

Unitary Dressing Transformations and Exponential Decay Below Threshold for Quantum Spin Systems. Parts III and IV

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Abstract. This is the continuation of a series of articles concerning a class of quantum spin systems with Hamiltonian operators of the form

$$H_\lambda = \sum_{x \in \Lambda} s_x + \sum_{\gamma_0 \subset \Lambda} \lambda^{|\gamma_0|c-1} t_{\gamma_0},$$

where Λ is a graph, λ is a small parameter and s_x has a gap ≥ 1 for all $x \in \Lambda \setminus \mathcal{S}$. In the singular set $\mathcal{S} \subset \Lambda$, the gap of s_x can be arbitrarily small. Part III is devoted to the proof of a preliminary result, while in Part IV we consider the case in which \mathcal{S} is a subset of finite density of Λ . This completes the first iteration step of the deterministic part of the proof of localization in the ground state of the random field quantum XY model.

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