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Neutrino-Nucleon (Nucleus) Scattering for non-Neutrino Physics: The case of Neutral Current induced Photon Production¹
XILIN ZHANG, Univ of Washington

Previously, I have studied the photon production in neutral current (NC) neutrino-nucleon (nucleus) scattering, and addressed its relevance to the MiniBooNE anomaly. (MiniBooNE is a short baseline neutrino oscillation experiment at FNAL.) In this talk I will review this topic, and discuss its connection to parity violating electron-nucleon scattering. Such electron scattering has been used in Qweak experiment at Jlab to measure precisely the proton weak charge. In addition, the nucleon-to-resonance excitations induced by both weak and electromagnetic currents play important roles in the NC photon production process. Understanding all these excitations in a unified microscopic framework is challenging. I will mention our effort along this line, and emphasize the complementarity between neutrino and electron scattering measurements of these excitations and their importance to improve our knowledge of nucleon structure.

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