^{92}Mo(^{60}Ni,2pnγ) 1987Br14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 185, 2 (2022)	23-Aug-2022

1987Br14: E=255 MeV ^{60}Ni beam was produced from the Argonne Tandem Linac. Target was 1 mg/cm^2 ^{92}Mo foil. γ rays were detected with a small planar (LEPS) and three large Ge(Li) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma$(t). Deduced levels, J^π, $T_{1/2}$, conversion coefficients, γ-ray multipolarities.

Also includes the following reactions:

1995Ni10: ^{94}Mo(^{58}Ni,2pnγ),E(^{58}Ni)=250 MeV from the ATLAS accelerator at ANL. Measured conversion electrons with two Hamamatsu Si p-i-n diodes and γ rays with a large Ge detector. Deduced conversion coefficients.

1984HoZN: ^{96}Ru(^{58}Ni,4pnγ) at UNILAC. Measured $\gamma\gamma$(t). Deduced isomer $T_{1/2}$.

1982No07: ^{94}Mo(^{58}Ni,2pnγ) E=233-250 MeV from the Munich MP tandem. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma$(t) with Ge(Li) detectors. Deduced isomer $T_{1/2}$. A 2.5 μs isomer was reported and tentatively assigned to ^{149}Er through delayed γ rays at 64, 69, 132, 167, 393 and 1570. The 393γ is not seen by 1987Br14.

^{149}Er Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0	(1/2$^+$)		
111.3 *10*	(3/2$^+$)		
741.6 *15*	(11/2$^-$)		
2311.4 *15*	(15/2$^-$)		
2478.7 *15*	(15/2$^+$)		
2542.0 *15*	(15/2$^+$)		
2610.9 *15*	(19/2$^+$)	0.61 μs *8*	$T_{1/2}$: from $\gamma\gamma$(t) 1987Br14.
2611.0+x	(21/2$^+$)		Additional information 1. E(level): x<60 (1987Br14).
2683.4+x?			
2864.00+x? *15*			
3187.70+x *10*	(23/2$^-$)		
3242.8+x *4*	(27/2$^-$)	4.8 μs *2*	$T_{1/2}$: other: 3.8 μs *3* (1984HoZN), 2.5 μs *9* (1982No07,tentative).

[†] From a least-squares fit to γ-ray energies.
[‡] From 1987Br14, based on systematics and shell-model configurations. The assignments are the same in the Adopted Levels.
[#] From $\gamma\gamma$(t) in 1987Br14.

γ(^{149}Er)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	α[@]	Comments
55.1 *3*	3.5 *12*	3242.8+x	(27/2$^-$)	3187.70+x	(23/2$^-$)	E2	31.5 *10*	α(L)exp=23 *20* (1995Ni10); α(M)exp=8 *7* (1995Ni10); α(exp)=26 *9* (1987Br14) α(L)=24.2 *7*; α(M)=5.89 *18* I$_\gamma$: from $\gamma\gamma$-coin (1987Br14).
63.3 *2*	6.6 *3*	2542.0	(15/2$^+$)	2478.7	(15/2$^+$)	M1	10.62 *18*	α(L)exp=1.2 *7* (1995Ni10); α(exp)=10.3 *20* (1987Br14) α(K)=8.89 *15*; α(L)=1.352 *23*; α(M)=0.300 *5* α(exp)=8.3 to 12.3 (1987Br14).
68.9 *1*	5.8 *3*	2610.9	(19/2$^+$)	2542.0	(15/2$^+$)	E2	12.77 *19*	α(L)exp=9.3 *35* (1995Ni10); α(M)exp=2.4 *9* (1995Ni10); α(exp)=14.8 *27* (1987Br14) α(K)=2.024 *28*; α(L)=8.23 *13*; α(M)=2.007 *31* α(exp)=12.1 to 17.4 (1987Br14).

Continued on next page (footnotes at end of table)

^{92}Mo(^{60}Ni,2pnγ) 1987Br14 (continued)

$\gamma(^{149}Er)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α@	Comments
72.4& *4*	≈1	2683.4+x?		2611.0+x	(21/2$^+$)			E_γ,I_γ: seen in $\gamma\gamma$-coin only (1987Br14).
111.3		111.3	(3/2$^+$)	0.0	(1/2$^+$)	M1#	2.094 *29*	
132.3 *1*	10.2 *5*	2610.9	(19/2$^+$)	2478.7	(15/2$^+$)	E2	1.051 *15*	α(K)exp=0.51 *15* (1995Ni10); α(L)exp=0.6 *2* (1995Ni10) α(K)=0.525 *7*; α(L)=0.403 *6*; α(M)=0.0974 *14*
167.3 *1*	81 *2*	2478.7	(15/2$^+$)	2311.4	(15/2$^-$)	E1	0.0830 *12*	α(K)exp=0.066 *19* (1995Ni10); α(K)exp<0.10 (1987Br14) α(K)=0.0696 *10*; α(L)=0.01047 *15*; α(M)=0.002316 *33*
179.9& *2*	4.9 *3*	2864.00+x?		2683.4+x?				
230.6 *1*	16.0 *5*	2542.0	(15/2$^+$)	2311.4	(15/2$^-$)			
253.0& *3*	2.2 *3*	2864.00+x?		2611.0+x	(21/2$^+$)			
323.7 *1*	9.3 *4*	3187.70+x	(23/2$^-$)	2864.00+x?				
576.7 *1*	84 *2*	3187.70+x	(23/2$^-$)	2611.0+x	(21/2$^+$)			
630.3		741.6	(11/2$^-$)	111.3	(3/2$^+$)	M4#	0.320 *4*	
1569.8 *2*	100 *3*	2311.4	(15/2$^-$)	741.6	(11/2$^-$)			
1737.0 *3*	5 *1*	2478.7	(15/2$^+$)	741.6	(11/2$^-$)			

† From 1987Br14.
‡ From ce data of 1995Ni10 and deduced α(exp) by 1987Br14 from intensity balance, unless otherwise noted.
# From the Adopted Gammas.
@ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
& Placement of transition in the level scheme is uncertain.

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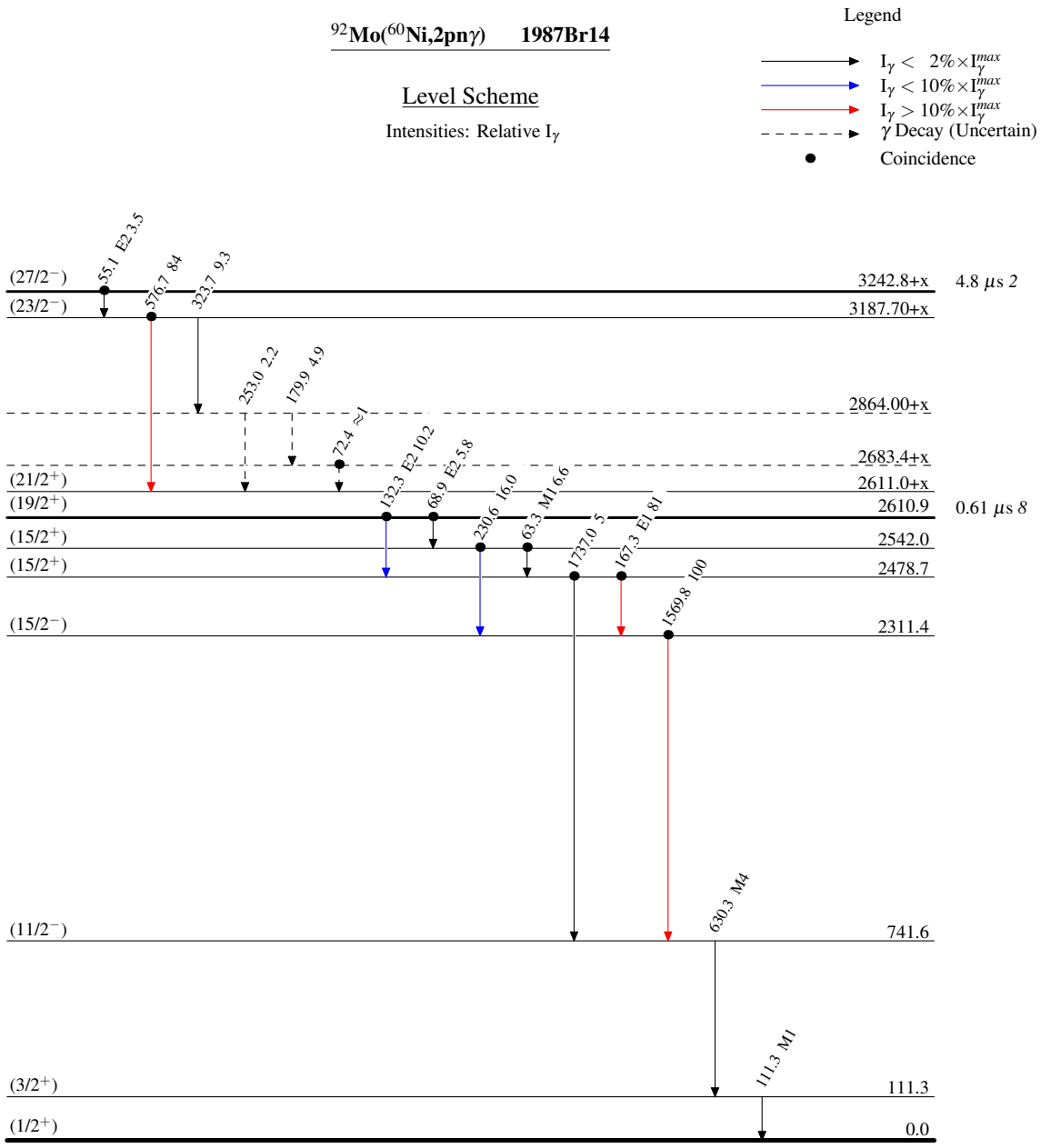
Level Scheme

Intensities: Relative I_γ



$^{149}_{68}Er_{81}$