

Abstract Submitted  
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**Majorana fermions in one-dimensional spin-orbit coupled Fermi gases** RAN WEI, ERICH MUELLER, Cornell University — We theoretically study trapped one-dimensional Fermi gases in the presence of spin-orbit coupling induced by Raman lasers. The gas changes from a conventional (non-topological) superfluid to a topological superfluid as one increases the intensity of the Raman lasers above a critical chemical-potential dependent value. Solving the Bogoliubov-de Gennes equations self-consistently, we calculate the density of states in real and momentum space at finite temperatures. We study Majorana fermions (MFs) which appear at the boundaries between topologically trivial and topologically non-trivial regions. We linearize the trap near the location of a MF, finding an analytic expression for the localized MF wavefunction and the gap between the MF state and other edge states.

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