Quantum ergodicity for expanding quantum graphs in the regime of spectral delocalization

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The aim of the talk is to discuss the phenomenon of "quantum ergodicity" of eigenfunctions on large expander graphs. We will start with the work of Anantharaman-Le Masson and Anantharaman-Sabri concerning discrete graphs, but the goal is to prove similar results for large quantum graphs. Last year, we proved the same statement for quantum graphs that had been obtained for discrete graphs : if a sequence of finite quantum expander graphs "converges" to an infinite tree, and the latter has purely absolutely continuous spectrum in some given interval I, then "most" of the eigenfunctions of the finite graphs with frequency in I are delocalized in the sense of quantum ergodicity (which is a rather weak notion of delocalization). Note that the size of the graph goes to infinity, not the frequency, and that we are now dealing with unbounded Schrödinger operators, which modifies a lot the arguments, although the phenomenon is the same at the end. This is joint work with M. Ingremeau, M. Sabri, B. Winn. After stating the result, the talk will mostly be dedicated to the definition of Benjamini-Schramm convergence (which is new for quantum graphs) and to examples where the result applies.