MASTROPIETRO, Vieri
Universita' degli Studi di Milano
Dipartimento di Matematica
20133 Milano, Italy

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Interacting Fermions with Quasi-random Disorder: A Quantum KAM

We rigorously establish persistence of localization at low temperatures in presence of weak many-body interaction in a system of one dimensional lattice electrons with an incommensurate Aubry-Andre' potential. Convergence of the expansions is obtained by a quantum many body extension of methods adopted for the stability of tori of nearly integrable hamiltonian systems (KAM theory) combined with fermionic RG methods.

Extensions to the spinful case or to the case when several chains are coupled are discussed.

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