Contribution ID: **5** Type: **not specified**

QED radiative corrections for accelerator neutrinos

Monday, 27 March 2023 09:45 (20 minutes)

Charged-current quasielastic neutrino scattering is the signal process in neutrino oscillation experiments and requires precise theoretical prediction for the analysis of modern and future experimental data. We formulate radiative corrections in a soft-collinear effective field theory framework, evaluate soft and collinear contributions analytically in QED, provide a hadronic model for "hard" contributions, present the resulting scattering cross sections and contrast them with experimental data. We validate the precise relation between electron and muon neutrino cross sections for the experimental setup of modern and future accelerator-based neutrino oscillation experiments. The exchange of photons with nuclear medium modifies (anti)neutrino and electron scattering cross sections. We study the distortion of (anti)neutrino-nucleus and charged lepton-nucleus cross sections and estimate the QED-medium effects. We find new permille-to-percent level effects, which were never accounted for in either (anti)neutrino-nucleus or electron-nucleus scattering.

Primary author: Dr TOMALAK, Oleksandr (Los Alamos National Laboratory)

Presenter: Dr TOMALAK, Oleksandr (Los Alamos National Laboratory)

Session Classification: Session 1