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Mixing of Quantum Walks on Graphs

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Given a simple, undirected, regular graph G = (V, E) with adjacency matrix A, a continuous-time quantum walk on G is given by $v_t = \exp(-iAt)\, v_0$, where v_0 is a unit |V|-dimensional vector. The probability distribution induced by such a walk at time t on vertex u is $p_u(t) = |v_t[u]|^2$. A quantum walk on G is called “uniform mixing” if there is a time t* such that $p_u(t^*) = 1/|V|$ for all u in V.

Classical random walks on well-behaved graphs are known to mix to the uniform distribution. But this is a property not shared by most quantum walks. This talk describes counter-intuitive differences in mixing phenomena between classical and quantum walks on graphs.
