

# Pion and kaon production in nucleon - nucleon collisions

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Inclusive cross section for pion production in proton - proton collisions are calculated based on unintegrated parton distributions (uPDF). In addition to purely gluonic terms this  $k_T$  - factorization approach includes also quarks degrees of freedom.

Phenomenological fragmentation functions from the literature are used.

The new contributions  $gq \rightarrow q$  and  $qg \rightarrow q$  are comparable to the  $gg \rightarrow g$  diagram at midrapidities and dominante in the fragmentation region. The new mechanisms are responsible for  $\pi^+ - \pi^-$  asymmetry.

In contrast to standard collinear approach, application of  $2 \rightarrow 1$   $k_T$  - factorization approach can be extended towards much lower transverse momenta, both at mid and forward rapidity regions.

The results of the calculation are compared with SPS and RHIC data. This  $k_T$  - factorization approach leads to asymmetry in the production of  $\pi^+$  and  $\pi^-$ , very similar to the one observed very recently by the BRAHMS collaboration.

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