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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.