

Abstract Submitted  
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**Ac Josephson Effect in Topological Josephson Junctions**<sup>1</sup> JULIA MEYER, DRISS BADIANE, MANUEL HOUZET, INAC-SPSMS, CEA/UJF Grenoble, LEONID GLAZMAN, Yale University — Topological superconductors admit zero-energy Majorana bound states at their boundaries. In Josephson junctions between two topological superconductors, the presence of these states gives rise to an Andreev bound state whose energy varies  $4\pi$ -periodically in the superconducting phase difference. An applied voltage bias leads to a dynamically varying phase according to the Josephson relation. Furthermore, it leads to dynamics of the occupation of the bound state via its non-adiabatic coupling to the continuum. While the Josephson relation suggests a fractional Josephson effect due to the  $4\pi$ -periodicity of the bound state, its observability relies on the conservation of the occupation of the bound state on the experimentally probed time scale. We study the lifetime of the bound state and identify the time scales it has to be compared to. In particular, we are interested in signatures of the fractional Josephson effect in the Shapiro steps and in current noise measurements.

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