

Abstract Submitted
for the DNP07 Meeting of
The American Physical Society

A New Picture of Structure of Meson BING AN LI, Dept. of Phys., Univ. of Kentucky — Quark model and parton model are the two models of hadrons. In this talk a unified model of meson structure is presented. Based on current algebra and chiral symmetry a chiral field theory of pseudoscalar, vector, axial-vector mesons is constructed. Both constituent and current quark masses appear in the same theory. Quark condensation, N_C expansion, and chiral symmetry are embedded. Besides three current quark masses there are two parameters. The theory is phenomenologically successful. A brief review of the achievements is presented. In this talk we emphasize the new picture of the structure of pion. m_π^2 is derived. Pion form factor is predicted, which is in excellent agreement with data in both space-like and time-like regions. A new asymptotic pion form factor $F(Q^2)|_{Q^2 \rightarrow \infty}$ is obtained. The pion structure is revealed:

1. when $q^2 < m_\rho^2$ pion is made of a pair of constituent quarks: $q\bar{q}$
2. when $q^2 > m_\rho^2$ pion is made of a pair of constituent quarks plus ρ cloud multi-quark pairs
3. at large q^2 pion is made of a pair of constituent quarks plus a hard gluon

Similar structures for kaons and other mesons are presented.

Bing An Li
Dept. of Phys., Univ. of Kentucky

Date submitted: 22 Jun 2007

Electronic form version 1.4