Contribution ID: **82** Type: **Poster**

Persistence of Topological Phases in Non-Hermitian Quantum Walks

Discrete-time quantum walks (DTQWs) are known to exhibit exotic topological states and phases. Physical realization of quantum walks in a noisy environment may destroy these phases. We investigate the behavior of topological states in quantum walks in the presence of a lossy environment. The environmental effects in the quantum walk dynamics are addressed using the non-Hermitian Hamiltonian approach. We show that the topological phases of the quantum walks are robust against moderate losses. The topological order in one-dimensional (1D) split-step quantum walk persists as long as the Hamiltonian is $\mathcal{PT}$-symmetric. Although the topological nature persists in two-dimensional (2D) quantum walks as well, the $\mathcal{PT}$-symmetry has no role to play there. Furthermore, we observe the noise-induced topological phase transition in two-dimensional quantum walks.

Presenter: Mr MITTAL, Vikash (Indian Institute of Science Education & Research (IISER) Mohali)

Session Classification: Beers and Posters