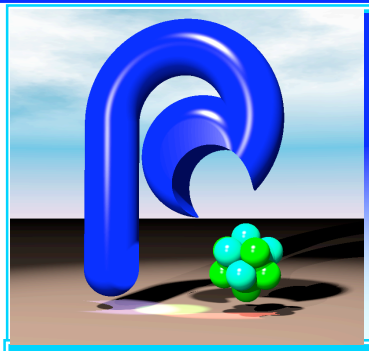

独立行政法人 理化学研究所

第３回 原子核グループ月例コロキウム

The 3rd RIKEN Nuclear Physics Monthly Colloquium

Pions in Nuclei

a Probe of Chiral Restoration

Prof. Dr. Paul Kienle

Technische Universität München, Germany

Stefan Meyer Institute for Subatomic Physics Wien, Austria

Spontaneous chiral symmetry breaking, as proposed by Nambu and Jona-Lasinio is presented as mechanism which creates the large mass gap between the QCD groundstate and the hadrons with the pion decay constant, f_π as order parameter of this phase transition. It is expected that f_π_, which determines the isovector strength of pion-nucleon and –nucleus s-wave interaction, decreases linearly with the density of a nuclear medium and brings about a partial restoration of chiral symmetry.

Recent experiments are presented to study with high precision the s-wave pion-nucleon and pion-nucleus interaction in comparison, using X-ray spectroscopy of pionic hydrogen on one hand and pion transfer reactions to study deeply bound s-states of a pion in heavy nuclei on the other hand. From the ratio of the thus determined isovector scattering lengths, we find that the squared pion decay constants, which are inversely proportional to their respective isovector scattering lengths, are modified by a nuclear medium. Our results indicate that the order parameter of symmetry breaking f_π(_$_0$)_ is reduced by a factor of ~0.64 in a nucleus with density _$_0$= 0.17 fm^{-3} .in good agreement with theoretical expectations. Thus we have found evidence for partial restoration of spontaneously broken chiral symmetry by a nuclear medium, by studying chiral dynamics.

2005/Jun/21 (Tue) 13 : 30

Nishina-hall,

お問い合わせ：

核物理セミナー委員会

担当：板橋健太

npsoc@rarf.riken.jp