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主题：problem with the AdS/QCD prediction of alpha_s at very low Q2
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AD

Dear Tianbo and Sabbir,

Here is the problem I mentioned to you this morning with the AdS/QCD prediction of alpha_s at very low Q2:

The GDH and Bjorken sum rules imply that the derivative of α_{g1} at $Q^2=0$ is:

$(3\pi)/(4g_a)(\kappa_n^2/M_n^2-\kappa_p^2/M_p^2)$

where g_A is the nucleon axial mass, $M_{n(p)}$ the neutron(proton) mass and $Kappa_{n(p)}$ the neutron(proton) anomalous magnetic moment.

The AdS/QCD derivative of $alpha_{g1}$ at $Q^2=0$ is:

$-\pi/(4\kappa^2)$

Combining the two:

$g_a=3\kappa^2 (\kappa_n^2/M_n^2-\kappa_p^2/M_p^2)$

Using $\kappa=M_p/2$ and approximating the neutron and proton masses to be equal, we get

$g_A=3/4*(\kappa_n^2-\kappa_p^2)$.

It's an elegant formula linking kappa to g_a! But when we do the numerical application, with the anomalous magnetic moments κ_n=-1.91 and $\kappa_p=1.79$, we get 0.33 instead of the experimental value 1.27. Maybe this factor 4 mismatch can be resolved by accounting for the nonzero quark masses?

Best regards,

Alexandre