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Optimal Control of Majorana Zero Modes GIL REFAEL, TORSTEN KARZIG, Caltech, ARMIN RAHMANI, University of British Columbia, FELIX VON OPPEN, Freie Universität Berlin — Braiding of Majorana zero modes provides a promising platform for quantum information processing, which is topologically protected against errors. Strictly speaking, however, the scheme relies on infinite braiding times as it utilizes the adiabatic limit. Here we study how to minimize nonadiabatic errors for finite braiding times by finding an optimal protocol for the Majorana movement. Interestingly, these protocols are characterized by sharp transitions between Majorana motion at maximal and minimal velocities. We show that these so-called bang-bang protocols can minimize the nonadiabatic transitions of the system by orders of magnitude in comparison with naive protocols.

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