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Final Results from the Jefferson Lab Q_{weak} Experiment[1]

GREGORY SMITH, Jefferson Lab

The Q_{weak} collaboration has unblinded our final result. We briefly describe the $\vec{e}p$ elastic scattering experiment used to extract the asymmetries measured in the two distinct running periods which constituted the experiment. The precision obtained on the final combined asymmetry is $\pm$ 9.3 ppb. Some of the backgrounds and corrections applied in the experiment will be explained and quantified. We then provide the results of several methods we have used to extract consistent values of the proton's weak charge Q_W^p from our asymmetry measurements. We also present results for the strange and axial form factors obtained from a fit to existing parity-violating electron scattering data. In conjunction with existing atomic parity violation results on ^{133}Cs we extract the vector weak quark couplings C_{1u} and C_{1d}. The latter are combined to obtain the neutron's weak charge. From the proton's weak charge we obtain a result for $\sin^2\theta_W$ at the energy scale of our experiment, a sensitive SM test of the running of $\sin^2\theta_W$. We also show the mass reach for new beyond-the-Standard-Model physics obtained from our determination of the proton's weak charge and its uncertainty, and discuss sensitivity to specific models.

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