

## Light-cone QCD sum rules for soft contribution to exclusive Drell-Yan process at J-PARC

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Exclusive Drell-Yan process,  $\pi^- p \rightarrow \mu^+ \mu^- n$ , may be measured using the high-intensity pion beams at J-PARC, and its QCD description is complementary to that for the deeply virtual meson production,  $\gamma^* p \rightarrow \pi N$ , at e.g., JLAB. The leading hard exclusive amplitude for exclusive Drell-Yan process was obtained by E.R. Berger, M. Diehl, and B. Pire [Phys. Lett. B523 (2001) 265] in terms of the partonic subprocess convoluted with the relevant nonperturbative functions, the nucleon generalized parton distributions (GPDs) and the pion distribution amplitudes, and, recently, subleading amplitudes, suppressed by the inverse powers of the dilepton mass  $Q$ , have also been calculated by S. V. Goloskokov and P. Kroll [Phys.Lett. B748 (2015) 323]. However, those predictions based on the QCD factorization approach still seem to have large uncertainties that originate from the treatment of the pion pole contribution arising in the relevant GPDs in the ERBL region, the parton transverse momentum to regularize the endpoint singularities, the so-called soft-overlap mechanism, etc. These effects related to “soft contribution” important at J-PARC kinematics are not directly accessible in the usual framework for QCD factorization of the hard exclusive amplitudes. We study the exclusive Drell-Yan process constructing the light-cone QCD sum rules for the corresponding exclusive amplitudes, which allow us to estimate the relevant soft contributions making use of dispersion relations and quark-hadron duality.

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