Localization revisited

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the talk (based on joint work with J. Schenker) is devoted to a new type of decay bounds for the eigenfunctions of random operators in the localized regime: with good probability, all the (normalized) eigenfunctions are exponentially decaying outside a ball of volume the squared inverse of their sup norm. Moreover, the number of eigenfunctions having sup norm smaller than, say, t is smaller than $D\exp(-Ct^{-2/d})$ times the total number of eigenfunctions in the system: most eigenfunctions localize on finite size balls independent of the system size. We also discuss converse of this estimate and provide an application to decay estimates for the one-particle and the two-particles density matrices of the ground states of n non interacting fermionic quantum particles subjected to a random potential in a large box.