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Radiative corrections in neutral-current (anti)neutrino-nucleon elastic scattering at GeV energies

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We introduce radiative corrections in neutral-current (anti)neutrino-nucleon elastic scattering at GeV energies within the effective field theory framework. We factorize cross sections into soft and hard functions, clarify the (anti)neutrino flavor dependence at both amplitude and cross-section levels, and improve the quantum chromodynamics (QCD) contributions to low-energy neutral-current processes. In particular, we find that the radiative corrections reach a magnitude comparable to the contributions from the strange quarks. In addition, we confront our results with the experimental data from BNL E734 and MiniBooNE, and provide further implications for extracting information on the axial-vector structure and strangeness content of the nucleon.

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