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Topological aspects of Josephson π -junctions in Kitaev wires
CHRISTIAN SPÅNSLÄTT, EDDY ARDONNE, Stockholm University, JAN BUDICH, University of Innsbruck, T.H. HANSSON, Stockholm University — We investigate the topological properties of Josephson junctions with a phase shift of π in one dimensional topological superconductors. We show that by imposing a reality constraint on the order parameter, the resulting zero energy junction bound state can be mapped onto a soliton solution of a Jackiw-Rebbi type Dirac equation similar to that in polyacetylene. Further, we consider π -junctions where the order parameter phase winds across the junction so that the aforementioned bound state generically acquires a gap. We relate these observations to the classification of the junctions according to their anti-unitary symmetries.

Christian Spånslätt
Stockholm University

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