Mixing Properties in Quantum Walks

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Abstract of Talk: Random walks on a graph, a special case of Markov chains, are well studied stochastic processes. This research studies quantum walks (random walks, when performed by a quantum particle) and their mixing properties, which is the expected value of the position of the particle after infinite time. We first begin by analyzing the walks on circulant graphs (Cayley graphs of cyclic groups) and then extend our study to other families of graphs obtained by gluing circulants together. The importance of graph properties, such as spectrum and automorphism groups, in the behavior of these walks are highlighted. Comparisons to classical random walks are made to contrast their basic characteristics.