

Abstract Submitted
for the HAW09 Meeting of
The American Physical Society

Effect of Gluon and Pion Exchanges on Hyperons TSUYOSHI MIY-
ATSU, KOICHI SAITO, Department of Physics, Faculty of Science and Technology,
Tokyo University of Science, Japan — A new version of the quark-meson coupling
model, which involves not only the gluon-quark interaction but also the pion-quark
coupling based on chiral symmetry, is applied to hyperons in a nuclear medium.
Our aim is to study the effects of one-gluon exchange (OGE) and pion-cloud on
the mass of hyperon (Λ , Σ and Ξ) in a nuclear matter. To describe a nuclear mat-
ter, we add the intermediate attractive and repulsive forces by introducing the σ ,
which is *not* the chiral partner of the π meson, and the ω mesons. We determine
the model parameters by fitting the nuclear saturation condition at normal density.
As a consequence, we find that the effect of the gluon and pion exchanges provides
the hyperfine splitting in the hadron spectra, and the hyperfine interaction due to
the gluon exchange plays an important role in the in-medium baryon spectra. In
contrast, the pion-cloud effect is relatively small. At the quark mean-field level, the
 Λ feels more attractive force than the Σ or Ξ in matter.

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Date submitted: 26 Jun 2009

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