

A. SOME TOPICS RELATED TO NUCLEAR PHYSICS

A1 Study of Nuclear Structure with π Mesons

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A2 Some Rules in High Energy Physics

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A3 Parity Nonconserving Potentials

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The parity nonconserving nuclear potential (PNCP) emerging from the product of two strangeness conserving hadronic currents, is a logical, although not a necessary extension^{1,2)} of the standard description of nonleptonic decays of baryons. It has been suggested that PNCP can be used as a probe in the structure of weak Lagrangians, which is otherwise inaccessible.³⁾ Extensive calculations have been made recently concerning contributions to PNCP due to pion and vector meson exchange. Pion exchange has been calculated using either current algebra combined with SU(3) symmetry^{4,5)} or SU(3) symmetry alone.⁶⁾ Both approaches lead to essentially the same result:

$$V_{\pi} = \frac{G_{\pi} g}{2M} (\vec{\sigma}_1 + \vec{\sigma}_2) [\vec{p}_{21}, f(r)] \cdot (\tau_{1+} \tau_{2-} - \tau_{1-} \tau_{2+}) \eta;$$

$$G_{\pi} = 1.92 \cdot 10^{-7}, \quad \frac{g^2}{4\pi} = 14.4,$$

$$f(r) = \frac{1}{4\pi} \frac{e^{-m_{\pi} r}}{r}.$$

Here the factor η depends on a particular weak interaction Lagrangian model.