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Emergence of semifluxons in long 0-π-0 Josephson junctions as a topological state change MICHAEL GRUPP, Ulm University, REINHOLD WALSER, TU Darmstadt, WOLFGANG SCHLEICH, Ulm University —
We present a generic, analytical model of the emergence of semifluxons in long 0-π-0 Josephson junctions and demonstrate its implementation in the context of ultracold matter waves using optical junctions. Semifluxons are well-known topological states at the interface of superconductors (1), related to ordinary quantized magnetic flux or vortices in superfluid systems. They appear in particular when there is a spatially varying tunnel rate in the Josephson junction. This interesting subject has stimulated previous work to implement analogous states in ultracold quantum gases (2).

(1) E. Goldobin, et al., Phys. Rev. Lett., 92, 057005 (2004)
(2) R. Walser, et al., NJP, 10, 045020 (2008)

Michael Grupp
Ulm University

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