

Form factors and proton radius with elastic scattering and ISR at MAMI

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Abstract

An overview of the form factor programme of the A1 Collaboration at MAMI is given. Results on the electromagnetic form factors of the proton measured with elastic electron scattering at four-momentum transfers Q^2 between 0.003 and 1 GeV^2/c^2 are reported, which allow an extraction of the electric and magnetic radii and a determination of the two-photon-exchange correction. The analysis of proton data taken at Q^2 up to 2 GeV^2/c^2 as well as the analysis of deuteron data are ongoing. A novel technique to measure the electric form factor of the proton at very low Q^2 using initial state radiation (ISR) is presented and first results from a pilot experiment are reported. Future plans at Mainz include an ISR measurement with a new gas jet target and a new experiment to measure the neutron electric form factor.