Parton flux functions at the LHC

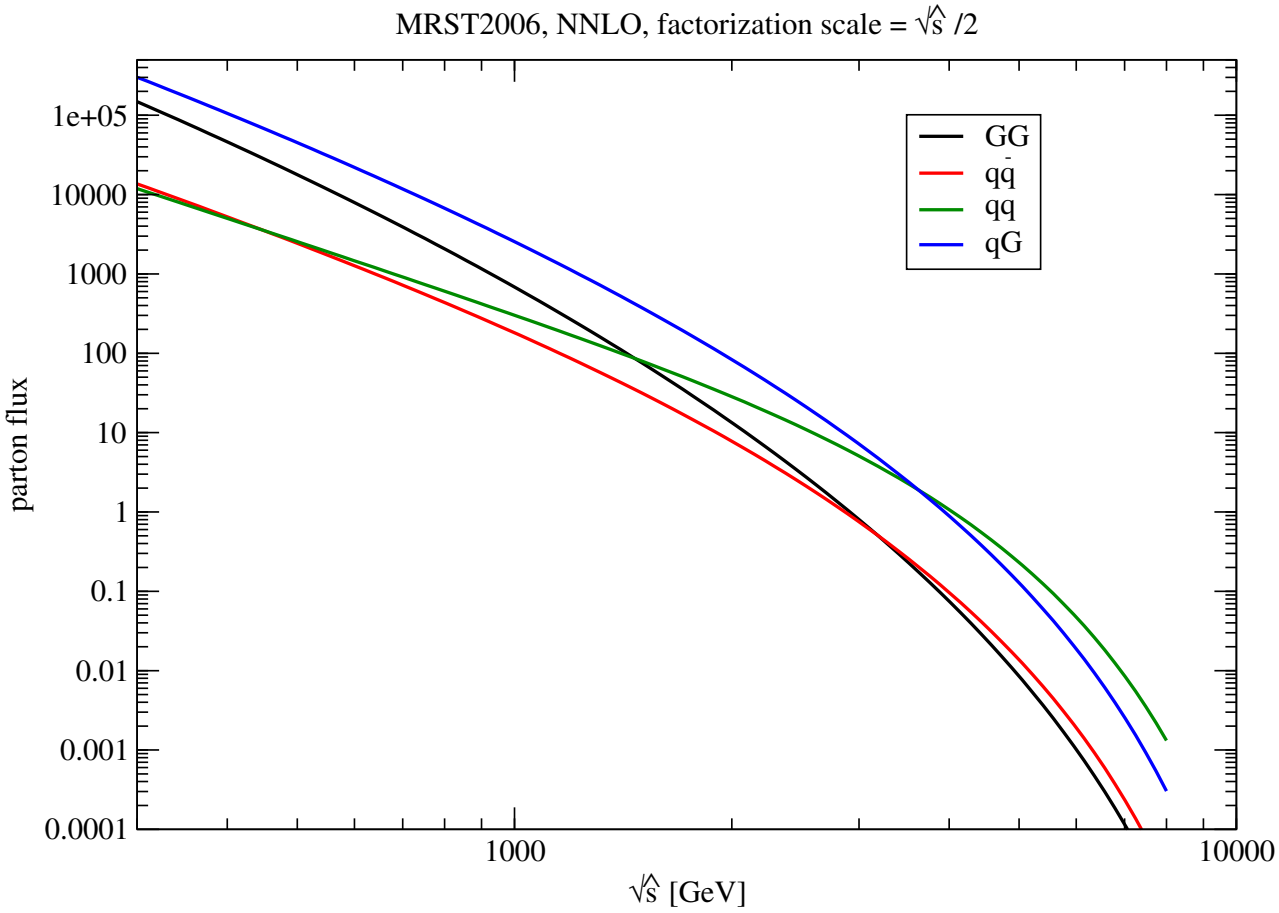

Figure 1: Overview of some parton flux functions at the LHC ($\sqrt{s} = 14$ TeV), as defined in eq.(3.53b) in class. "GG" means that both partons in the initial state of the hard scattering reaction are gluons; "qG" refers to one gluon and one quark or antiquark in the initial state, summed over all flavors; "qq" means two quarks of the same flavor (antiquarks are not included here), summed over flavors; and "$q\bar{q}$" means one quark and one antiquark of the same flavor, summed over flavors. The results are for the MRST parameterization of the parton fluxes, with factorization scale = $0.5\sqrt{\hat{s}}$.

$q\bar{q}$ flux functions at the LHC

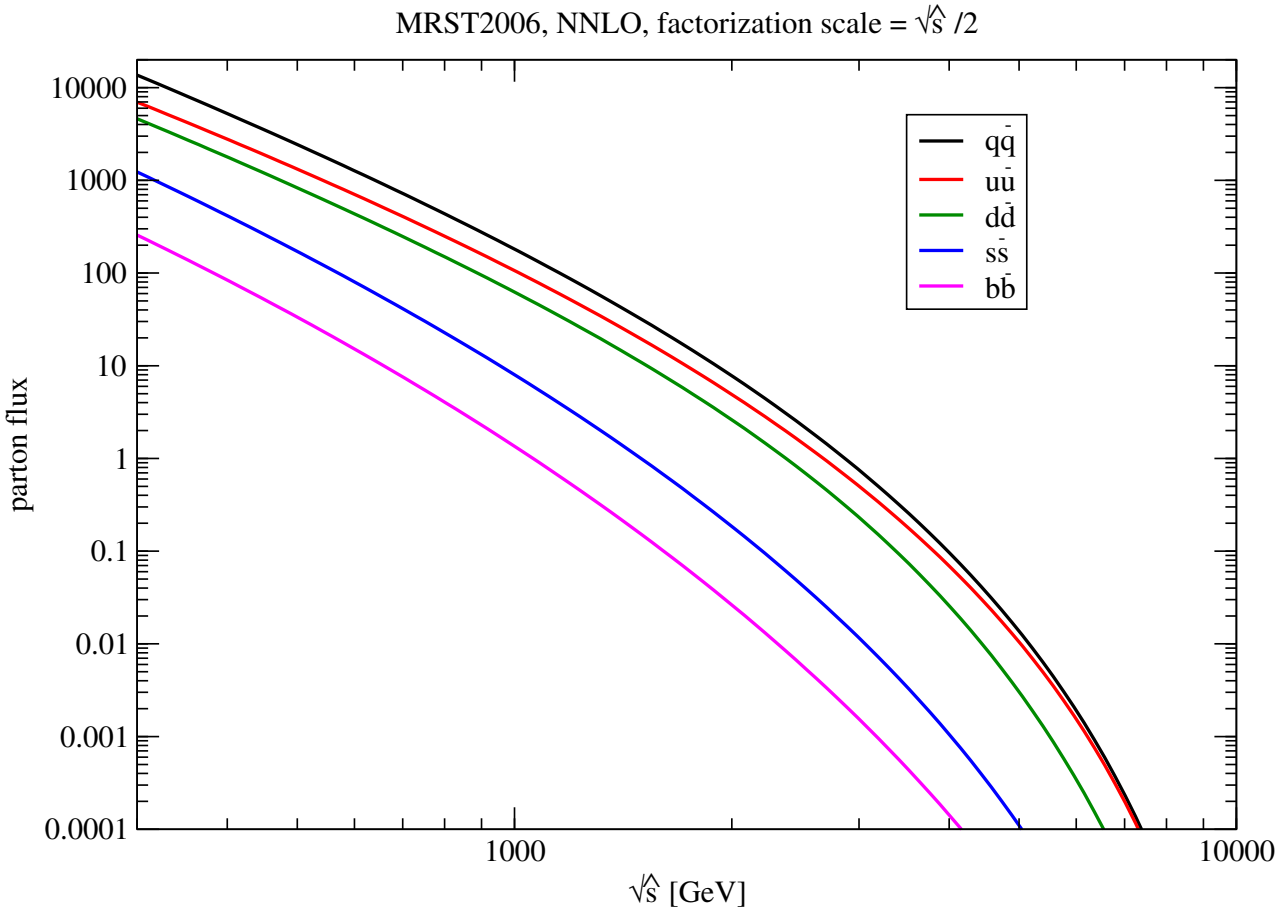

Figure 2: The black curve is the same as the red curve in the previous figure. The other curves show the contributions of different flavors to this sum. Already the rate of annihilation of strange quark–antiquark pairs is suppressed by roughly an order of magnitude relative to $u\bar{u}$ annihaltion; the $b\bar{b}$ flux is suppressed by another factor of ~ 4.

Weighted integrals over parton flux functions

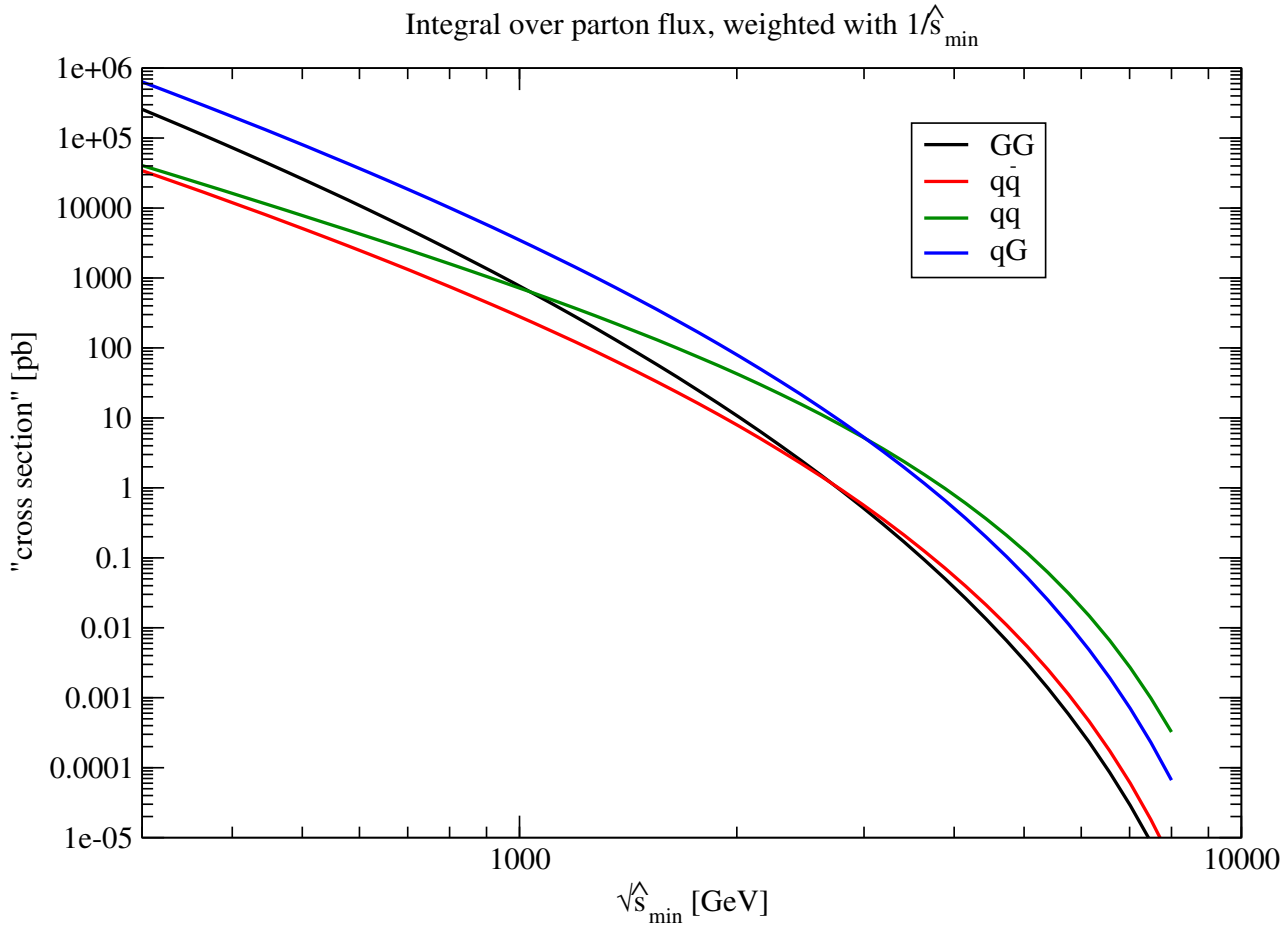

Figure 3: The integral shown corresponds to a pp "cross section" if the partonic cross section $\hat{\sigma} = 1/\hat{s}_{\min}$, where $\hat{s}_{\min}$ is the kinematic minimum of the partonic Mandelstam$-s$ for the given reaction; $\hat{s}_{\min}$ can e.g. be decided by the masses of the particles in the final state [$\hat{s}_{\min} = (m_1 + m_2)^2$], or by a p_T cut on a jet [$\hat{s}_{\min} = 4p_{T,\min}^2$]. Of course, real partonic cross sections in addition involve powers of coupling constants as well as other numerical factors. The notation of the parton fluxes as in the first figure. Note that the LHC experiments have accumulated about $20,000$ pb^{-1} of data so far.