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**Characterizing disordered fermion systems using the momentum-space entanglement spectrum** IAN MONDRAGON-SHEM, MAYUKH KHAN, TAYLOR HUGHES, University of Illinois, Urbana-Champaign — We show that momentum-space entanglement can reveal the existence of robust extended states in disordered fermions systems. This approach represents a novel alternative to the more conventional position-space entanglement used in condensed matter settings. We illustrate this proposal by using explicit 1D models with spatially correlated disorder that exhibit phases which avoid complete Anderson localization. The momentum space entanglement spectrum clearly reveals the location of delocalized states in the energy spectrum and can be used as a signature of the phase transition between a delocalized and localized phase. We further discuss possible applications to 2D systems that exhibit topological properties which arise from the existence of robust bulk extended states in their energy spectrum.

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