**Strong Correlation Effects in 2D Topological Quantum Phase Transitions**

A.Amaricci1, M.Capone1

*1 Scuola Internazionale Superiore di Studi Avanzati (SISSA), Via Bonomea 265, 34136 Trieste, Italy.*

Topological Quantum Phase Transitions (TQPT) are characterized by changes in global topological invariants, beyond the conventional paradigm of local order parameters. The recent progress in identifying topological states in strongly correlated compounds and hetero-structures, pushed attention to the effects of the electronic interaction in TIs.

Here, we demonstrate that interaction can change the conventional portrait of TQPT[1-3]: we uncover a topological transition of first-order character occurring for strong enough interaction. Our study reveals the existence of a quantum critical endpoint, associated with an orbital instability, on the transition line between a TI and a trivial insulator[1,2]. We show that the conventional paradigm of continuous TQPT breaks down: The change of the topological invariants takes place without energy gap closing but preserving the symmetries protecting the topological phase.

Finally, we address the fate of the helical edge states in TIs showing that Time-Reversal Symmetry (TRS) opposes to the strong interaction effects via edge states reconstruction mechanism[4]: The progressive penetration of the edge states into the bulk. We show that a similar process survives in presence of anti-ferromagnetic ordering[5].

**References**

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