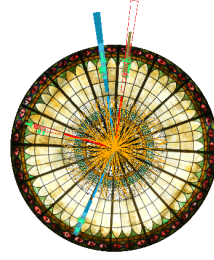


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Exclusive mesoproduction of lepton pair $\pi^- p \rightarrow \ell^+ \ell^- n$ to probe GPDs at J-PARC: power corrections and lepton angular distribution

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The measurement of exclusive mesoproduction of lepton pair, $\pi^- p \rightarrow \ell^+ \ell^- n$, may be performed using the high-intensity pion beams at J-PARC in the near future. The leading hard exclusive amplitude for this process was obtained by E.R. Berger, M. Diehl, and B. Pire [Phys. Lett. B 523 (2001) 265] in terms of the partonic subprocess convoluted with the relevant nonperturbative functions, the nucleon GPDs and the pion distribution amplitudes. The result is associated with the nonperturbative functions of twist two and with the longitudinally polarized virtual photon which is produced by quark-antiquark annihilation and decays into a lepton pair. It was also pointed out that the contributions associated with the transversely polarized virtual photon are suppressed by the inverse powers of the dilepton mass Q , compared to the leading amplitude; such power corrections could play important roles for the J-PARC kinematics but have not been studied in the literature.

We derive the relevant exclusive amplitudes associated with the transversely polarized virtual photon, taking into account the twist-three nonperturbative functions, and show that the interference of this amplitude from transverse photon and the leading amplitude from longitudinal photon yields the first ($1/Q$) power correction to the cross section, which exhibits the lepton angular distribution different from the leading contribution. We also discuss the endpoint behavior of the relevant convolution integral involved in the cross section and give an estimate of the size of the $1/Q$ power correction.

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