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Extension of the Non-Hermitian Quantum Walk Model into a 2D Hexagonal Lattice[1] LANG-TAO HUANG, Department of Physics, Tsinghua University, Beijing 100084, China — We generalize the 1D non-Hermitian quantum walk model of M. S. Rudner, and L. S. Levitov [1] to three different cases: 1D model with next nearest hopping, 2D model with and without next nearest hopping on hexagonal lattice respectively. We find that the quantization of the average decay length is always robust to next nearest hopping with real hopping parameter in 1D, but in the case of 2D, this quantization is only present in some special circumstances. We also find the 2D model is compatible to the 1D one by setting one of the hopping terms to zero. As to the Haldane model, quantization of this type exits only in 0 or π magnetic flux phases.

[1] M. S. Rudner and L. S. Levitov, Phys. Rev. Lett. **102**, 065703 (2009).

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