

Abstract Submitted  
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**Unconventional Josephson signatures of Majorana bound states** LIANG JIANG, DAVID PEKKER, GIL REFAEL, Department of Physics, Caltech, JASON ALICEA, Department of Physics and Astronomy, University of California, Irvine, YUVAL OREG, Department of Condensed Matter Physics, Weizmann Institute of Science, FELIX VON OPPEN, Dahlem Center for Complex Quantum Systems and Fachbereich Physik, Freie Universitat Berlin — A junction between two topological superconductors containing a pair of Majorana fermions exhibits a ‘fractional’ Josephson effect,  $4\pi$  periodic in the superconductors’ phase difference. An additional fractional Josephson effect, however, arises when the Majoranas are spatially separated by a superconducting barrier. This new term gives rise to a set of Shapiro steps which are essentially absent without Majorana modes and therefore provides a unique signature for these exotic states. Other new signatures associated with Majorana fermions will also be discussed.

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