

Abstract Submitted  
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**Universal Nonequilibrium Signatures of Majorana Zero Modes in Quench Dynamics**<sup>1</sup> ROMAIN VASSEUR, JAN DAHLHAUS, JOEL MOORE, UC Berkeley — The quantum evolution after a metallic lead is suddenly connected to an electron system contains information about the excitation spectrum of the combined system. We exploit this type of “quantum quench” to probe the presence of Majorana fermions at the ends of a topological superconducting wire. We obtain an algebraically decaying overlap (Loschmidt echo)  $\mathcal{L}(t) = |\langle \psi(0) | \psi(t) \rangle|^2 \sim t^{-\alpha}$  for large times after the quench, with a universal critical exponent  $\alpha = \frac{1}{4}$  that is found to be remarkably robust against details of the setup, such as interactions in the normal lead, the existence of additional lead channels or the presence of bound levels between the lead and the superconductor. As in recent quantum dot experiments, this exponent could be measured by optical absorption, offering a new signature of Majorana zero modes that is distinct from interferometry and tunneling spectroscopy.

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