

Core Polarization Effects of some odd sd-shell nuclei using M3Y effective nucleon-nucleon interaction

Khalid S. Jassim

Department of Physics, College of Education for pure Science, University of Babylon, PO Box 4, Hilla-Babylon, Iraq

E-mail: Khalid_ik74@yahoo.com

ABSTRACT

Inelastic electron scattering form factors in some odd-A sd-shell nuclei (^{17}O , ^{27}Al and ^{39}K) have been calculated taking into account higher energy configurations outside sd-shell model space, which are called core-polarization (CP) effects. The two-body wildenthal interaction is used for the sd-shell model space. The two-body Michigan three Yukawas (M3Y) interactions are used for the core-polarization (CP) matrix elements. This interaction was given in LS-coupling. A transformation between LS and jj must performed to get the relation between the two-body shell model matrix elements and the relative and center of mass coordinates, using the harmonic oscillator radial wave functions with Talmi-Moshinsky transformation. The sd-shell model calculations fail to describe the data in both the transition strength and the form factor; the inclusion of CP effects modifies the form factors markedly and describes the experimental data very well in both the absolute strength and the momentum transfer dependence.

Keywords: Inelastic electron scattering, form factor, Shell model

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