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## **On the Imbalanced $d$ -wave Superfluids within the Spin Polarized Extended Hubbard Model: Weak Coupling Limit**

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We investigate the superfluid properties of  $d$ -wave pairing symmetry within the Extended Hubbard Model in a magnetic field. We analyze the temperature and magnetic field dependencies of the order parameter. We find that in the two-dimensional case, the spatially homogeneous spin polarized superfluidity with two Fermi surfaces (called breached pair-II (BP-II) state) is stable in the weak coupling limit, at  $T = 0$ , as opposed to the  $s$ -wave pairing symmetry case in 2D. We construct the ground state phase diagrams both for fixed chemical potential and electron concentration. Furthermore, we obtain the temperature vs. magnetic field and temperature vs. spin polarization phase diagrams.