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Strange sea contribution to the ground state charge and magnetization of the nucleon

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The contributions of strange quarks to nucleon properties have been studied in several observables: to the momentum from deep inelastic neutrino scattering, to the spin with polarized deep inelastic electron scattering and to the mass with pion-nucleon scattering. In order to extract the contribution of strange quarks to the ground state charge and magnetization distributions of the nucleon, several Parity Violating (PV) electron scattering experiments have been carried out. These experiments involve measurement of the helicity dependent cross section of elastically scattered polarized electrons from an unpolarized target. During this talk, I will be focusing on the G0 experiment at the Thomas Jefferson National Accelerator Facility. G0 recently measured the parity violating asymmetry in the cross section for polarized electrons scattered at backward angles off liquid hydrogen and deuterium. Measurements were made at two momentum transfers: 0.23 and 0.62 $(\mathrm{GeV}/c)^2$. Combined with earlier forward angle measurements on a hydrogen target, also from the G0 experiment, the contribution of strange quarks to the proton's charge and magnetization distributions can be determined. These measurements also allow the extraction of the isovector axial form factor as seen in electron scattering. Final results of the complete separation of the strange electric, strange magnetic and the isovector axial form factors at these two kinematic points are presented. A variety of recent theoretical predictions of these form factors are discussed.

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