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Induced superconducting FFLO states in patterned island systems and in topological insulators SMITHA VISHVESHWARA, QINGLEI MENG, TAYLOR HUGHES, NADYA MASON, University of Illinois at Urbana-Champaign — We explore the possibility of inducing the elusive Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) superconducting phase in 2D metal films by means of proximity coupling to patterned superconducting islands. We show that as a function of externally applied magnetic field, such a system not only renders the phase stable for a large region of parameter space but can also be tuned through different spatial ordering wavevectors associated with the FFLO order. We generalize these results to the surface states of 3D topological insulators and metallic surface states with Rashba coupling. We find that these FFLO states can be mapped into BCS states in which a uniform superconductor gap occurs in momentum space and can potentially be accessed in physical systems with relative ease.

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