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The Fulde-Ferrell-Larkin-Ovchinnikov state in two-dimensional s-wave and d-wave superconductors[1] QIAN WANG, HONGYI CHEN, Texas Center for Superconductivity, University of Houston, Houston, Texas 77204 , CHIA-REN HU, Department of Physics, Texas A&M University, College Station, Texas 77843, CHIN-SEN TING, Texas Center for Superconductivity, University of Houston, Houston, Texas 77204 — We study the Fulde-Ferrel-Larkin-Ovchinnikov (FFLO) states for two-dimensional superconductors under a strong magnetic field at low temperature. Using a tight-binding model, the spatial variation of the superconducting order parameter is self-consistently determined by solving Bogliubov-de-Gennes equations iteratively. We then calculate the magnetization and the LDOS of the FFLO state. When the magnetic field is parallel to the superconducting plane, our results show that for 2D s-SC (d-SC), 1D stripe (2D lattice) solutions are more energetically favorable. At certain symmetric sites, we find that the features in the local density of states can be ascribed to two types of bound states. We also investigate the effect of impurities on the FFLO state and the vortex structure when the FFLO state is subjected to an orbital magnetic field.

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