

NATURAL WIDTHS OF ATOMIC LEVELS IN THORIUM DETERMINED BY THE ICES METHOD

Tuesday, 12 July 2022 17:30 (20 minutes)

The overwhelming majority of the experimental atomic-level widths in thorium (see, e.g., the compilation [1]) were determined by the X-ray emission spectroscopy and only several N-subshell values were obtained by the XPS method. There are no available relevant experimental data determined by another methods. Therefore, we used suitable conversion electron lines of the 9.2, 15.1 and 24.3 keV nuclear transitions in ^{227}Th (generated in the β -decay of ^{227}Ac) measured in the works [2,3] for the determination of the M1, M2, M3, N1, N2, and N3 atomic-level widths using the approach and the computer code [4]. The values obtained are given in the table (in eV).

Atomic subshell

M1 M2 M3 N1 N2 N3

This work 14.1 ± 0.5 11.4 ± 0.5 6.9 ± 0.4 11.4 ± 1.4 8.6 ± 1.2 6.0 ± 0.7

Ref. [1] 15.5 ± 2.0 $13.2 \pm (5 \div 25)\%$ $8 \pm (5 \div 25)\%$ $11.5 \pm (10\%)$ 8.8 ± 0.8 7.5 ± 1.0

As can be seen, the agreement within 2σ (or better) is found between the present and compiled data [1] and for the most of the atomic subshells in question our values are more precise. Thus, our data represent a valuable contribution to the database of the experimental natural atomic-level widths of thorium.

[1] J.L. Campbell, T. Papp, *Atom. Data Nucl. Data Tables*, 77 (2001) 1.

[2] A. Kovalík et al., *Eur. Phys. J. A*, 55 (2019) 131.

[3] A. Kovalík et al., *Eur. Phys. J. A*, 57 (2021) 285.

[4] A. Inoyatov et al., *J. Elect. Spec. Relat. Phenom.*, 160 (2007) 54.

The speaker is a student or young scientist

No

Section

1. Nuclear structure: theory and experiment

Primary authors: INOYATOV, Anvar (Joint Institute for Nuclear Research, Dubna); Dr KOVALÍK, Alojs (NPI ASCR, Řež, Czechia); Mr PEREVOSHCHIKOV, Lev (Joint Institute for Nuclear Research); FILOSOFOV, Dmitry; Mr DADAKHANOV, Jakhangir (Joint Institute for Nuclear Research)

Presenter: INOYATOV, Anvar (Joint Institute for Nuclear Research, Dubna)

Session Classification: Nuclear structure: theory and experiment