methods -- Magnetic Modulation Doping For Quantum Anomalous Hall Effect -- Magnetic Proximity Induced Quantum Anomalous Hall Effect -- Topological Phase Transitions Relevant to Quantum Anomalous Hall Effect -- Half-integer Quantized Electrodynamics in 3D Topological Insulator -- Summary.
Sommario/riassunto	This book presents experimental studies on emergent transport and magneto-optical properties in three-dimensional topological insulators with two-dimensional Dirac fermions on their surfaces. Designing magnetic heterostructures utilizing a cutting-edge growth technique (molecular beam epitaxy) stabilizes and manifests new quantization phenomena, as confirmed by low-temperature electrical transport and time-domain terahertz magneto-optical measurements. Starting with a review of the theoretical background and recent experimental advances in topological insulators in terms of a novel magneto-electric coupling,

the author subsequently explores their magnetic quantum properties and reveals topological phase transitions between quantum anomalous Hall insulator and trivial insulator phases; a new topological phase (the axion insulator); and a half-integer quantum Hall state associated with the quantum parity anomaly. Furthermore, the author shows how these quantum phases can be significantly stabilized via magnetic modulation doping and proximity coupling with a normal ferromagnetic insulator. These findings provide a basis for future technologies such as ultra-low energy consumption electronic devices and fault-tolerant topological quantum computers.