Quark Mass Dependence of Nucleon Magnetic Moment and Charge Radii

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Abstract: Understanding hadron structure within the framework of QCD is an extremely challenging problem. Our purpose here is to explain the model-independent consequences of the approximated chiral symmetry of QCD for two famous results concerning the quark structure of the nucleon. We show that both the apparent success of the constituent quark model in reproducing the ratio of proton to neutron magnetic moments and the apparent success of the Foldy term in reproducing the observed charge radius of the neutron are coincidental. That is, a relatively small change of the current quark mass would spoil both results.

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