



Iranian Journal of Physics Research, Vol. 18, No. 3, 2018

Elastic scattering of ^{15}N ions by ^{12}C at 23 MeV

H Nanakar¹ and K Omidreza²

1. Department of Physics, Payame Noor University, Tehran, Iran

2. Physics & Accelerators Research School, Nuclear Science & Technology Research Institute (NSTRI), Tehran, Iran

(Received 07 May 2017 ; in final form 10 January 2018)

Abstract

Scattering of ^{15}N ions with the energy of $E_{\text{lab}} = 23$ MeV on the $\text{CH}_2(\text{Au})$ target was investigated. Elastic scattering of these ions in the angular range of 7° - 19° was measured by employing the silicon strip detector, "LEDA". By using the measured scattering data, deviation of ion beam, number of incident ions on the target, and differential cross sections of the $^{12}\text{C}(^{15}\text{N}, ^{15}\text{N})^{12}\text{C}$ elastic scattering in the angular range of 7° - 19° were determined. Moreover, by applying the optical model and using the Fresco software, the scattering cross sections in the angular range of 0° - 60° and in the laboratory framework were obtained by entering the extrapolated optical parameters. The obtained cross section data were then compared with the experimental ones. The theoretical cross section data resulting from the optical potential exhibited a meaningful difference with the experimental data obtained in this research work with regard to the covered angular range.

Keywords: elastic scattering, nucleus-nucleus collision, ^{15}N beam, ^{12}C target, optical model, LEDA detector

For full article, refer to the Persian section