

Parton Distribution Function

- ▶ Go to <https://www.lhapdf.org/>
- ▶ Install the library and download the data for <https://arxiv.org/abs/2109.02653>
- ▶ Reproduce figure 1 of <https://arxiv.org/abs/2109.02653>
- ▶ Advanced: Compare $\alpha_s(Q^2)$ at LO, NLO, and NNLO for a given PDF family

Hints:

- ▶ particle ID (PID): $g \rightarrow 21, d \rightarrow 1, \bar{d} \rightarrow -1, u \rightarrow 2, \bar{u} \rightarrow -2, s \rightarrow 3, \bar{s} \rightarrow -3, c \rightarrow 4, \dots$
- ▶ derived distributions: $u_v = u - \bar{u}, d_v = d - \bar{d}$
- ▶ The plotted function is $xf_j(x)$ and its uncertainty
- ▶ The default reference value of α_s is 0.118 at $Q^2 = M_Z^2$