

Abstract Submitted  
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**Interacting topological phases in multiband nanowires**<sup>1</sup> ROMAN LUTCHYN, Microsoft Research, Station Q, University of California, Santa Barbara, CA 93106, MATTHEW P.A. FISHER, Department of Physics, University of California, Santa Barbara, California 93106 — We show that semiconductor nanowires coupled to an s-wave superconductor provide a playground to study effects of interactions between different topological superconducting phases supporting Majorana zero-energy modes. We consider quasi-one dimensional system where the topological phases emerge from different transverse subbands in the nanowire. In a certain parameter space, we show that there is a multi-critical point in the phase diagram where the low-energy theory is equivalent to the one describing two coupled Majorana chains. We study effect of interactions as well as symmetry-breaking perturbations on the topological phase diagram in the vicinity of this multi-critical point. Our results shed light on the stability of the topological phase around the multi-critical point and have important implications for the experiments on Majorana nanowires.

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