^{238}U(^{70}Zn,xγ) 2012Re11

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 202,59 (2025)	25-Feb-2025

Adapted from the XUNDL dataset for 2012Re11, compiled by E. Thiagalingam and B. Singh (McMaster) on June 14, 2012.

2012Re11: E=460 MeV ^{70}Zn beam was produced from the Laboratori Nazionali di Legnaro (LNL) Tandem-ALPI accelerator complex. Target was 400 μg/cm^2 ^{238}U. Projectile-like nuclei were detected and identified by the large-acceptance magnetic spectrometer PRISMA. γ rays were detected with the CLARA array consisting of 22 Compton-suppressed Ge clover detectors. Measured Eγ, Iγ, $\gamma(\theta)$, $\gamma\gamma$-coin, (^{65}Co)γ-coin. Deduced levels, J, π, configurations. Comparison with large-scale shell-model calculations. See also 2012Re24 and 2012Re16.

^{65}Co Levels

E(level)[†‡]	J$^\pi$[#]
0.0	(7/2$^-$)
882.3 *7*	(3/2$^-$)[&]
1223.0 *10*	(3/2$^-$)[&]
1479.5 *3*	(11/2$^-$)[@]
1642.8 *7*	(9/2$^-$)[@]
2479.8 *6*	(11/2$^-$)
2670.3 *6*	(13/2$^-$)
3029.6 *7*	(15/2$^-$)
3272.3 *7*	(15/2$^-$,17/2$^+$)

[†] Additional information 1.

[‡] From a least-squares fit to γ-ray energies.

[#] As proposed in 2012Re11, based on their measured $\gamma(\theta)$ and shell-model predictions, unless otherwise noted.

[@] Assignments for 1480 and 1643 levels are inverse in 2009Pa16 in their decay scheme of ^{65}Fe β^- decay (1.12 s). 2012Re11 argue that those assignments by 2009Pa16 are mainly based on systematics of neighboring odd-A Co isotopes, but from data in this work, the intensity ratio of the 1480γ and 1643γ is completely different from those for correpsonding transitions in ^{61}Co and ^{63}Co, which, together with measured R$_{asym}$ of 1480γ suggesting ΔJ=2, indicates a spin-parity inversion for the two levels as members of the $\pi f_{7/2}^{-1}$ 2$^+$(^{66}Ni) multiplet, compared to spin-parities of correspdoning levels in ^{61}Co and ^{63}Co. 2012Re11 also show that their assignments are consistent with the predictions from the large-scale shell-model calculations using the LNPS interaction proposed in 2010Le20.

[&] From Adopted Levels. No assignment in 2012Re11.

γ(^{65}Co)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
[x]76.7 *4*	60 *6*						
190.5 *3*	9 *1*	2670.3	(13/2$^-$)	2479.8	(11/2$^-$)	D	R$_{asym}$=0.67 *29*.
242.7 *2*	15 *2*	3272.3	(15/2$^-$,17/2$^+$)	3029.6	(15/2$^-$)		R$_{asym}$=0.94 *26*.
[x]272.4 *5*	10 *2*						
[x]325.6 *3*	17 *2*						
340.7 *7*	7 *2*	1223.0	(3/2$^-$)	882.3	(3/2$^-$)		
359.3 *2*	18 *2*	3029.6	(15/2$^-$)	2670.3	(13/2$^-$)		
[x]379.7 *4*	18 *2*						
[x]430.1 *6*	6 *2*						
882.3 *7*	21 *5*	882.3	(3/2$^-$)	0.0	(7/2$^-$)		
1000.4 *6*	16 *3*	2479.8	(11/2$^-$)	1479.5	(11/2$^-$)		
1190.5 *9*	21 *3*	2670.3	(13/2$^-$)	1479.5	(11/2$^-$)		

Continued on next page (footnotes at end of table)

^{238}U(^{70}Zn,xγ) 2012Re11 (continued)

γ(^{65}Co) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
1479.5 *3*	100 *5*	1479.5	(11/2$^-$)	0.0	(7/2$^-$)	Q	R_{asym}=1.19 *14*.
1642.8 *7*	14 *3*	1642.8	(9/2$^-$)	0.0	(7/2$^-$)		

† From 2012Re11.
‡ Deduced by the evaluator based on R_{asym} in 2012Re11, as given under comments. Expected R_{asym} values are ≈0.8 for stretched dipole transition (ΔJ=1) and ≈1.2 or larger for stretched quadrupole transition (ΔJ=2).
x γ ray not placed in level scheme.

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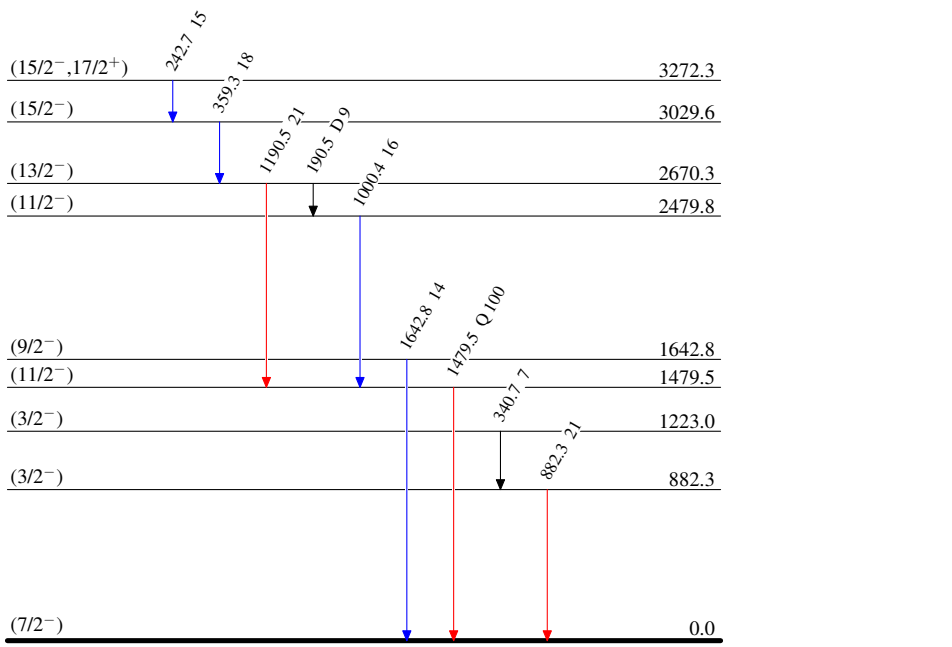
Level Scheme

Intensities: Relative I_γ



$^{65}_{27}Co_{38}$