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## **Christino Tamon (Clarkson)**

## Mixing of Quantum Walks on Graphs

## Abstract for the Combinatorics Seminar 2009 May 5

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.

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