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Quench dynamics of paired states of fermions in two dimensions with breaking of parity and time-reversal symmetries¹ NOAH BRAY-ALI, Joint Quantum Institute, National Institute of Standards and Technology-Gaithersburg and University of Maryland, College Park — Resonantly paired fermions in two spatial dimensions with breaking of parity and time-reversal symmetry are believed to exhibit two topologically distinct phases at low temperature: the weak-pairing (Bardeen-Cooper-Schrieffer or BCS) phase and the strong-pairing (Bose-Einstein condensate or BEC) phase. We examine the dynamic response of each phase to a rapid quench towards and away from the quantum critical regime. The weak-pairing (BCS) phase has a higher residual defect concentration after the quench than the strong-pairing (BEC) phase. We relate this to the presence of a topologically protected, Majorana fermion edge excitation in the weak-pairing phase, and propose quench dynamics as a practical, experimental probe of this excitation in these systems.

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