

Two-photon exchange in electron-proton scattering -the OLYMPUS experiment at DESY

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Content

The OLYMPUS experiment will measure the two-photon exchange amplitude in the elastic electron-proton scattering. This amplitude is a possible explanation for the significant, experimental discrepancy in the determination of the ratio of the proton electric to magnetic form factors, $R = \mu_p G_E^p / G_M^p$, determined using Rosenbluth separation and polarization transfer techniques. A measurement of the elastic scattering cross section ratio, $\sigma_{e+p} / \sigma_{e-p}$, will provide a direct measurement of the two-photon exchange amplitude. The OLYMPUS experiment was carried out at the DESY laboratory in Hamburg, Germany using the 2.01 GeV electron and positron beams of the DORIS storage ring incident on an internal hydrogen gas target. Independent luminosity monitors were operated in parallel to the main spectrometer during data taking to allow for a precise relative luminosity measurement. Approximately 4.45 fb^{-1} of data were collected. The OLYMPUS experiment and the status of the analysis will be discussed.

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