

Superfluid Density Wave in Two Weakly Linked Superconducting Ultrathin Films

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A sufficiently strong parallel magnetic field between two weakly coupled superconducting ultrathin films produces staggered supercurrent loops and a superfluid density wave, yielding an inhomogeneous Fulde-Ferrell Larkin-Ovchinnikov (FFLO) state characterized by Josephson vortex-antivortex pairs. Conversely, a weak parallel magnetic field produces a uniform Fulde-Ferrell (FF) state. The transition between these states falls into the universality class of 2D commensurate-incommensurate transitions.