

The exclusive Drell-Yan process and deeply virtual pion production

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After a brief introduction in the handbag approach, generalized parton distributions (GPDs) and hard subprocesses deeply virtual lepton production of pions will be discussed in some detail. It will be shown that a leading-twist analysis of this process fails drastically. A successful interpretation of the experimental data on pion production is however achieved by treating the pion-pole contribution non-perturbatively (i.e. replacing the perturbative pion electromagnetic form factor by the experimental one) and by taking into account the transversity GPDs which feed the amplitudes for transversely polarized photons and represent a twist-3 effect. Next it will be reported on an analysis of the exclusive pion-induced Drell-Yan process. The same GPDs contribute to it as for pion lepton production and the corresponding subprocesses are $s - u$ crossed. In the light of the results on pion lepton production the four partial cross sections ($d\sigma_L$, $d\sigma_T$, $d\sigma_{LT}$, $d\sigma_{TT}$) of the Drell-Yan process are therefore evaluated by treating the pion-pole contribution non-perturbatively and taking into account contributions from transversely polarized photons. The results obtained this way are substantially larger than predictions to leading-twist accuracy.

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