

Next-to-leading order (NLO) subprocesses:

1. $gg \rightarrow Q\bar{Q}g$
2. $q\bar{q} \rightarrow Q\bar{Q}g$ ($q = u, d, s$)
3. $gq \rightarrow Q\bar{Q}q, g\bar{q} \rightarrow Q\bar{Q}\bar{q}$ [new at NLO]
4. Virtual corrections to $gg \rightarrow Q\bar{Q}$ and $q\bar{q} \rightarrow Q\bar{Q}$

NLO corrections for σ_{tot} and differential cross sections $d\sigma/dp_T dy$ known since long:

- Nason, Dawson, Ellis, NPB303(1988)607; Beenakker, Kuif, van Neerven, Smith, PRD40(1989)54 [σ_{tot}]
- NDE, NPB327(1989)49; (E)B335(1990)260; Beenakker *et al.*, NPB351(1991)507 [$d\sigma/dp_T dy$]

Well tested by recalculations and zero-mass limit:

- Bojak, Stratmann, PRD67(2003)034010 [$d\sigma/dp_T dy$ (un)polarized]
- Kniehl, Kramer, Spiesberger, IS, PRD71(2005)014018 [$m \rightarrow 0$ limit of diff. x-sec]
- Czakon, Mitov, NPB824(2010)111 [σ_{tot} , fully analytic]