

Measurement of the $\psi(2S)$ to J/ψ cross section ratio in photoproduction with the ZEUS detector at HERA

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The exclusive photoproduction reaction $\gamma p \rightarrow \psi(2S)p$ has been studied with the ZEUS detector in ep collisions at HERA using an integrated luminosity of 350 pb^{-1} , in the kinematic range $30 < W < 180 \text{ GeV}$, $Q^2 < 1 \text{ GeV}^2$, $|t| < 5 \text{ GeV}^2$, where W is the photon proton centre-of-mass energy, Q^2 is the photon virtuality and t is the four-momentum transfer at the proton vertex. The $\psi(2S)$ mesons were identified via the decay channels: $\psi(2S) \rightarrow \mu^+ \mu^-$ and $J/\psi \pi^+ \pi^-$ with $J/\psi \rightarrow \mu^+ \mu^-$. The ratio of the production cross sections $R = \sigma(\psi(2S))/\sigma(J/\psi)$ was measured as a function of W and compared to predictions of the perturbative QCD.

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