

Abstract Submitted
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Quartet condensation of fermions ASEEM TALUKDAR, University of Cincinnati — We investigate quartet condensation in fermion systems with four internal states. Physical examples include spin-3/2 fermionic atoms, transition metal oxides with orbital degeneracy, bi-layered systems with electrons and holes and quadra-layer spin-polarized electron hole systems. We consider a simple SU(4) symmetric model in which the fermions interact among themselves with point attractive interactions. The effective free energy functional of the Cooper Pairs (CP) is found to contain attractive interactions among certain types of CP's. This will allow the CP's to form bound states or quartets. Using a variational calculation based on the Bogoliubov inequality, we find that the system may undergo quartet condensation which will suppress the CP instability. By tuning the interaction away from the SU(4) limit, a phase transition from quartet to CP condensation can occur.

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