

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

$Q(\beta^-) = -8.68 \times 10^3$ 11; S(n)=9510 30; S(p)=3530 60; $Q(\alpha) = 2340$ 30 [2021Wa16](#)

S(2n)=21740 200 (syst), S(2p)=5422 23, $Q(\epsilon p) = 4943$ 23 ([2021Wa16](#)).

[1988WiZN](#): measured β -delayed Ep, (x-ray)-p coin, γ -p coin, $T_{1/2}(p)$ $\% \beta^+ p$.

[Additional information 1.](#)

 ^{141}Gd Levels**Cross Reference (XREF) Flags**

- A** ^{141}Gd IT decay (24.5 s)
B ^{141}Tb ϵ decay (3.5 s)
C $^{112}\text{Sn}(^{32}\text{S}, 2pn\gamma)$

E(level) [†]	J^π [‡]	$T_{1/2}$	XREF	Comments
0.0	$1/2^+$	14 s 4	ABC	$\% \epsilon + \% \beta^+ = 100$; $\% \beta^+ p = 0.03$ 1 (1989Gi06) J^π : see 377.8 level. $T_{1/2}$: from 1989Gi06 ; other: 20 s 4 (1986Wi15); note that 1989Gi06 did not see $T_{1/2} = 1.3$ s 7 reported by 1988TuZY .
113.16 7	$(3/2^+)$		ABC	J^π : γ from $5/2^+$ is M1, syst for N=77 odd-A nuclei.
198.32 7	$(3/2^+)$		ABC	J^π : γ to $3/2^+$ is M1, γ from $5/2^+$ is M1, syst for N=77 nuclei.
258.17 6	$5/2^+$		ABC	J^π : see 377.8 level.
377.76 ^d 9	$11/2^-$	24.5 s 5	ABC	$\% \epsilon + \% \beta^+ = 89$ 2; $\% \text{IT} = 11$ 2 (1989Gi06) J^π : $\log ft = 5.6$ to $11/2^-$, syst for N=77 odd-A nuclei suggests $J^\pi = 11/2^-$ for 377.8 level, $5/2^+$ for 258.2 level and $1/2^+$ for 0.0 level. $T_{1/2}$: from 1989Gi06 . Others: 20.8 s 8 (1988TuZY), 22 s 3 (1986Re11). J^π : γ to $1/2^+$, γ from $(7/2^-)$.
492.35 7	$(5/2^+, 3/2^-)$		BC	J^π : γ to $11/2^-$, γ from $(7/2^-)$, no ϵ via $(5/2^-)$ parent.
514.47 10	$(9/2, 11/2^-)$		BC	
551.59 8	$(7/2^-)^{\#}$		BC	
646.16 10	$(7/2^-)^{\#}$		B	
661.43 10	$(3/2^-, 5/2^-)$		B	J^π : γ to $3/2^+$, $\log ft = 6.0$ via $(5/2^-)$ parent.
752.64 9	$(3/2^-, 5/2^-)$		B	J^π : $\log ft = 5.3$ via $(5/2^-)$ parent, γ to $3/2^+$.
758.35 11	$(3/2^-, 5/2^-, 7/2^-)$		B	J^π : $\log ft = 5.4$ via $(5/2^-)$ parent.
895.15 8	$(7/2^-)^{\#}$		BC	
907.4 ^d 9	$(15/2^-)$		C	
940.53 11	$(7/2^-)^{\#}$		BC	
989.72 11	$(7/2^-)^{\#}$		BC	
995.0 9	$(13/2^-)$		C	
1100.07 14	$(7/2^-)^{\#}$		B	
1131.87 14	$(7/2^-)^{\#}$		B	
1282.3 ^c 7	$(9/2^-)$		C	
1547.5 7	$(11/2^-)$		C	
1661.5 10	$(17/2^-)$		C	
1671.2 ^d 11	$(19/2^-)$		C	
1873.1 ^c 12	$(13/2^-)$		C	
2136.6 12	$(19/2^-)$		C	
2149.9 [@] 12	$(13/2^+)$		C	
2254.2 11	$(15/2^-)$		C	
2276.3 11	$(15/2^-)$		C	
2447.6 12	$(21/2^-)$		C	

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Adopted Levels, Gammas (continued) ^{141}Gd Levels (continued)

E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF
2516.7 ^b 16	(23/2 ⁻)	C	3808.3 ^b 23	(29/2 ⁻)	C	6124 ^{&} 3	(39/2 ⁻)	C
2561.4 ^d 14	(23/2 ⁻)	C	3813.9 [@] 21	(25/2 ⁺)	C	6926 [@] 3	(41/2 ⁺)	C
2597.4 ^c 16	(17/2 ⁻)	C	3915.7 ^a 21	(31/2 ⁻)	C	7031 ^{&} 3	(43/2 ⁻)	C
2685.2 [@] 16	(17/2 ⁺)	C	4058.2 ^b 23	(31/2 ⁻)	C	7874 [@] 3	(45/2 ⁺)	C
2759.4 ^b 19	(25/2 ⁻)	C	4299.9 ^a 23	(33/2 ⁻)	C	8112 ^{&} 3	(47/2 ⁻)	C
2874.7 ^{&} 12	(19/2 ⁻)	C	4449.4 ^{&} 21	(31/2 ⁻)	C	8855 [@] 4	(49/2 ⁺)	C
3148.2 ^a 14	(25/2 ⁻)	C	4471.0 [@] 24	(29/2 ⁺)	C	9379 ^{&}	(51/2)	C
3233.2 [@] 19	(21/2 ⁺)	C	4679.0 ^a 25	(35/2 ⁻)	C	9884 [@] 4	(53/2 ⁺)	C
3278.3 ^{&} 16	(23/2 ⁻)	C	4894.3 25	(35/2 ⁻)	C	10959 [@] 4	(57/2 ⁺)	C
3307.8 ^a 15	(27/2 ⁻)	C	5214 [@] 3	(33/2 ⁺)	C	12109 [@] 4	(61/2 ⁺)	C
3383.4 ^b 21	(27/2 ⁻)	C	5265.3 ^{&} 24	(35/2 ⁻)	C	13320 [@]	(65/2 ⁺)	C
3594.3 ^a 18	(29/2 ⁻)	C	5775 3	(39/2 ⁻)	C			
3778.9 ^{&} 19	(27/2 ⁻)	C	6036 [@] 3	(37/2 ⁺)	C			

[†] From least-squares fit to E_γ data (χ^2 norm=1.85 greater than χ^2 critical=1.73).

[‡] Unless otherwise noted, assignments are based on DCO ratios and rotational band structure as reported in 1993Mu05. Where bandhead spin and parity assignments are not firm, values are given in parentheses.

J=(7/2⁻) from γ to 11/2⁻, (9/2) and log ft≤6.0 via (5/2⁻) parent.

@ Band(A): neutron i_{13/2} band, $\alpha=+1/2$.

& Band(B): $\Delta J=2$, based on 19/2⁻.

^a Band(C): $\Delta J=1$, based on 25/2⁻.

^b Band(D): $\Delta J=1$, based on 23/2⁻.

^c Band(E): $\Delta J=2$, based on 9/2⁻.

^d Band(F): $\Delta J=2$, based on 11/2⁻.

 $\gamma(^{141}\text{Gd})$

All data for E_γ with uncertainty are from ε decay, others are from ($^{32}\text{S}, 2\text{pn}\gamma$).

E _i (level)	J _i ^π	E _γ	I _γ	E _f	J _f ^π	Mult. [†]	$\alpha^{\ddagger}$	Comments
113.16	(3/2 ⁺)	113.2 1	100	0.0	1/2 ⁺	M1	1.412	$\alpha(\text{K})=1.193$ 17; $\alpha(\text{L})=0.1720$ 25; $\alpha(\text{M})=0.0374$ 6 $\alpha(\text{N})=0.00860$ 13; $\alpha(\text{O})=0.001334$ 19; $\alpha(\text{P})=8.89\times 10^{-5}$ 13
198.32	(3/2 ⁺)	85.2 1	12.5 23	113.16	(3/2 ⁺)	M1	3.19	$\alpha(\text{K})=2.69$ 4; $\alpha(\text{L})=0.390$ 6; $\alpha(\text{M})=0.0847$ 13 $\alpha(\text{N})=0.0195$ 3; $\alpha(\text{O})=0.00302$ 5; $\alpha(\text{P})=0.000201$ 3
		198.4 1	100 10	0.0	1/2 ⁺	M1	0.293	$\alpha(\text{K})=0.248$ 4; $\alpha(\text{L})=0.0354$ 5; $\alpha(\text{M})=0.00768$ 11 $\alpha(\text{N})=0.001767$ 25; $\alpha(\text{O})=0.000274$ 4; $\alpha(\text{P})=1.84\times 10^{-5}$ 3
258.17	5/2 ⁺	59.8 1	14.3 29	198.32	(3/2 ⁺)	M1	8.88	$\alpha(\text{K})=7.48$ 11; $\alpha(\text{L})=1.094$ 17; $\alpha(\text{M})=0.238$ 4 $\alpha(\text{N})=0.0547$ 9; $\alpha(\text{O})=0.00847$ 13; $\alpha(\text{P})=0.000563$ 9
		145.0 1	31 4	113.16	(3/2 ⁺)	M1	0.700	$\alpha(\text{K})=0.592$ 9; $\alpha(\text{L})=0.0850$ 12; $\alpha(\text{M})=0.0185$ 3 $\alpha(\text{N})=0.00425$ 6; $\alpha(\text{O})=0.000660$ 10; $\alpha(\text{P})=4.41\times 10^{-5}$ 7
		258.2 1	100 10	0.0	1/2 ⁺	E2	0.0964	$\alpha(\text{K})=0.0717$ 10; $\alpha(\text{L})=0.0192$ 3; $\alpha(\text{M})=0.00439$ 7 $\alpha(\text{N})=0.000989$ 14; $\alpha(\text{O})=0.0001388$ 20; $\alpha(\text{P})=4.35\times 10^{-6}$ 7

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Adopted Levels, Gammas (continued)

$\gamma(^{141}\text{Gd})$ (continued)							
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult. [†]	$\alpha^\ddagger$
377.76	11/2 ⁻	119.6 1	100	258.17	5/2 ⁺	E3	15.93
B(E3)(W.u.)=7.8×10 ⁻⁴ 14 $\alpha(\text{K})=2.74$ 4; $\alpha(\text{L})=10.08$ 15; $\alpha(\text{M})=2.49$ 4 $\alpha(\text{N})=0.557$ 9; $\alpha(\text{O})=0.0718$ 11; $\alpha(\text{P})=0.0001662$ 24							
492.35	(5/2 ⁺ , 3/2 ⁻)	234.5 1	12.2 49	258.17	5/2 ⁺		
		379.2 1	71 7	113.16	(3/2 ⁺)		
		492.2 1	100 10	0.0	1/2 ⁺		
514.47	(9/2, 11/2 ⁻)	136.7 1	100	377.76	11/2 ⁻		
551.59	(7/2 ⁻)	59.3 1	18 4	492.35	(5/2 ⁺ , 3/2 ⁻)		
		173.9 1	15 2	377.76	11/2 ⁻	[E2]	0.356
$\alpha(\text{K})=0.236$ 4; $\alpha(\text{L})=0.0928$ 14; $\alpha(\text{M})=0.0215$ 3 $\alpha(\text{N})=0.00482$ 7; $\alpha(\text{O})=0.000655$ 10; $\alpha(\text{P})=1.312\times 10^{-5}$ 19							
646.16	(7/2 ⁻)	293.3 1	100 10	258.17	5/2 ⁺		
		94.5 1	2.1 21	551.59	(7/2 ⁻)		
		131.6 1	100 11	514.47	(9/2, 11/2 ⁻)		
		268.3 2	62 6	377.76	11/2 ⁻		
661.43	(3/2 ⁻ , 5/2 ⁻)	463.4 1	100	198.32	(3/2 ⁺)		
752.64	(3/2 ⁻ , 5/2 ⁻)	91.5 1	5.0 25	661.43	(3/2 ⁻ , 5/2 ⁻)		
		494.3 1	100 10	258.17	5/2 ⁺		
		554.2 1	50 5	198.32	(3/2 ⁺)		
758.35	(3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻)	206.7 2	7.4 56	551.59	(7/2 ⁻)		
		500.2 1	100 9	258.17	5/2 ⁺		
895.15	(7/2 ⁻)	248.8 1	5.2 21	646.16	(7/2 ⁻)		
		343.6 1	100 10	551.59	(7/2 ⁻)		
		402.9 1	28.9 72	492.35	(5/2 ⁺ , 3/2 ⁻)		
		517.5 1	27.8 31	377.76	11/2 ⁻		
		636.9 1	11.3 21	258.17	5/2 ⁺		
907.4	(15/2 ⁻)	529.6	100	377.76	11/2 ⁻		
940.53	(7/2 ⁻)	389.0 1	100 18	551.59	(7/2 ⁻)		
		426.0 1	64 18	514.47	(9/2, 11/2 ⁻)		
989.72	(7/2 ⁻)	475.4 1	100 10	514.47	(9/2, 11/2 ⁻)		
		611.8 1	16 4	377.76	11/2 ⁻		
995.0	(13/2 ⁻)	617.3	100	377.76	11/2 ⁻		
1100.07	(7/2 ⁻)	585.6 1	100	514.47	(9/2, 11/2 ⁻)		
1131.87	(7/2 ⁻)	617.4 1	100	514.47	(9/2, 11/2 ⁻)		
1282.3	(9/2 ⁻)	342.0		940.53	(7/2 ⁻)		
		387.5		895.15	(7/2 ⁻)		
1547.5	(11/2 ⁻)	265.7		1282.3	(9/2 ⁻)		
		557.3		989.72	(7/2 ⁻)		
		606.9		940.53	(7/2 ⁻)		
1661.5	(17/2 ⁻)	666.5		995.0	(13/2 ⁻)		
		754.0		907.4	(15/2 ⁻)		
1671.2	(19/2 ⁻)	763.9	100	907.4	(15/2 ⁻)		
1873.1	(13/2 ⁻)	590.8	100	1282.3	(9/2 ⁻)		
2136.6	(19/2 ⁻)	465.4		1671.2	(19/2 ⁻)		
		475.0		1661.5	(17/2 ⁻)		
2149.9	(13/2 ⁺)	602.4	100	1547.5	(11/2 ⁻)		
2254.2	(15/2 ⁻)	706.7	100	1547.5	(11/2 ⁻)		
2276.3	(15/2 ⁻)	728.8	100	1547.5	(11/2 ⁻)		
2447.6	(21/2 ⁻)	776.2		1671.2	(19/2 ⁻)		
		786.1		1661.5	(17/2 ⁻)		
2516.7	(23/2 ⁻)	380.1	100	2136.6	(19/2 ⁻)		
2561.4	(23/2 ⁻)	890.3	100	1671.2	(19/2 ⁻)		

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Adopted Levels, Gammas (continued) $\gamma(^{141}\text{Gd})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π
2597.4	(17/2 ⁻)	724.3	100	1873.1	(13/2 ⁻)	4449.4	(31/2 ⁻)	670.5	100	3778.9	(27/2 ⁻)
2685.2	(17/2 ⁺)	535.3	100	2149.9	(13/2 ⁺)	4471.0	(29/2 ⁺)	657.1	100	3813.9	(25/2 ⁺)
2759.4	(25/2 ⁻)	242.7	100	2516.7	(23/2 ⁻)	4679.0	(35/2 ⁻)	379.1	100	4299.9	(33/2 ⁻)
2874.7	(19/2 ⁻)	598.5		2276.3	(15/2 ⁻)	4894.3	(35/2 ⁻)	836.1	100	4058.2	(31/2 ⁻)
		620.5		2254.2	(15/2 ⁻)	5214	(33/2 ⁺)	742.6	100	4471.0	(29/2 ⁺)
3148.2	(25/2 ⁻)	700.4	100	2447.6	(21/2 ⁻)	5265.3	(35/2 ⁻)	815.9	100	4449.4	(31/2 ⁻)
3233.2	(21/2 ⁺)	548.0	100	2685.2	(17/2 ⁺)	5775	(39/2 ⁻)	880.6	100	4894.3	(35/2 ⁻)
3278.3	(23/2 ⁻)	403.6	100	2874.7	(19/2 ⁻)	6036	(37/2 ⁺)	822.4	100	5214	(33/2 ⁺)
3307.8	(27/2 ⁻)	159.5		3148.2	(25/2 ⁻)	6124	(39/2 ⁻)	859.0	100	5265.3	(35/2 ⁻)
		746.6		2561.4	(23/2 ⁻)	6926	(41/2 ⁺)	889.6	100	6036	(37/2 ⁺)
3383.4	(27/2 ⁻)	624.0	100	2759.4	(25/2 ⁻)	7031	(43/2 ⁻)	906.4	100	6124	(39/2 ⁻)
3594.3	(29/2 ⁻)	286.5	100	3307.8	(27/2 ⁻)	7874	(45/2 ⁺)	948.3	100	6926	(41/2 ⁺)
3778.9	(27/2 ⁻)	500.6	100	3278.3	(23/2 ⁻)	8112	(47/2 ⁻)	1081.2	100	7031	(43/2 ⁻)
3808.3	(29/2 ⁻)	425.0	100	3383.4	(27/2 ⁻)	8855	(49/2 ⁺)	981.0	100	7874	(45/2 ⁺)
3813.9	(25/2 ⁺)	580.7	100	3233.2	(21/2 ⁺)	9379?	(51/2)	1268 [#]	100	8112	(47/2 ⁻)
3915.7	(31/2 ⁻)	321.4	100	3594.3	(29/2 ⁻)	9884	(53/2 ⁺)	1028.9	100	8855	(49/2 ⁺)
4058.2	(31/2 ⁻)	250.0		3808.3	(29/2 ⁻)	10959	(57/2 ⁺)	1075	100	9884	(53/2 ⁺)
		674.8		3383.4	(27/2 ⁻)	12109	(61/2 ⁺)	1150	100	10959	(57/2 ⁺)
4299.9	(33/2 ⁻)	384.2	100	3915.7	(31/2 ⁻)	13320?	(65/2 ⁺)	1212 [#]	100	12109	(61/2 ⁺)

[†] From ^{141}Gd IT decay (24.5 s) dataset.

[‡] [Additional information 2.](#)

[#] Placement of transition in the level scheme is uncertain.

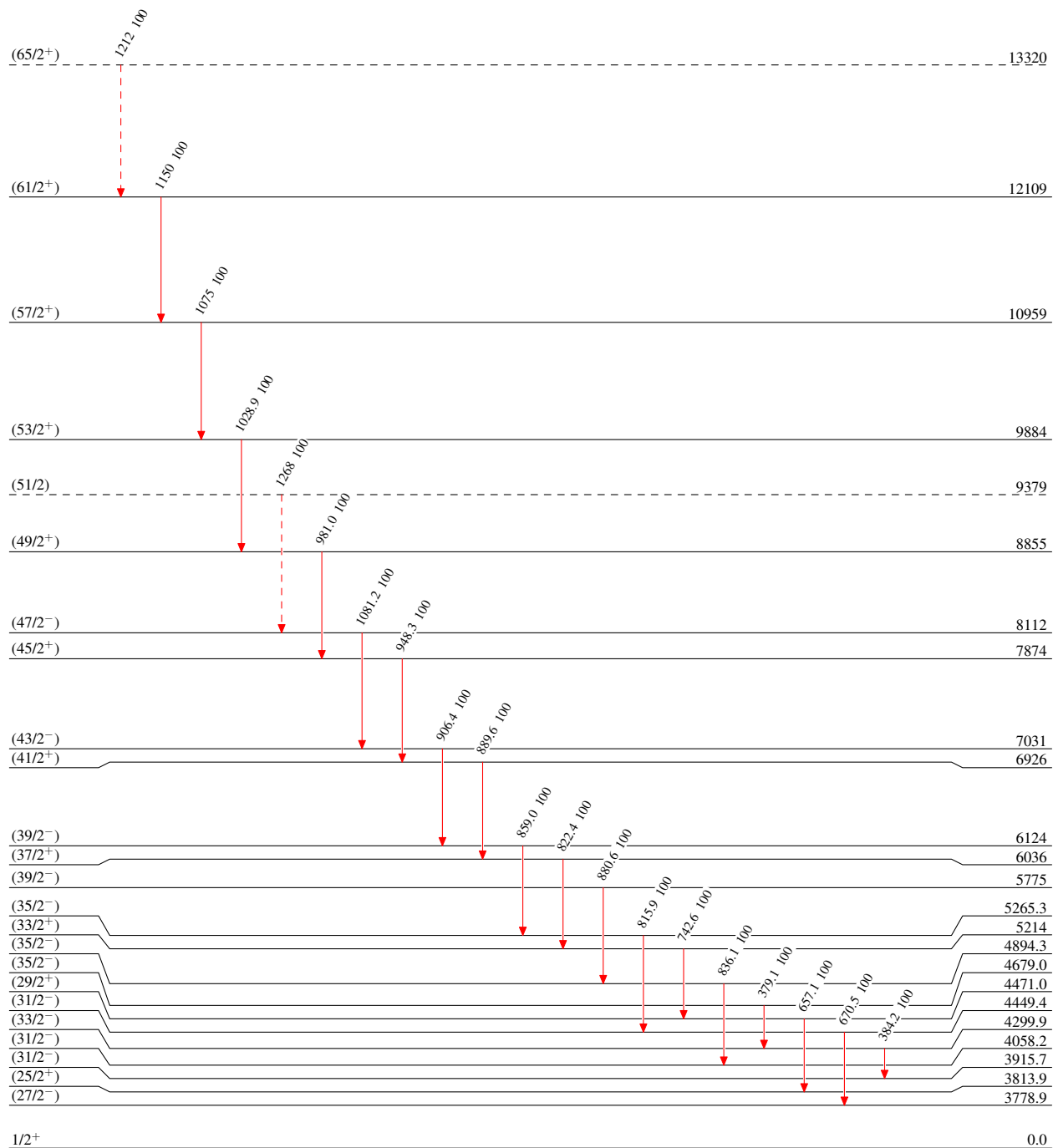
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Type not specified

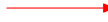
- ▶ $I_\gamma < 2\% \times I_\gamma^{\max}$
 —————▶ $I_\gamma < 10\% \times I_\gamma^{\max}$
 —————▶ $I_\gamma > 10\% \times I_\gamma^{\max}$
 - - - - -▶ γ Decay (Uncertain)

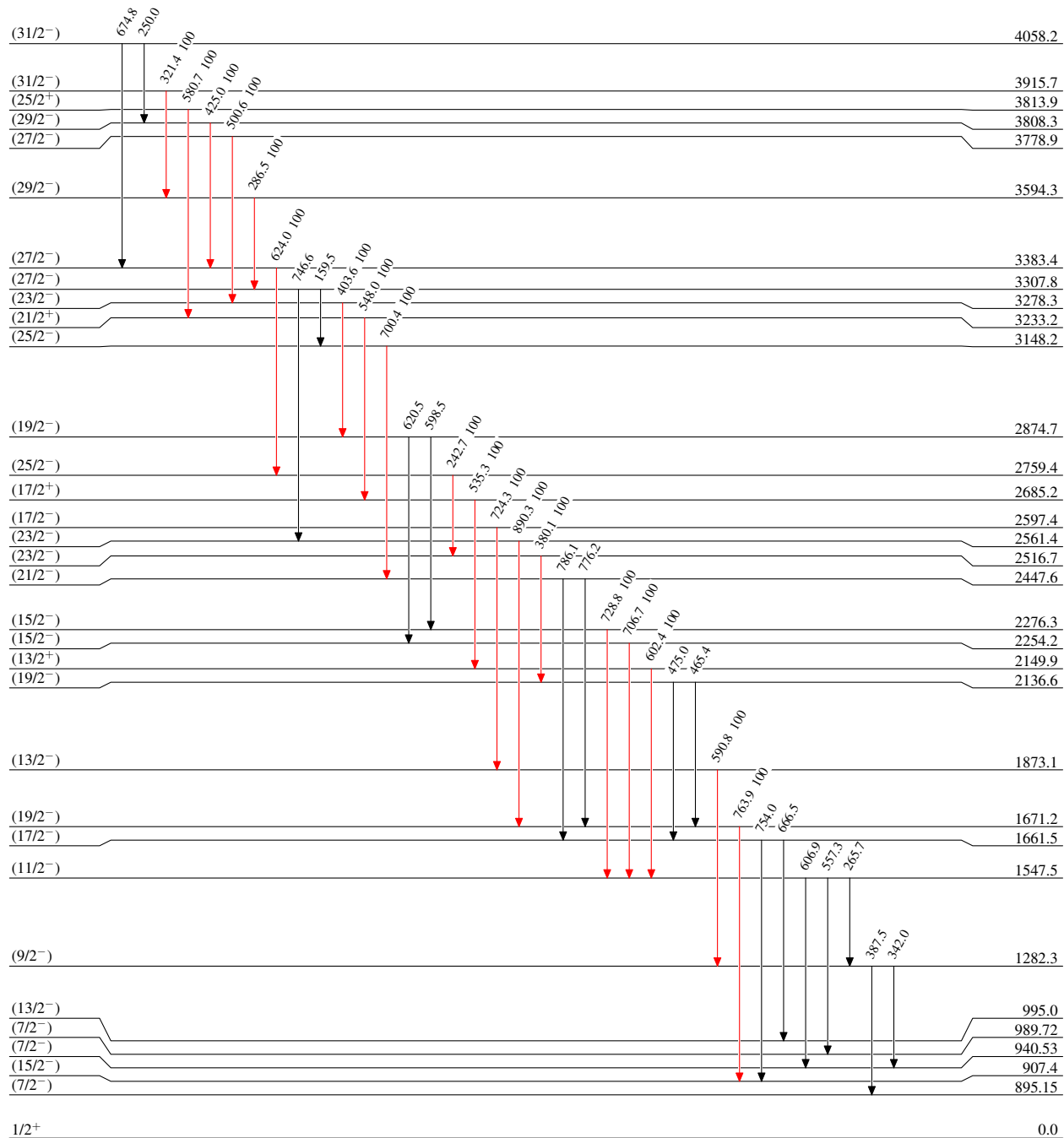


Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Type not specified

Legend

-  $I_\gamma < 2\% \times I_\gamma^{\max}$
 $I_\gamma < 10\% \times I_\gamma^{\max}$
 $I_\gamma > 10\% \times I_\gamma^{\max}$

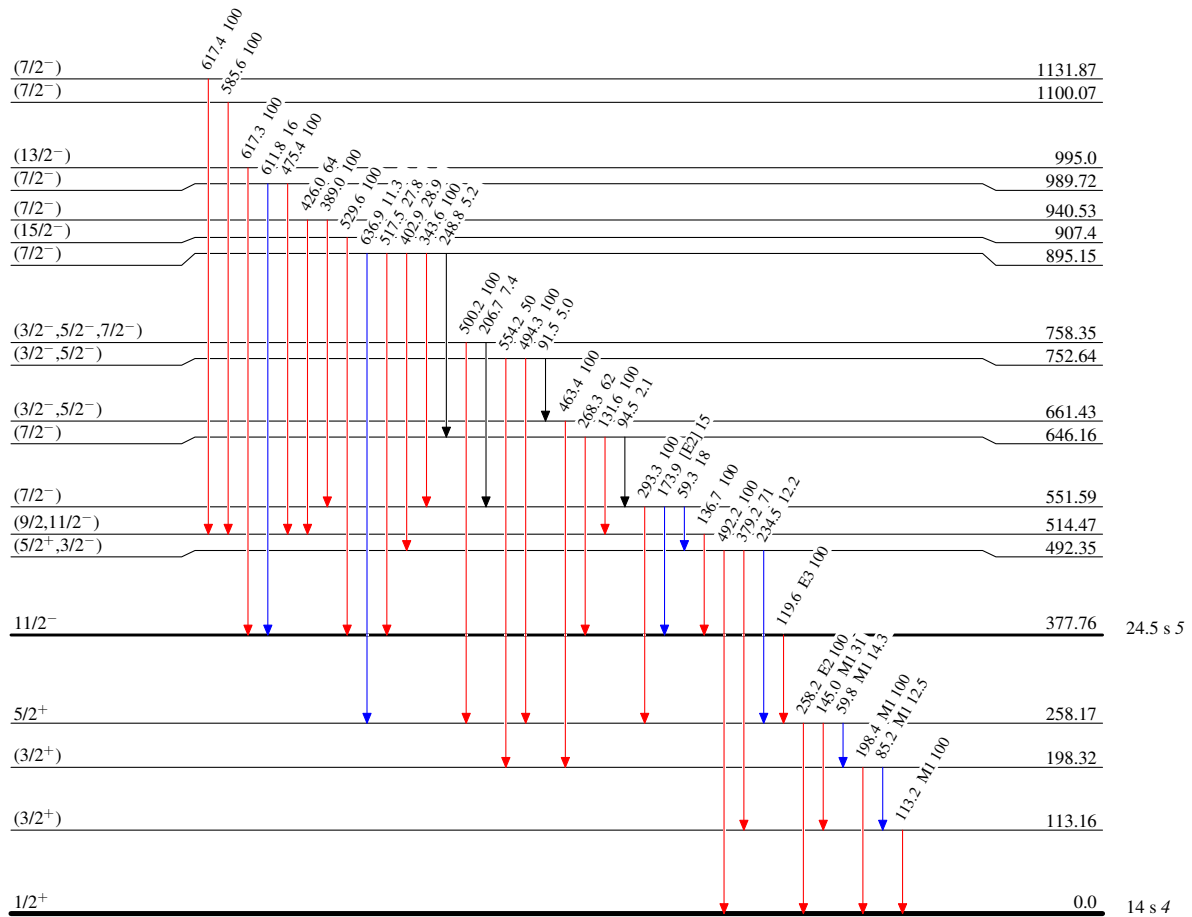


Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Type not specified

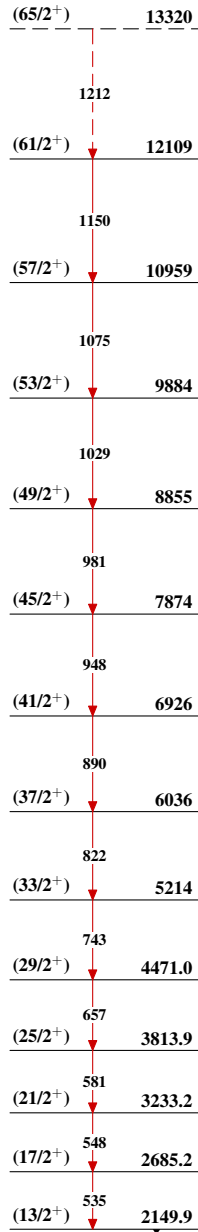
Legend

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$

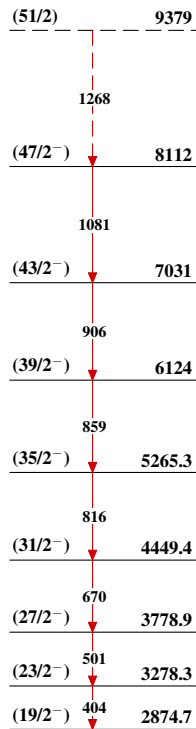


Adopted Levels, Gammas

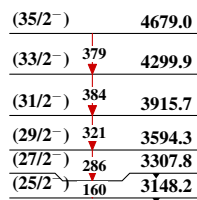
**Band(A): Neutron $i_{13/2}$
band, $\alpha=+1/2$**



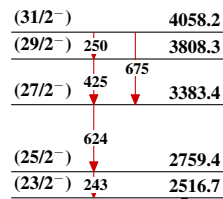
**Band(B): $\Delta J=2$, based on
 $19/2^-$**



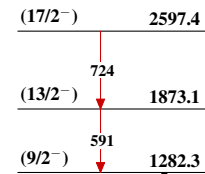
**Band(C): $\Delta J=1$, based on
 $25/2^-$**



**Band(D): $\Delta J=1$, based on
 $23/2^-$**



**Band(E): $\Delta J=2$, based on
 $9/2^-$**



**Band(F): $\Delta J=2$, based on
 $11/2^-$**

