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Exclusive Electroproduction of two Pions at HERA

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The exclusive electroproduction of two pions in the mass range $0.4 < M(\text{p}\pi\pi) < 2.5$ GeV has been studied with the ZEUS detector at HERA using an integrated luminosity of 82 pb^{-1} . The analysis was carried out in the kinematic range of $2 < Q^2 < 80 \text{ GeV}^2$, $32 < W < 180$ GeV and $|t| < 0.6$ GeV, where Q^2 is the photon virtuality, W is the photon-proton centre-of-mass energy and t is the squared four-momentum transfer at the proton vertex. The two-pion invariant-mass distribution is interpreted in terms of the pion electromagnetic form factor, $|F(M(\text{p}\pi\pi))|$, assuming that the studied mass range includes the contributions of the ρ , ρ' and ρ'' vector-meson states. The masses and widths of the resonances were obtained and the Q^2 dependence of the cross-section ratios $\sigma(\rho' \rightarrow \text{p}\pi\pi)/\sigma(\rho)$ and $\sigma(\rho'' \rightarrow \text{p}\pi\pi)/\sigma(\rho)$ was extracted. The pion form factor obtained in the present analysis is compared to that obtained in $e^+e^- \rightarrow \text{p}\pi\pi$.

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