

Neutral weak axial form factor and neutrino-nucleon scattering

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Using a combination of lattice QCD calculation of the strange-quark form factors, and experimental (anti) neutrino differential cross-section data in a regime where nuclear effects are shown to be negligible, we obtain a precise determination of the weak axial form factor in the regime $0 \leq Q^2 \leq 1 \text{ GeV}^2$, and of the corresponding weak-axial charge. We are thereby able to reproduce the MiniBooNE and BNL E734 data for the (anti) neutrino-nucleus differential cross section to high precision, showing that the nuclear corrections to the experimentally extracted cross section in this kinematic regime are very small. The calculation will play an vital role in understanding nuclear effects in neutrino-nucleus scattering.

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