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To cite this version:


HAL Id: in2p3-00014005
http://hal.in2p3.fr/in2p3-00014005
Submitted on 22 Sep 2003

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Virtual Compton Scattering at low energy and the Generalized Polarizabilities of the Nucleon

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Virtual Compton Scattering has opened a new field of investigation of nucleon structure. At low center-of-mass energies, the process $\gamma^* p \to \gamma p$ allows the determination of the Generalized Polarizabilities (GPs) of the proton [1]. These observables generalize the concept of nucleon polarizabilities to any photon virtuality $Q^2$. The GPs are predicted by many models, including Heavy Baryon Chiral Perturbation Theory [2]. A first generation of experiments studying photon electroproduction $ep \to ep\gamma$ have been performed at MAMI [3], Jefferson Lab [4] and Bates [5]. They measure the unpolarized VCS structure functions $P_{LL} - P_{TT}/\epsilon$ and $P_{LT}$ which are linear combinations of the lowest order dipole GPs. Analysis methods are based on the Low Energy Theorem [1] or the Dispersion Relation formalism [6]. Results of the MAMI [3] and JLab [7] experiments are presented, together with the future prospects in the field.

References


