

Abstract Submitted
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A Theory of BCS-BEC Crossover YASEMIN GURCAN, CUNY Graduate Center, J.L. BIRMAN, Distinguished Prof., CCNY, CUNY Graduate Center — In ultracold atomic fermions, the sign and the magnitude of pairing interactions can be controlled by using the magnetically-tuned Feshbach resonances to achieve a continuous transition between Cooper pairs of dilute fermi gas to BEC of diatomic molecules, which is known as the “BCS-BEC crossover.” At present, although several models have been proposed, there is still no exact analytical solution of the many-body problem of BCS-BEC crossover region. The standard BCS mean-field theory of superconductivity was used to describe the whole crossover resulting a useful approximation. In our studies, we introduced solvable models for an exact analytical solutions of BCS-BEC crossover region at $T = 0$ using the generalized $SU(2) \times SU(1,1)$ coherent states.

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