

Homework Exercises for QCD and Collider Physics 2005/2006

Exercises for Lecture 1 (9.Nov 2005)

- Four-vector kinematics: show that the invariants s, t, u give $s+t+u = m_1^2+m_2^2+m_3^2+m_4^2$, with m being the masses of the particles in a $2 \rightarrow 2$ process. (definitions are given in PDG)
- show that dL_{ips} is Lorentz invariant, by explicitly calculating the Lorentz boost in z -direction.
- Using light-cone variables: show that a longitudinal boost using light cone variables results in a shift in rapidity. (see article hep-ph/9705393)
- Matrix element calculation: Use *FORM* and repeat the calculation for $e+q \rightarrow e+q$. Now calculate $\nu+q \rightarrow \nu+q$. (look at the calcs for $e+\mu \rightarrow e+\mu$ and $\nu+\mu \rightarrow \nu+\mu$.)