

QED radiative corrections to charged-current neutrino-nucleon elastic scattering for accelerator neutrino experiments

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Charged-current quasielastic scattering is the signal process in modern neutrino oscillation experiments. It also serves as the main tool for the reconstruction of the incoming neutrino energy. Exploiting effective field theory, we factorize neutrino-nucleon quasielastic cross sections into soft, collinear, and hard contributions. We evaluate soft and collinear functions from QED and provide a model for the hard contribution. Performing resummation, we account for logarithmically-enhanced higher-order corrections and evaluate cross sections and cross-section ratios quantifying the resulting error. We discuss the relevance of radiative corrections depending on conditions of modern and future accelerator-based neutrino experiments.

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Primary authors: QING, Chen (University of Kentucky); MCFARLAND, Kevin (University of Rochester); TOMALAK, Oleksandr (University of Kentucky); Prof. HILL, Richard J (University of Kentucky)

Presenter: TOMALAK, Oleksandr (University of Kentucky)

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