

An improved parametrization of the pion-nucleus optical potential for p-shell nuclei

Viacheslav Tsaran

In this work, we develop a new code for pion-nucleus scattering in the framework of the distorted wave impulse approximation in momentum space. We devise the second-order pion-nucleus optical potential which involves analysis of pion-nucleus elastic scattering as a solution of the Lippmann-Schwinger equation. The optical potential is constructed on the base of the individual pion-nucleon scattering amplitudes extracted from SAID [1] and the harmonic oscillator shell model is used to develop its second-order part. Finally, we estimate optimal energy-independent parameters of the optical potential by a multi-energy fit of the pion-carbon total, reaction and differential elastic cross sections.

[1] R. L. Workman et al., Phys. Rev. C 86, 035202 (2012).