

Hand-in exercises in the course QCD@Colliders, HT 2006

6. Hadroproduction of jets, vector bosons and heavy quarks

- A. **Derive** the single-jet inclusive cross-section $\frac{d^3\sigma}{d^2p_\perp dy}$ (given by Eq. (7.30)) starting from $\frac{d^3\sigma}{dx_1 dx_2 d\hat{t}}$ for the two-jet cross-section. Also show that $d^3p = E d^2p_\perp dy = E p_\perp dp_\perp d\varphi dy$
- B. **Calculate** the invariant matrix element squared $\overline{\sum}|\mathcal{M}|^2$ for $qq' \rightarrow qq'$ and $qq \rightarrow qq$ scattering (given in Table 7.1) based on the results for the corresponding QED processes (see 17.4 in Peskin and Schroeder for hints).