

Jozef Stefan Institute, Department of Theoretical Physics

*Solid State Group Seminars*

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## **Breakdown of the bulk boundary correspondence in a strongly correlated model Hamiltonian**

In this talk I will give a short introduction to topology in general and to the influence of strong correlations on a topological model Hamiltonian in particular. The first part will be about the definition of topological invariants, how to compute them and what changes in case of strong interactions. Then I will turn to the Kane-Mele-Hubbard model, in particular focusing on the competition between topological and magnetic order. Both bulk and ribbon Green's functions have been calculated using the variational cluster approach, employing a two-site dynamical impurity approximation (DIA). The resulting invariants are compared to the existence of gapless edge states of the ribbon, where we use a site-dependent antiferromagnetic Weiss field on the ribbon. It turns out that spontaneous symmetry breaking occurs locally at the edges already at much smaller interactions than in the middle of the ribbon, leading to a gap in the edge spectral function. As a consequence, the topological invariant defined in the bulk may not correspond to the existence of gapless edge states since time reversal invariance is locally broken only at the edges. Eventually, I will compare the results to Mean-Field approximations using in-plane and out-of-plane magnetic moments, showing that the direction has a huge influence on the correct topological description.

Tuesday, Mar 1, 3:00pm

Cajna soba F-1, Jozef Stefan Institute