Coulomb excitation **2023Il02,2009Va01,2007Va20**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Jun Chen and Ameenah R. Farhan	NDS 194,3 (2024)	8-Jan-2024

2023Il02: 304-MeV ^{76}Zn beam produced at Radioactive Ion Beam facility REX-ISOLDE (CERN) by 1.4 GeV protons incident on a UC_x target, followed by separation of ^{76}Zn fragments using laser ionization source RILIS, General Purpose Separator (GPS) prior to deposit into the Penning trap (REXTRAP), and finally charge bred in the Electron Beam Ion Source (REXEBIS). Measured Eγ, Iγ, (^{76}Zn)γ-coin using Miniball array of eight triple clusters of Ge detectors for γ rays, and annular double-sided silicon strip detector (DSSSD) for ^{76}Zn nuclei. Deduced levels, E2 matrix elements, and Coulomb-excitation cross sections by GOSIA-GOSIA2 least-squares analysis code using as input six E2 matrix elements from literature for the following transitions in ^{196}Pt: first 2^+ to g.s., second 2^+ to the first 2^+, first 4^+ to the first 2^+, diagonal elements for first and second 2^+ and the first 4^+ states. Comparisons with theoretical calculations using large-scale shell-model with LNPS and JUN45 interactions, and Monte-Carlo shell-model (MCSM) with A3DA-m Hamiltonian. Comparison with previous experimental results.

2009Va01, 2007Va20: E=2.83 MeV/nucleon ^{76}Zn beam produced at Radioactive Ion Beam facility REX-ISOLDE (CERN). Target=^{120}Sn. The Zn beams were produced using protons at E=1.4 GeV impinging UC_x target. The Mass-separated Zn beam was accumulated and bunched in a Penning Trap. Measured Eγ using MINIBALL array of 24 HPGe detectors. Charged particles were measured with a double-sided silicon strip detector. Comparison with collective model predictions and large-scale shell-model calculations. Experimental results analyzed using GOSIA2 code. 2009Va01 and 2007Va20 are from the same group.

^{76}Zn Levels

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0	0^+		
599	2^+	25.4 ps *+37−29*	B(E2)↑=0.145 *18* (2009Va01) $T_{1/2}$: deduced from B(E2)↑ by the evaluators. B(E2)↑: other: 0.143 *+29−26* (2023Il02).
1297	(4^+)	10.4 ps *+25−22*	B(E2)↑=0.059 *+15−11* $T_{1/2}$: deduced by evaluators from B(E2)↑. B(E2)↑: deduced from B(E2)↓=0.033 *+8−6* (see comments for 698γ), average of values from 2009Va01 and 2023Il02.

† From Eγ values.
‡ From the Adopted Levels.

γ(^{76}Zn)

E_i(level)	J_i^π	Eγ†	Iγ†	E_f	J_f^π	Mult.	Comments
599	2^+	599	100	0	0^+	[E2]	B(E2)↓=0.0290 *36* (2009Va01), 0.0286 *+58−51* (2023Il02). E2 matrix element (599, 2^+ to g.s., 0^+)=+0.378 eb *36* (2023Il02). B(E2)↓=0.0285 *56* listed in 2023Il02; but the evaluators obtain B(E2)↓=0.0286 *+58−51* from the matrix element.
1297	(4^+)	698	100	599	2^+	[E2]	B(E2)↓=0.033 *+8−6*, weighted average of 0.032 *9*(2009Va01) and 0.0336 *+77−63* (2023Il02). E2 matrix element (1297, 4^+ to 599, 2^+)=+0.55 eb *6* (2023Il02). B(E2)↓=0.0330 *70* listed in 2023Il02, but the evaluators obtain B(E2)↓=0.0336 *+77−63* from the matrix element.

† From the Adopted Levels, Gammas dataset. Energies are rounded values.

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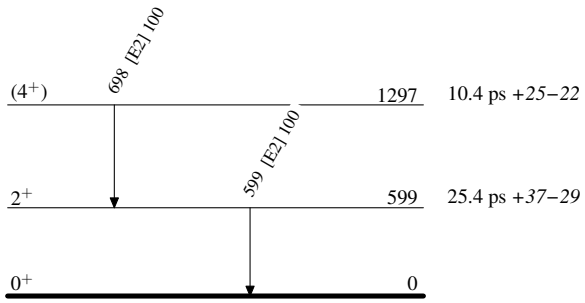
Level Scheme

Intensities: % photon branching from each level



$^{76}_{30}Zn_{46}$