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## DISSIPATIVE QUANTUM RANDOM WALKS

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### Abstract:

Quantum Random Walks have been introduced almost 20 years ago by Y. Aharonov, L. Davidovich, and N. Zagury [Phys. Rev. A, 48(2):1687–1690, 1993] and have found considerable attention and applications in quantum information. As is often the case in quantum mechanics, Quantum Random Walks differ strongly in their behavior from their classical counterpart. In this joint work with S. Attal, C. Sabot, and I. Sinayskiy we introduce Dissipative Quantum Random Walks, by taking into account the typical phenomena of dissipation and decoherence that occur in open quantum systems. The relationship to classical random walks will be discussed as well as the potential of Dissipative Quantum Random Walks to explain quantum efficiency, that is one of the striking aspects of transport in quantum biological systems.