Constraint on $\mathbf{\Delta}$g(x) from $\boldsymbol{\pi}^0$ production at RHIC

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We investigate the polarized gluon distribution $\Delta g(x)$ by a global analysis of current DIS and π^0 asymmetry data [1]. The π^0 data from RHIC-Spin experiments provide a strong constraint on $\Delta g(x)$, so that its uncertainty is reduced as shown in Fig.1. However, sign problem appears because the gg process, which is the dominant contribution to the polarized differential cross section in the low p_T region, is roughly proportional to square of $\Delta g(x)$. Therefore, we discuss the two types of solutions: positive and negative $\Delta g(x)$. Furthermore, we discuss that resent DIS data of COMPASS and HERMES play an important role in determining $\Delta g(x)$ at large x.
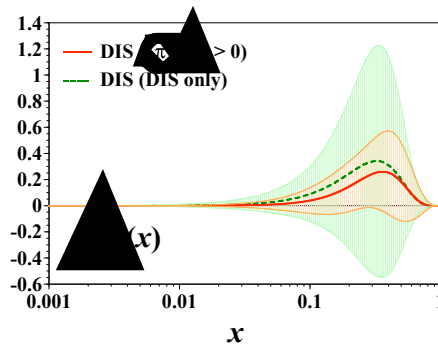
FIGURE 1. Comparison of polarized gluon distributions ($\Delta g(x)$) and their uncertainties [1]. The solid and dashed curves show the gluon distributions from the DIS and π^0 data and from only the DIS data, respectively. The shaded areas are their uncertainties.

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