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Luminosity Measurement at HERA with Elastic QED Compton Events

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At HERA, deep inelastic scattering progresses have been studied in order to probe the fundamental forces predicted by the standard model and the structure of the proton. One of the most fundamental processes is the elastic production of photons, e p -> e p gamma. For the case where the momentum transfer at the proton vertex is small, but both the electron and the photon have significant transverse momentum, the process is referenced as elastic QED Compton scattering. This process has the feature that it may be calculated at high precision in the framework of perturbative QED, and experimental background from other processes, like deeply-virtual Compton scattering, is small. In this analysis, the rate of elastic QED Compton events together with the cross section predicted from QED in used to measure the integrated luminosity of H1 datasets. The results are compared to default measurements of the integrated luminosity using Bethe-Heitler events.

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