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The strange asymmetry of the proton sea

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Abstract content

Summary

The quark - anti quark sea of hadrons is produced by the splitting of gluons to $q - \bar{q}$ pairs in a way which is similar to the vacuum polarization phenomena in electro-dynamics. Then, it is expected that the sea quark and anti quark distributions, as a function of the fraction of the momentum of the hadron carried by the quark or anti quark, be equal one another. However, interactions between partons inside the hadron can break this equality. In particular, for the strange sea of the proton it is required that $\int_0^1 dx\,[s(x) - \bar{s}(x)] = 0$ to ensure zero net strangeness, but there is still room for $s(x) \neq \bar{s}(x)$. This last inequality can be attributed to the internal dynamics responsible for the proton as a bound state of quarks, anti-quarks and gluons. In this work we present a model of the internal structure of the proton which can accommodate such kind of asymmetric sea quark and anti-quark parton distribution functions. We will compare also the results from the model with the currently available experimental data on the $s(x)$ and $\bar{s}(x)$ proton pdf's.

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