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Nucleon electroweak elastic and transition form factors

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Nucleon properties are largely determined by the strong interaction; and a central aim of on-going experimental and theoretical efforts is to understand their structure as composite objects made of three valence light quarks. Electron+nucleon scattering is a well developed experimental technique in such studies and it has delivered, for instance, precise measurements of nucleon electromagnetic and transition form factors. An entirely new window onto nucleon and baryon structure is opened when one uses neutrino scattering. Indeed, reliable predictions of nucleon (N) and N-to-$\Delta(1232)$ electroweak form factors are crucial for understanding new-generation long-baseline neutrino oscillation experiments. Recent developments within the framework of continuum Schwinger function methods (CSMs) have enabled practitioners to deliver the first Poincaré-invariant parameter-free predictions for such form factors. Where data are available, the predictions confirm the measurements. More importantly, the results are serving as motivation for new experiments at high-luminosity facilities. This presentation will describe nucleon electroweak elastic and transition form factors. Solving QCD is a hard problem and a many-pronged approach offers the best hope for success.

Presenter(s) : ,