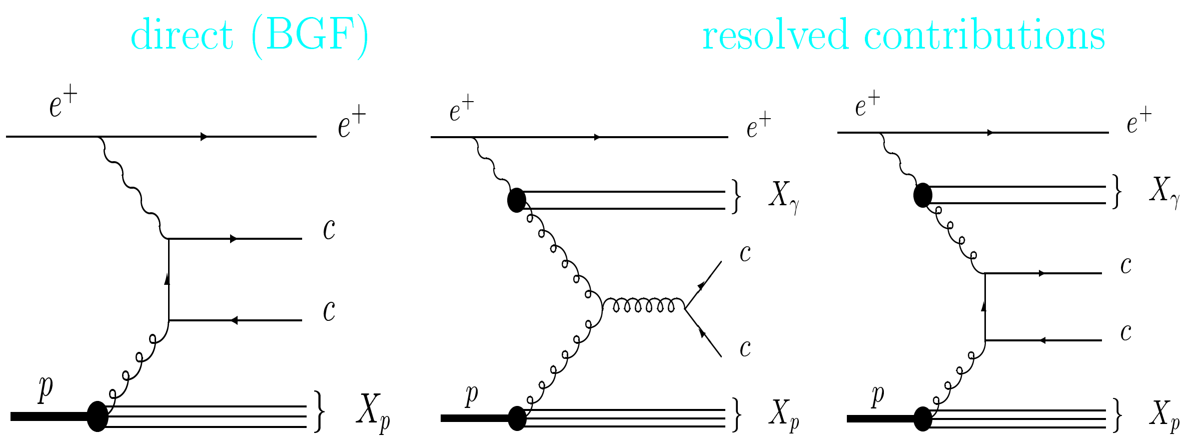
Production of *OPEN* Charm : $D^\star, D^\circ$...

- in LO in α_s : direct process of photon-gluon fusion(BGF of $\mathcal{O}(\alpha\alpha_s)$, i.e. $\gamma g \to c\bar{c}$) is dominant.
  Resolved contributions ($\sim \mathcal{O}(\alpha/\alpha_s) \times \mathcal{O}(\alpha_s^2)$ i.e. $gg \to c\bar{c}, q\bar{q} \to c\bar{c}$)
  lead to notion of photon structure function;
  Note: resolved cont. at HERA are larger than at fixed-target (E_{CM}); they are reduced by expt'l cuts, they vanish for large Q^2.



- in NLO processes: in higher order only *SUM* of direct and resolved processes (gg, qg, qq) is well defined.

- Calculations in pQCD :
  Assume scale hard enough (i.e. α_s small enough) to render pQCD feasible and factorization theorem valid:

  ▷ Massive approach $m_c \neq 0$: fixed order perturb. theory (FOPT) with number of active flavours in proton $N_f = 3$ plus gluon.
  Charm only produced at perturbative level.
  Breaks down for $p_T \gg m_c$: no large-p_T resummation done
  Reliable for σ_{tot} (agrees with expt. at pp, γp) and $d\sigma$ at $p_T \leq m_c$
  (Frixione *et al.*, Harris+Smith,...)