

Abstract Submitted
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Proposal for interferometric detection of the topological character of modulated superfluidity in ultracold Fermi gases¹ MASON SWANSON, The Ohio State University, YEN LEE LOH, The University of North Dakota, NANDINI TRIVEDI, The Ohio State University — A system with unequal populations of up and down fermions may exhibit a Larkin-Ovchinnikov (LO) phase characterized by periodic domain walls across which the order parameter changes sign and the excess polarization is localized. Despite fifty years of theoretical and experimental work, there has so far been no unambiguous observation of an LO phase. We propose an experiment in which two fermion clouds, prepared with unequal population imbalances, are allowed to expand and interfere. We show that a pattern of staggered fringes in the interference is unequivocal evidence of LO physics. The resilience of these interference signatures against thermal and quantum fluctuations is also discussed, and our results are supported with time-of-flight simulations of the experiment. Y.-L. Loh and N. Trivedi, Phys. Rev. Lett. 104, 165302 (2010). M. Swanson et al., arXiv:1106.3908

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Mason Swanson
The Ohio State University

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