Complex-time Locality Estimates for Quantum Lattice Systems

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Lieb-Robinson bounds for quantum lattice systems and complex-time generalizations of such bounds for quantum chains have recently been used to obtain a number of nontrivial results in statistical mechanics. If similar complex-time bounds could be shown to exist for higher dimensional systems, many of the proofs of these results would immediately extend to these cases. In this talk we will show that the existence of such complex-time locality estimates in dimensions greater than one is related to interesting questions concerning lattice animals and first-passage percolation. Finally, we will answer the question of the existence of such complex-time locality estimates.