核物理

# 两味LOFF态下的色超导

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摘要

自从色超导理论被提出以来， 通常考虑的是参与配对的夸克的化学势不相等时的情形。 当化学势的差别达到某一合适值时， 库柏对就有非零的总动量， 这就是Larkin Ovchinnikov Fulde Ferre(LOFF)态。 这种形式的夸克凝聚自发破坏了平移不变性和旋转不变性， 导致能隙以晶格的形式周期性变化。 在中等重子数密度区的基础上， 从SU（2） NJL模型出发描述两味LOFF态， 并通过平均场近似， 引用N G基底、 傅立叶变换和频率求和等方法得到热力学势， 进而通过热力学势对序参量求偏导得到耦合的Gap方程， 并使用数值法解耦合方程找到LOFF态的窗口。

Ever since the theory of color superconductivity was issued， it is likely to involve pairing between species of quarks with differing chemical potentials. For suitable values of the differences between chemical potentials， Cooper pairs with non zero total momentum are favored， as was first realized by Larkin， Ovchinnikov， Fulde and Ferrell (LOFF). Condensates of this sort spontaneously break translational and rotational invariance， leading to gaps which vary periodically in a crystalline pattern. This article focuses on the two flavor color superconducting phase at moderate baryon density. LOFF state is described through SU(2) NJL model. By using the mean field approximation， N G basis， fourier transformation， frequency summation， the thermodynamic potential and Gap equation are obtained. Finally， the window of LOFF state is found by the numerical method.

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