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**Majorana modes in single channel cold atomic gases with short-ranged attractive interactions**<sup>1</sup> JAY SAU, XIAOPENG LI, Condensed Matter Theory Center and Joint Quantum Institute at the University of Maryland — Majorana modes have been predicted to exist in topological superfluids that generated by a combination of spin-orbit coupling and short-ranged attractive interactions. One dimensional superfluids with intrinsic interactions, however, present a precarious competition between phase fluctuations and topological superfluidity. Previously, it has been argued that the Majorana nature survives with some modification in multi-channel and proximity-induced superfluidity in systems of ultra-cold atoms. This discussion is more subtle in the single channel case because the universal properties of one dimensional fermions with attractive interactions are known to be described by a simple Luttinger liquid in the low-energy limit. In this talk, we will discuss the properties of Galilean invariant one dimensional fermi gases with attractive interactions and show how they display properties consistent with both being a topological (or non-topological) superfluid and a Luttinger liquid.

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