

Abstract Submitted
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Landau levels of Majorana fermions in a spin liquid STEPHAN RACHEL, TU Dresden, LARS FRITZ, Utrecht University, MATTHIAS VOJTA, TU Dresden — Majorana fermions, originally proposed as elementary particles acting as their own antiparticles, can be realized in condensed-matter systems as emergent quasiparticles, a situation often accompanied by topological order. Here we propose a physical system which realizes Landau levels highly degenerate single-particle states usually resulting from an orbital magnetic field acting on charged particles for Majorana fermions. This is achieved in a variant of a quantum spin system due to Kitaev which is distorted by triaxial strain. This strained Kitaev model displays a spin-liquid phase with charge-neutral Majorana-fermion excitations whose spectrum corresponds to that of Landau levels, here arising from a tailored pseudo-magnetic field. We show that measuring the dynamic spin susceptibility reveals the Landau-level structure by a remarkable mechanism of probe-induced bound-state formation.

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