量子物理学・ナノサイエンス第 111 回特別セミナー

Superfluidity of chiral doublet baryons in neutron stars

講師　：　安井 繁宏 准教授

二松学舎大学 国際政治経済学部

日程　：　7 月 8 日（火）16:00-

場所　：　本館地下 B61 物理学系輪講室

概　要

Chiral symmetry is a fundamental symmetry of hadrons. One of the important properties of chiral symmetry is provided by the existence of chiral doublets (pairs of hadrons with positive and negative parities). The degeneracy of the two hadrons in a chiral doublet can be realized at high densities inside the neutron star due to the chiral symmetry restoration. In this talk, we focus on nucleons and N*(1535) as the baryons in the chiral doublet, and discuss superfluids due to the interaction between nucleons and N*(1535) at high densities. We propose the emergent chiral symmetry as a generalized symmetry including both naive and mirror representations in the chiral doublet, and adopt Z2 symmetry or SU(2) symmetry as internal symmetries. Under these symmetries, we consider the gap equation for the four-point interaction between nucleons and N*(1535), and obtain the phase diagram of superfluidity. We show that there exist gapless fermions and topological structures in the superfluid and they can provide a new view on the internal structure of neutron stars.

連絡教員　　慈道　大介（内線 2083）