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Quantum walks on graph complements

Quantum walks on graphs describe the behavior of a quantum state in a quantum spin network. While this is currently a very active area of research, little is known about the relationship of the state transfer properties between a graph and its complement. In this talk, we characterize the conditions such that peak state transfer (resp., pretty good state transfer) in a graph is preserved in the complement. We also quantify the difference between the behavior of quantum state transfer between two vertices in a graph and its complement, and provide crude bounds for Nordhaus-Gaddum type relations involving the entries of the corresponding transition matrix. This work is a product of the PIMS First Year Interest Groups (FYIG), joint with Joy Cooper, Hermie Monterde, Alireza Talebpour, and Ruth Wang (arXiv:2610.07673).