AUTOMORPHIC EQUIVALENCE AND THE CLASSIFICATION OF GAPPED PHASES

S. Bachmann

Department of Mathematics, University of California Davis

By introducing the notion of automorphic equivalence we obtain a rigorous notion of physical equivalence of the set of ground states of two quantum spin models. We prove that two models are equivalent in that sense if there exists an interpolating path of Hamiltonians with a gap above the ground states that does not close, uniformly in the volume. Applying this notion of equivalence to one-dimensional models with matrix product ground states, we demonstrate the importance of edge states. This will be illustrated by studying the $SO(2l+1)$ invariant generalizations of the AKLT model. We explicitly prove that each of these models is equivalent to a model with a unique product ground state in the bulk and a specific number of edge states. This is joint work with Bruno Nachtergaele.