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Unconventional interaction between vortices in a polarized Fermi gas VLADIMIR M. STOJANOVIC, Carnegie Mellon University, W. VINCENT LIU, University of Pittsburgh, YONG BAEK KIM, University of Toronto and University of California, Berkeley — Using effective field theory approach we study a homogeneous superfluid state with a single (gapless) Fermi surface, recently suggested as a possible phase for an ultracold Fermi gas with spin-population imbalance. We find an unconventional form of the interaction between vortices. The presence of gapless fermions gives rise to an attractive long-range potential oscillating in space, analogous to the RKKY magnetic interaction in metals. Our study then leads to an interesting question as to the nature of the vortex lattice in the presence of the competition between the usual repulsive logarithmic Coulomb and the fermion-induced attractive oscillatory interactions.

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