

Competition between Abelian and Zeeman magnetic field effects in two dimensional ultra-cold gas of fermions

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The ground state of ultra-cold fermions in the presence of the effects of the orbital and Zeeman magnetic field is analyzed. The three different states superconducting, normal and phase separated are founded. The system, in the presence of the orbital synthetic magnetic field effects, shows non-monotonous changes of the phase boundaries when electron concentration is changed. We observe not only the reentrant phenomena but also the density dependent oscillations of the different areas of the phase diagram. The chemical potential also shows oscillatory behavior and discontinuities with respect to the changes in the number of fermions.

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