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Local Adiabatic Mixing of Majorana Kramers pairs in DIII wires¹ KONRAD WÖLMS, Center for Quantum Devices, Niels Bohr Institute, University of Copenhagen, 2100 Copenhagen, Denmark , ADY STERN, Department of Condensed Matter Physics, Weizmann Institute of Science, Rehovot, 76100, Israel, KARSTEN FLENSBERG, Center for Quantum Devices, Niels Bohr Institute, University of Copenhagen, 2100 Copenhagen, Denmark — We consider coherence of localized Kramers pairs of Majorana fermions in a DIII topological superconductors and show that they get mixed by adiabatic processes, even if the instantaneous Hamiltonian stays in the DIII class at each instant of time. In particular, we compute the associated Berry curvature analytically for an illustrative toy model as well as numerically for a simple DIII wire model and discuss the general conditions for the mixing to be finite. The mixing occurs for a wide range of perturbations, for example even by electrical noise alone. Our calculation thus shows that quantum information stored in time-reversal symmetric Majorana Kramers pairs are not topologically protected.

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Gediminas Kirsanskas Center for Quantum Devices, Niels Bohr Institute, University of Copenhagen

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