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Role of Topological Invariants in Characterizing Phase Transitions in Topological Insulators

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Abstract: *Topological insulators have emerged as a fascinating class of materials with unique electronic properties and distinct topological characteristics. These materials exhibit a variety of phase transitions, both quantum and thermal, which are crucial for understanding their exotic behaviors. This paper explores the pivotal role of topological invariants in characterizing phase transitions in topological insulators. We provide a comprehensive overview of the underlying principles, experimental evidence, and implications for the broader field of condensed matter physics. By emphasizing the importance of topological invariants, we aim to shed light on the intricate interplay between topology and phase transitions in these intriguing materials.*

Keywords: Topological insulators, Quantum Hall effect, Band topology.

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