

Abstract Submitted  
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**Berry phase mediated chiral p-wave superfluids of fermionic cold atoms** CHUANWEI ZHANG, Department of Physics and Astronomy, Washington State University, Pullman, WA, SUMANTA TEWARI, Department of Physics and Astronomy, Clemson University, Clemson, SC, ROMAN LUTCHYN, SANKAR DAS SARMA, Condensed Matter Theory Center, Department of Physics, University of Maryland, College Park, MD — Two-dimensional  $px+ipy$  superfluids or superconductors offer a playground for studying intriguing physics such as quantum teleportation, non-Abelian statistics, and topological quantum computation. Creating such a superfluid in cold fermionic atom optical traps using p-wave Feshbach resonance is turning out to be challenging. Here we propose a method to create a  $px+ipy$  superfluid directly from an s-wave interaction making use of a topological Berry phase. Methods to generate the required topological Berry phase in cold atomic systems will be discussed.

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