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On ground states and excitations in certain disordered quantum spin chains. Preliminary report.

We study the ground states and low-energy excitations of disordered quantum spin chains. In some cases, disorder effects have been linked to manifestations of dynamical localization, such as by zero-velocity Lieb-Robinson bounds. Assuming such zero-velocity bounds and mild uniqueness assumptions for the finite volume ground state we show uniqueness of the infinite volume ground state. In the Ising and XXZ spin chains there is no unique ground state. Instead there a manifold of domain wall type excitations, called kink/anti-kink states, that appear as ground states in the infinite volume limit. We investigate the localization properties of domain wall excitations in the disordered quantum Ising model. (Received September 25, 2018)