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Spin and flavor content of octet baryons

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Abstract content

The spin and flavor content of baryons is studied in the framework of the unquenched quark model in which the effects of quark-antiquark pairs (flavor u, d and s) are taken into account via a microscopic, QCD-inspired, quark-antiquark creation mechanism. The inclusion of the quark-antiquark pairs leads to a relatively large contribution or orbital angular momentum to the proton spin [1] which may help to solve the so-called spin crisis of the proton, and an excess of anti-d over anti-u quarks [2], in agreement with the experimental data for the proton.
In addition, the spin and flavor content of all ground state octet baryons are presented and compared to the predictions of other models of baryon structure, such as the meson-cloud model and the chiral quark model. Even though all approaches give similar results for the proton, their predictions for the other octet baryons vary enormously. It would therefore be very interesting to measure the flavor asymmetry of hyperons, for example in Drell-Yan processes in hyperon-induced dilepton production with Sigma beams on protons [3,4] (e.g. at CERN), or in backward kaon-electroproduction (e.g. at the 12 GeV upgraded JLab) [5]. Hyperon physics may open a new window to probe the sea content of baryons, to discriminate between different models of hadron structure and to improve our understanding of the non-perturbative region of QCD.
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Summary

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