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Exclusive Photoproduction of 2π+2π− Final State at HERA

Exclusive production of four charged pions at the ep collider HERA is studied at small photon virtualities $Q^2 < 2$ GeV^2. The data were taken with the H1 detector in the years 2006 and 2007 at a centre-of-mass energy of $\sqrt{s} = 319$ GeV and correspond to an integrated luminosity of 7.6 pb^{-1}. The cross section of the reaction $\gamma p \to 2(\pi^+\pi^-)Y$ is determined in the phase space of $45 < W_{\gamma p} < 100$ GeV, $|t| < 1$ GeV^2 and $M_Y < 1.6$ GeV. The 4π mass spectra indicate that the reaction proceeds predominatly via production and decay of $\rho(1450)$ and $\rho(1700)$ resonances. Parameters of these resonances as well as production cross sections times branching ratio into four charged pions are estimated from the mass fit, which includes contributions from non-resonant 4π channel and interference terms.

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Track Classification: Diffraction in e-p and e-A collisions