

Geometric phase for the Ising XY model at finite temperature

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Abstract

Mathematical results about gapped Hamiltonians of fermions have been reached recently. A very relevant one is the classification of the such systems in terms of topological indices. We know that topological index of type \mathbb{Z}_2 introduced by Araki and Evans characterize the phase transition of spin and fermionic systems given by bilinear Hamiltonians. The mathematical framework are Self-dual CAR Algebras (SdCAR), in which this kind of characterization are completely determined by basis projections or equivalently by complex structures associated with the one particle Hilbert space. But some local formula for the calculation of this indices is lacking.

In this presentation I will discuss an explicit relation between Uhlman connection and the basis projection for the self-dual one particle Hamiltonian of the Ising XY model, and how this extends the topological \mathbb{Z}_2 index to states of finite temperature of this model. (Join work with S. Tabban and A.F. Reyes-Lega.)