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Studies of the diffractive photoproduction of isolated photons at HERA

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The photoproduction of isolated photons is measured using diffractive events recorded by the ZEUS detector at HERA. Cross sections are evaluated in the photon transverse-energy and pseudorapidity ranges $5 < E_T^\gamma < 15$ GeV and $-0.7 < \eta^\gamma < 0.9$, inclusively and with a jet with transverse-energy and pseudorapidity in the ranges $4 < E_T^{\text{jet}} < 35$ GeV and $-1.5 < \eta^{\text{jet}} < 1.8$, for an integrated electron-proton luminosity of 374 pb^{-1} . A number of kinematic variables are studied and compared to predictions from the RAPGAP Monte Carlo model. In considering the fraction of the energy of the colourless (“Pomeron”) exchange that is transferred to the photon-jet final state, z_P , it is found that the data lie above the RAPGAP predictions for $z_P > 0.9$, giving evidence for direct-Pomeron interactions. The shapes of the kinematic distributions of events below and above this value of z_P are separately well described by RAPGAP. This and other features provide evidence for a universal set of parton distribution functions in the Pomeron.

Primary authors: WING, Matthew (University of London (GB)); BUSSEY, Peter John (University of Glasgow (GB)); BUSSEY, Peter John (University of Glasgow (GB))

Presenter: BUSSEY, Peter John (University of Glasgow (GB))

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