Strange vector form factors in the context of the SAMPLE, A4, HAPPEX, and G0 experiments

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Abstract

The strange properties of the nucleon are studied within the framework of the SU(3) chiral quark-soliton model [1], isospin symmetry being assumed and the symmetry-conserving SU(3) quantization [2] being employed. We present the form factors $G^0_{E,M}(Q^2)$, $G^Z_M(Q^2)$ and the electric and magnetic strange form factors $G^{\rm s}_{E,M}(Q^2)$ incorporating pion and kaon asymptotics in a self-consistent way. The results show a fairly good agreement with the recent experimental data from the SAMPLE [3] and HAPPEX collaborations [4]. The strange magnetic moment we obtained is: $\mu_s = 0.12\ \mu_N$ (with the kaon tail) and $\mu_s = 0.07\ \mu_N$ (with the pion tail). The electric and magnetic radii are, respectively, $\langle r^2\rangle^s_E = -0.22 \sim -0.10\ \mathrm{fm}^2$ and $\langle r^2\rangle^s_M = 0.30 \sim 0.63\ \mathrm{fm}^2$. We also present predictions for future measurements including the A4 experiment at MAMI (Mainz), HAPPEX II, G0 experiments at TJNAF.

References

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