

Accepted Manuscript

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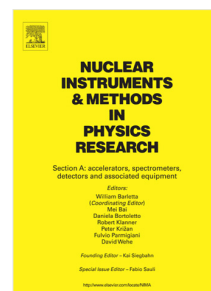
PII: S0168-9002(17)31056-2
DOI: <https://doi.org/10.1016/j.nima.2017.10.019>
Reference: NIMA 60165

To appear in: *Nuclear Inst. and Methods in Physics Research, A*

Received date: 6 June 2017
Revised date: 4 October 2017
Accepted date: 9 October 2017

Please cite this article as: H.C. Manjunatha, K.N. Sridhar, Empirical formula for neutron scattering lengths and cross sections, *Nuclear Inst. and Methods in Physics Research, A* (2017), <https://doi.org/10.1016/j.nima.2017.10.019>

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Empirical formula for neutron scattering lengths and cross sections

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Abstract

The neutrons are important tool to study the condensed matter and they can also be used in nuclear physics. Hence in the present work, we have formulated an empirical formula for neutron absorption cross sections, coherent and incoherent neutron scattering cross sections and coherent neutron and incoherent scattering lengths for different mass number nuclei of wide atomic number range $1 < Z < 96$. This formula successfully produces experimental values 412 nuclei available in the literature.

Introduction

Neutron scattering is one of the important topics to study the structure and dynamics of materials on the atomic and nanometer scale. Tian et al., [1] described a neutron data processing and analysis for scattering experiments. Vanhoy et al., [2] measured neutron scattering cross sections for ²³Na. Lee et al., [3] designed multiple scattering Compton camera by neutron activation method. Beyer et al., [4] studied Inelastic scattering of fast neutrons from ⁵⁶Fe. Previous workers [5] evaluated neutron scattering cross-section in light water. Neutron data in event mode is also available [6]. Muhrer et al., [7] measured total neutron cross-section of water confined in silica microspheres. Gupta et al., [8] studied inelastic neutron scattering in Ag₂O. Han et al., [9] measured the neutron scattering on Gallium. A coherent scattering of neutrons by nanoparticles are measured by Lychagin et al., [10].

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