

Abstract Submitted
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Quantum walks on the chimera graph and its variants¹ BARRY SANDERS², XIANGXIANG SUN, SHU XU, JIZHOU WU, University of Science and Technology of China, WEI-WEI ZHANG, Beijing University of Posts and Telecommunications, NIGUM ARSHED, University of Science and Technology of China — We study quantum walks on the chimera graph, which is an important graph for performing quantum annealing, and we explore the nature of quantum walks on variants of the chimera graph. Features of these quantum walks provide profound insights into the nature of the chimera graph, including effects of greater and lesser connectivity, strong differences between quantum and classical random walks, isotropic spreading and localization only in the quantum case, and random graphs. We analyze finite-size effects due to limited width and length of the graph, and we explore the effect of different boundary conditions such as periodic and reflecting. Effects are explained via spectral analysis and the properties of stationary states, and spectral analysis enables us to characterize asymptotic behavior of the quantum walker in the long-time limit.

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