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Sum rules for leading vector form factors in hyperon semileptonic decays

Abstract

By considering that the weak currents and the electromagnetic current are members of the same SU(3) octet, two sum rules involving leading vector form factors in hyperon semileptonic decays are derived in the limit of exact flavor SU(3) symmetry. Deviations from this limit arise from second-order SU(3) symmetry breaking effects, according to the Ademollo-Gatto theorem. The 1/Nc expansion of QCD is used to evaluate such effects. One sum rule vanishes identically even in the presence of symmetry breaking and the other one obtains contributions mainly from the 10 + \bar{10} representation. Results obtained in (heavy) baryon chiral perturbation theory are used to test the validity of these sum rules. To order O(p2) in the chiral expansion, results are encouraging.

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