How Small are FSI Corrections at High Q^2?

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Abstract

It is widely accepted that Final State Interactions (FSI) and Meson Exchange Currents (MEC) diminish for quasi-elastic kinematics at high Q^2. For precision experiments recently performed at Jefferson Lab, as well as experiments proposed for the 12 GeV upgraded facility, it is important to accurately relate the processes measured using light nuclei and equivalent free nucleons. Both FSI and MEC amplitudes involve a loop integral which is expected to fall as Q^2 increases (as the form factors do). The singular part of the FSI integral does not depend on Q^2, but rather the on-shell elementary matrix elements and is maximum when the kinematics allow for re-scattering on a nucleon at rest.[1] The effect of the on-shell matrix elements, therefore, is maximized in the quasi-elastic kinematics.

In exclusive electron-nucleus reactions with $1\text{GeV}^2 \leq Q^2 \leq 4\text{GeV}^2$ a reduction theorem, the generalized eikonal approximation (GEA), emerges. GEA allows a potentially infinite number of re-scattering diagrams to be summed into the final set of Feynman diagrams.[2]

In this talk, I will discuss results of calculations made in the framework of recent theoretical models for FSI relevant to data taken for Jefferson Lab E02-013, a high precision measurement of the Sach's form factor G_E^n at Q^2 up to 3.5 GeV^2 *via* quasi-elastic scattering from a polarized ^{3}He target.

[1]Laget, J-M, arXiv: nucl-th/0303052
[2]Sargsian, M M, arXiv: nucl-th/0110053