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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 $\gamma^*p \rightarrow \gamma p$ 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 $ep \rightarrow ep\gamma$ 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

- [1] P. Guichon, G.Q. Liu and A. Thomas, Nucl. Phys. A 591 (1995) 606; P. Guichon and M. Vanderhaeghen, Prog. Part. Nucl. Phys. 41 (1998) 125.
- [2] T. Hemmert *et al.*, Phys. Rev. D 62 (2000) 014013; C.W. Kao and M. Vanderhaeghen, Phys. Rev. Lett. 89 (2002) 272002.
- [3] J. Roche *et al.*, Phys. Rev. Lett. 85 (2000) 708.
- [4] P. Bertin, C. Hyde-Wright, P. Guichon *et al.*, CEBAF Proposal PR93050 (1993). <http://hallaweb.jlab.org/experiment/E93-050/vcs.html>
- [5] J. Shaw, R. Miskimen *et al.*, MIT-Bates Proposal E97-03 (1997).
- [6] B. Pasquini *et al.*, Eur. Phys. J. A 11 (2001) 185; D. Drechsel, B. Pasquini and M. Vanderhaeghen, Phys. Rept 378 (2003) 99.
- [7] H. Fonvieille, JLab E93-050 preliminary results in Proc. Baryons 2002 Conf. (World Scientific, 2003), hep-ex/0206035; S. Jaminion *et al.*, in preparation; G. Laveissière *et al.*, in preparation.