^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 191,1 (2023)	22-Aug-2023

1970Mi01: 95.6% enriched ^{166}Er target. Measured Eγ, Iγ, $\gamma\gamma$-coin using Ge(Li) detector with Compton suppression for low-energy γ rays, Ge(Li) pair spectrometer for high-energy γ rays, and Ge(Li)-NaI(Tl) for $\gamma\gamma$-coin. A companion paper 1970Mi09 from the same authors used ^{167}Er(n,γ),E=thermal to study ^{168}Er levels and gamma rays, but as the target material contained 9% *2* of ^{166}Er, some γ rays from ^{167}Er were also seen in this work.

1965Ko13: 72.9% enriched ^{166}Er target. Measured Eγ, Iγ for 47 γ rays up to 799 keV using Riso Bent-crystal spectrometer. A total of 22 γ rays were placed in a level scheme of ^{167}Er.

The total γ-ray intensity of the primary γ rays is less than 20%, suggesting normalization problems or a very incomplete decay scheme. Additionally, there might be problems due to the neutron spectrum. Only 1970Mi01 used a bismuth filter to reduce the contributions from fast neutron.

Others:

1967Pr11: 99.97% enriched ^{166}Er target. Measured Eγ, Iγ of 25 primary γ rays using Ge(Li) detector at Argonne National Laboratory.

1965Gr32: this work is mainly for γ-ray study of ^{168}Er from ^{167}Er(n,γ),E=thermal.

1962Iv02 (same group as 1965Gr32): measured conversion electrons.

^{167}Er Levels

E(level)†	J$^\pi$‡	T$_{1/2}$	Comments
0.0	7/2$^+$ @		Proposed configuration: ν7/2[633] (90%) + ν7/2[633]+Q$_{20}$ (6%) + ν5/2[642] (3%) (1970Mi01).
79.3219 *13*	(9/2)$^+$ @		Proposed configuration: ν7/2[633] (86%) + ν7/2[633]+Q$_{20}$ (6%) + ν5/2[642] (6%) (1970Mi01).
177.952 *15*	(11/2)$^+$ @		
207.801 *5*	1/2$^-$ #	2.269 s *6*	%IT=100 T$_{1/2}$: from the Adopted Levels. Proposed configuration: ν1/2[521] (92%) + ν1/2[521]+Q$_{20}$ (2%) + ν3/2[521]+Q$_{22}$ (3%) + ν5/2[523]+Q$_{22}$ (2%) (1970Mi01).
264.874 *5*	3/2$^-$ #		J$^\pi$: spin from the Adopted Levels. Proposed configuration: ν1/2[521] (90%) + ν1/2[521]+Q$_{20}$ (2.5%) + ν3/2[521]+Q$_{22}$ (2%) + ν5/2[523]+Q$_{22}$ (2%) + ν5/2[512]+Q$_{22}$ (1%) + ν1/2[510] (1%) (1970Mi01).
281.574 *6*	5/2$^-$ @		Proposed configuration: ν1/2[521] (92%) + ν1/2[521]+Q$_{20}$ (3%) + ν3/2[521]+Q$_{22}$ (2.5%) + ν5/2[523]+Q$_{22}$ (2%) (1970Mi01).
346.558 *14*	5/2$^-$ @		Proposed configuration: ν5/2[512] (86%) + ν1/2[510]+Q$_{22}$ (11%) + ν1/2[521]+Q$_{22}$ (1%) (1970Mi01).
413.272 *7*	(7/2)$^-$ @		Proposed configuration: ν1/2[521] (88%) + ν1/2[521]+Q$_{20}$ (3%) + ν3/2[521]+Q$_{22}$ (2%) + ν5/2[523]+Q$_{22}$ (1.5%) + ν5/2[512]+Q$_{22}$ (2%) + ν1/2[510] (2%) (1970Mi01).
430.032 *15*	(7/2)$^-$ @		Proposed configuration: ν5/2[512] (86%) + ν1/2[510]+Q$_{22}$ (11%) + ν1/2[521]+Q$_{22}$ (1%) (1970Mi01).
441.980 *12*	(9/2)$^-$ @		Proposed configuration: ν1/2[521] (90%) + ν1/2[521]+Q$_{20}$ (3.5%) + ν3/2[521]+Q$_{22}$ (2.5%) + ν5/2[523]+Q$_{22}$ (2%) (1970Mi01).
531.50 *3*	3/2$^+$ #		J$^\pi$: spin from the Adopted Levels. Proposed configuration: ν7/2[633]+Q$_{22}$ (81%) + ν3/2[651] (15%) + ν3/2[651] +Q$_{20}$ (3%) (1970Mi01) for J^π=3/2$^+$ in the Adopted Levels.
573.74 *6*	(5/2)$^+$ @		Proposed configuration: ν7/2[633]+Q$_{22}$ (84%) + ν3/2[651] (10%) + ν3/2[651] +Q$_{20}$ (2%) + ν5/2[642] (1%) + ν5/2[642]+Q$_{22}$ (2%) (1970Mi01).
591.82 *15*			
667.909 *18*	(5/2)$^-$ @		Proposed configuration: ν5/2[523] (81%) + ν1/2[521]+Q$_{22}$ (16%) + ν5/2[523]+Q$_{20}$ (2%) (1970Mi01).
745.41 *12*	(7/2)$^-$ @		Proposed configuration: ν5/2[523] (80%) + ν1/2[521]+Q$_{22}$ (14%) + ν5/2[523]+Q$_{20}$

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^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13 (continued)

^{167}Er Levels (continued)

E(level)[†]	Jπ[‡]	Comments
		(2%) + ν5/2[512] (1%) + ν7/2[514] (1%) (1970Mi01).
752.78 *10*	$1/2^-,3/2^-$[#]	Proposed configuration: ν1/2[521]+Q_{22} (61%) + ν3/2[521] (37%) (1970Mi01) for $J^\pi=3/2^-$. In the Adopted Levels, $J^\pi=(3/2)^-$.
763.47 *8*	$1/2^-,3/2^-$[#]	Proposed configuration: ν5/2[512]+Q_{22} (56%) + ν1/2[510] (38%) + ν3/2[512] +Q_{22} (5%) (1970Mi01) for $J^\pi=1/2^-$. In the Adopted Levels, $J^\pi=(1/2)^-$.
801.65 *9*	$(3/2)^-$[#]	Jπ: spin from the Adopted Levels. Proposed configuration: ν5/2[512]+Q_{22} (54%) + ν1/2[510] (37%) + ν3/2[512] +Q_{22} (5%) + ν1/2[521] (2%) + ν1/2[521]+Q_{22} (1%) (1970Mi01) for $J^\pi=3/2^-$. In the Adopted Levels, $J^\pi=(3/2)^-$.
810.49 *11*		Proposed configuration: ν1/2[521]+Q_{22} (60%) + ν3/2[521] (36%) + ν5/2[512]+Q_{22} (1%) (1970Mi01) for $J^\pi=5/2^-$.
1058.96 *13*		Proposed configuration: ν1/2[521]+Q_{22} (80%) + ν5/2[523] (15%) + ν3/2[512] (2%) (1970Mi01) for $J^\pi=5/2^-$.
1086.28[&] *17*	1/2,3/2	Proposed configuration: ν3/2[521] (60%) + ν1/2[521]+Q_{22} (37%) + ν3/2[521] +Q_{20} (2%) (1970Mi01) for $J^\pi=3/2^-$. In the Adopted Levels, $J^\pi=3/2^+$.
1135.28[&] *23*		Proposed configuration: ν3/2[521] (58%) + ν1/2[521]+Q_{22} (36%) + ν3/2[521]+Q_{20} (2%) + ν5/2[523]+Q_{22} (2%) (1970Mi01) for $J^\pi=5/2^-$. In the Adopted Levels, $J^\pi=1/2^+$.
1178.98 *22*	1/2,3/2	Proposed configuration: ν1/2[521]+Q_{20} (93%) + ν1/2[521] (2%) + ν5/2[523]+Q_{22} (1%) + ν3/2[521]+Q_{22} (4%) (1970Mi01) for $J^\pi=1/2^-$.
1206.0 *3*		Proposed configuration: ν3/2[521] (55%) + ν1/2[521]+Q_{22} (36%) + ν3/2[521] +Q_{20} (3%) + ν5/2[523]+Q_{22} (2.5%) + ν5/2[512]+Q_{22} (1%) (1970Mi01) for $J^\pi=7/2^-$. In the Adopted Levels, $J^\pi\leq 7/2$.
1227.17 *17*	1/2,3/2	Proposed configuration: ν1/2[521]+Q_{20} (90%) + ν1/2[521] (2%) + ν5/2[512]+Q_{22} (1%) + ν3/2[521]+Q_{22} (7%) (1970Mi01) for $J^\pi=3/2^-$.
1254.4 *3*		Proposed configuration: ν1/2[521]+Q_{20} (90%) + ν1/2[521] (2%) + ν5/2[523]+Q_{22} (3%) + ν3/2[521]+Q_{22} (4%) (1970Mi01) for $J^\pi=5/2^-$.
1384.41 *12*	1/2,3/2	Proposed configuration: ν3/2[512] (41%) + ν7/2[514]+Q_{22} (38%) + ν1/2[510] +Q_{22} (16%) + ν5/2[523]+Q_{22} (3%) (1970Mi01) for $J^\pi=3/2^-$. In the Adopted Levels, $J^\pi=(3/2)^-$.
1545.4 *5*	1/2,3/2	
1565.2 *15*	1/2,3/2	
1641.2 *5*	1/2,3/2	
1649.3 *5*	1/2,3/2	
1661.9 *3*	1/2,3/2	
1719.6 *9*	1/2,3/2	
1754.8 *3*	1/2,3/2	
1792.3 *10*	1/2,3/2	
1810.4 *12*	1/2,3/2	
1869.0 *10*	1/2,3/2	
1923 *3*	1/2,3/2	
1949.6 *11*	1/2,3/2	
2064.3 *15*	1/2,3/2	
2095 *5*	1/2,3/2	
2105 *5*	1/2,3/2	
(6436.32 *20*)	$1/2^+$	S(n)(^{167}Er)=6436.43 *18* (2021Wa16). Jπ: s-wave capture in ^{166}Er g.s.

[†] From a least-squares fit to Eγ data.
[‡] Based on observed feeding by primary transition, except where noted.
[#] π from Iγ/Eγ^3 values in average-resonance capture (1970Bo29).
[@] From the Adopted Levels.
[&] See 1970Mi01 for a discussion of structure of this level.

^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13 (continued)

γ(^{167}Er)

Iγ normalization: Deduced from σ_n=15.0 *20* for thermal capture to 207.8 level (1965Ko13,2018MuZZ), I(γ+ce)(207.8γ), and α (revised to reflect change from α(E3)=1.48 used by 1965Ko13 to α(E3)=1.38); uncertainty reflects 30% to 50% uncertainty estimated by 1970Mi01 for Iγ(absolute) values.

See 1970Mi01 for high-energy γ rays with Eγ between 2481 and 4326. 1970Mi01 did not attempt to separate the ^{167}Er intensity in this region from that for the other Er isotopes.

With new cross-section data adopted by 2018MuZY, the relative cross-section contributions for ^{166}Er:^{167}Er in the ^{166}Er samples used by 1970Mi01 become 49:51 rather than 69:31 as reported by 1970Mi01. This increased extent of contamination by ^{168}Er γ rays affects the analysis of contaminant peaks listed here.

E_γ[†]	I_γ[†f]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α[g]	Comments
57.0723[‡] *12*	1.2[‡] *4*	264.874	3/2⁻	207.801	1/2⁻			
73.775[‡] *4*	0.26[‡] *10*	281.574	5/2⁻	207.801	1/2⁻			
79.3219[‡] *13*	0.36[‡] *7*	79.3219	(9/2)⁺	0.0	7/2⁺			
83.4733[‡] *25*	0.11[‡] *2*	430.032	(7/2)⁻	346.558	5/2⁻			
98.633[‡] *15*	0.025[‡] *10*	177.952	(11/2)⁺	79.3219	(9/2)⁺			
[x]98.835[‡b] *15*	0.025[‡]							
[x]103.133[‡b] *20*	0.020[‡]							
[x]116.74[‡#] *5*	0.020[‡]							
131.700[‡] *4*	0.29[‡] *4*	413.272	(7/2)⁻	281.574	5/2⁻			Eγ=131.70 *25*, Iγ=0.3 *1* (1970Mi01), intensity affected by the pulse-shape discrimination.
136.46[‡#h] *4*	0.015[‡]	667.909	(5/2)⁻	531.50	3/2⁺			
148.394[‡] *6*	0.36[‡] *4*	413.272	(7/2)⁻	264.874	3/2⁻			Eγ=148.43 *20*, Iγ=0.3 *1* (1970Mi01), intensity affected by the pulse-shape discrimination.
[x]159.02[‡] *3*	0.05[‡]							
[x]159.15[‡] *3*	0.05[‡]							
[x]159.26[‡] *3*	0.05[‡]							
160.406[‡] *10*	0.114[‡] *17*	441.980	(9/2)⁻	281.574	5/2⁻			Eγ=160.4 *5*, Iγ<0.2 (1970Mi01), intensity affected by the pulse-shape discrimination.
[x]162.9[b] *6*	<0.1[@]							
[x]167.4[b] *5*	<0.1[@]							
[x]174.0[b] *5*	<0.1[@]							
177.90[‡] *6*	0.015[‡] *6*	177.952	(11/2)⁺	0.0	7/2⁺			Eγ=177.65 *45*, Iγ<0.1 (1970Mi01), intensity affected by the pulse-shape discrimination.
[x]193.5[b] *5*	<0.1[@]							
207.801[‡] *5*	13.9[‡] *14*	207.801	1/2⁻	0.0	7/2⁺	E3	1.380	Eγ=208.84 *8*, Iγ=10.0 *20* (1970Mi01). Mult.: from the Adopted Gammas.
[x]209.04[‡#b] *10*	0.022[‡]							
[x]213.28[‡#b] *10*	0.022[‡]							
[x]226.9[b] *6*	<0.03							
237.873[&] *15*	0.144[&] *20*	667.909	(5/2)⁻	430.032	(7/2)⁻			Eγ=237.874 *15*, Iγ=0.165 *25* (1965Ko13). Eγ=237.78 *12*, Iγ=0.13 *2* (1970Mi01).

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^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13 (continued)

γ(^{167}Er) (continued)

Eγ[†]	Iγ[†f]	E_i(level)	J^π_i	E_f	J^π_f	Comments
[x]249.8[b] *6*	<0.03					
[x]275.21[‡b] *16*	0.096[‡] *24*					Eγ=274.4 *8*, Iγ=0.10 *3* (1970Mi01); small contribution from ^{168}Er.
[x]277.60[‡b] *16*	0.096[‡] *24*					Eγ=277.8 *9*, Iγ=0.09 *2* (1970Mi01).
[x]278.05[‡b] *16*	0.047[‡]					
315.57 *20*	≈0.043	745.41	(7/2)$^-$	430.032	(7/2)$^-$	Iγ: 1970Mi01 attribute ≈50% of intensity to ^{168}Er; total Iγ=0.085 *17*.
[x]317.25[‡] *20*	0.052[‡] *21*					Eγ=317.4 *8*, Iγ<0.04 (1970Mi01).
321.336[&] *25*	0.84[&] *11*	667.909	(5/2)$^-$	346.558	5/2$^-$	Eγ=321.335 *25*, Iγ=0.93 *9* (1965Ko13). Eγ=321.35 *10*, Iγ=0.71 *11* (1970Mi01).
[x]337.88[bc] *45*	0.05 *2*					
[x]341.70[‡] *5*	0.41[‡] *6*					
346.547[&] *15*	5.6[&] *6*	346.558	5/2$^-$	0.0	7/2$^+$	Eγ=346.549 *15*, Iγ=6.1 *6* (1965Ko13). Eγ=346.50 *7*, Iγ=4.90 *75* (1970Mi01).
[x]350.84 *25*	0.14 *3*					Eγ,Iγ: impurities contribute to this line.
351.31[‡] *25*	0.10[‡] *3*	430.032	(7/2)$^-$	79.3219	(9/2)$^+$	Eγ: placement suggested by 1979Bo44 in ^{167}Er(n,n′γ).
[x]357.4[c] *8*	<0.03					
[x]365.8[bc] *5*	<0.03					
[x]371.35[d] *18*	0.135[d] *28*					
371.35[d] *18*	0.14[d] *3*	801.65	(3/2)$^-$	430.032	(7/2)$^-$	Eγ: placement suggested by 1979Bo44 in ^{167}Er(n,n′γ).
386.48[&] *15*	0.094[&] *18*	667.909	(5/2)$^-$	281.574	5/2$^-$	Eγ=386.53 *15*, Iγ=0.13 *4* (1965Ko13). Eγ=386.33 *25*, Iγ=0.087 *18* (1970Mi01).
[x]394.6[‡#] *3*	0.7[‡]					
398.93[&] *16*	0.21[&] *2*	745.41	(7/2)$^-$	346.558	5/2$^-$	Eγ=398.95 *16*, Iγ=0.20 *6* (1965Ko13). Eγ=398.90 *16*, Iγ=0.21 *2* (1970Mi01).
403.18[&] *15*	0.140[&] *20*	667.909	(5/2)$^-$	264.874	3/2$^-$	Eγ=403.11 *25*, Iγ=0.14 *4* (1965Ko13). Eγ=403.20 *15*, Iγ=0.140 *20* (1970Mi01), ≈20% of total Iγ=0.186 *25* from ^{150}Sm.
[x]406.68 *28*	≈0.06					Iγ: 1970Mi01 attribute ≈25% of intensity to ^{150}Sm; total Iγ=0.08 *2*.
416.99 *18*	≈0.36	763.47	1/2$^-$,3/2$^-$	346.558	5/2$^-$	Eγ,Iγ: doublet; 1970Mi01 attribute ≈15% of intensity to ^{168}Er; total Iγ=0.42 *6*.
426.28 *22*	0.143 *20*	1178.98	1/2,3/2	752.78	1/2$^-$,3/2$^-$	
430.00 *28*	≈0.027	430.032	(7/2)$^-$	0.0	7/2$^+$	Eγ,Iγ: Doublet; 1970Mi01 attribute ≈80% of intensity to ^{168}Er; total Iγ=0.137 *20*.
444.0 *3*	0.152 *22*	1254.4		810.49		
[x]453.4[c] *10*	0.06 *2*					
455.32 *25*	≈0.15	801.65	(3/2)$^-$	346.558	5/2$^-$	Eγ,Iγ: doublet; 1970Mi01 attribute ≈25% of intensity to ^{168}Er; total Iγ=0.21 *5*.
460.5 *8*	0.05 *3*	667.909	(5/2)$^-$	207.801	1/2$^-$	
462.62 *40*	≈0.08	745.41	(7/2)$^-$	281.574	5/2$^-$	Iγ: 1970Mi01 attribute ≈40% of intensity to ^{168}Er; total Iγ=0.14 *3*.
471.36[‡] *30*	0.34[‡] *14*	752.78	1/2$^-$,3/2$^-$	281.574	5/2$^-$	Eγ=471.10 *40*, Iγ=0.15 *8* (1970Mi01), line affected by impurity line.
[x]474.04[‡] *40*	0.88[‡] *26*					Eγ=474.45 *40*, Iγ=0.2 *1* (1970Mi01); major portion of intensity assigned to ^{168}Er.
[x]480.1 *8*	<0.1					Eγ,Iγ: includes major component from ^{168}Er. Eγ

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^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13 (continued)

γ(^{167}Er) (continued)

Eγ[†]	Iγ[†f]	Ei(level)	J_i^π	Ef	J_f^π	Comments
						and Iγ measurements affected by background from ^{10}B(n,α).
487.91[&] *12*	0.90[&] *8*	752.78	1/2⁻,3/2⁻	264.874	3/2⁻	Eγ=487.86 *18*, Iγ=1.30 *26* (1965Ko13). Eγ=487.93 *12*, Iγ=0.88 *5* (1970Mi01).
494.39[&] *8*	1.14[&] *9*	573.74	(5/2)⁺	79.3219	(9/2)⁺	Eγ=494.44 *15*, Iγ=1.80 *45* (1965Ko13). Eγ=494.37 *9*, Iγ=1.13 *6* (1970Mi01).
[x]495.7[‡#] *3*	0.6[‡]					
498.57 *9*	1.40 *8*	763.47	1/2⁻,3/2⁻	264.874	3/2⁻	Iγ: 1970Mi01 attribute <10% of total intensity=1.48 *8* to ^{168}Er. Eγ=498.6 *3*, Iγ=3.0 *6* (1965Ko13, intensity seems too high).
[x]511.0[‡#b] *5*	1.1[‡]					Eγ: 1970Mi01 report that 511.17 *30* γ is complex, no Iγ given.
520.6 *5*	≈0.23	801.65	(3/2)⁻	281.574	5/2⁻	Eγ,Iγ: doublet; 1970Mi01 attribute ≈30% of intensity to ^{168}Er; total Iγ=0.33 *8*.
528.7[‡h] *4*	1.1[‡]	810.49		281.574	5/2⁻	
531.54[‡] *4*	6.8[‡] *10*	531.50	3/2⁺	0.0	7/2⁺	Eγ=531.54 *8*, Iγ=6.8 (1970Mi01), used for intensity normalization.
544.98[&] *25*	1.14 *29*	752.78	1/2⁻,3/2⁻	207.801	1/2⁻	Eγ=544.87 *25*, Iγ=2.9 (1965Ko13). Eγ=545.34 *45*, Iγ=1.14 *29* (1970Mi01).
554.8 *5*	0.44 *7*	1086.28	1/2,3/2	531.50	3/2⁺	
573.78[&] *9*	2.83[&] *23*	573.74	(5/2)⁺	0.0	7/2⁺	Eγ=573.77 *9*, Iγ=3.0 *6* (1965Ko13). Eγ=573.78 *9*, Iγ=2.80 *23* (1970Mi01).
[x]578.7[c] *5*	<0.2					
[x]583.79[d] *30*	0.38[d] *15*					
591.82[&] *15*	0.89[&] *11*	591.82		0.0	7/2⁺	Eγ=591.85 *50*, Iγ=1.6 *6* (1965Ko13). Eγ=591.82 *15*, Iγ=0.87 *9* (1970Mi01).
593.87[&] *12*	1.60[&] *24*	801.65	(3/2)⁻	207.801	1/2⁻	Eγ=593.82 *25*, Iγ=2.7 *7* (1965Ko13). Eγ=593.88 *12*, Iγ=1.55 *15* (1970Mi01).
603.76[&] *25*	0.73[&] *7*	1135.28		531.50	3/2⁺	Eγ=603.4 *5*, Iγ=1.4 (1965Ko13). Eγ=603.85 *25*, Iγ=0.73 *7* (1970Mi01).
[x]613.53[b] *28*	0.275 *40*					
[x]617.14[b] *28*	0.315 *35*					
[x]639.32 *18*	≈0.11					Iγ: 1970Mi01 attribute ≈75% of intensity to ^{168}Er; total Iγ=0.45 *5*.
645.74 *15*	≈0.58	1058.96		413.272	(7/2)⁻	Eγ,Iγ: doublet; 1970Mi01 attribute ≈40% of intensity to ^{168}Er; total Iγ=0.97 *9*. Theory predicts very low intensity for 645.7γ relative to Iγ values for other transitions from 1059.0 level to the 1/2[521] rotational band; a component of 645.7γ, therefore, probably belongs elsewhere.
[x]650.0[c] *5*	0.10 *4*					
[x]656.9[c] *6*	0.06 *3*					
[x]661.18[b] *32*	0.17 *4*					
668.3[de] *7*	0.06[de] *3*	667.909	(5/2)⁻	0.0	7/2⁺	
[x]691.80 *22*	0.33 *5*					Eγ: probable doublet; includes component from ^{168}Er.
[x]694.9 *5*	0.07 *2*					
[x]756.3[c] *10*	0.08 *3*					
[x]761.9[c] *10*	0.07 *3*					
[x]767.9[c] *10*	0.05 *3*					
777.0 *7*	0.11 *4*	1058.96		281.574	5/2⁻	

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^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13 (continued)

γ(^{167}Er) (continued)

Eγ[†]	Iγ[†f]	Ei(level)	J^π_i	Ef	J^π_f	Comments
794.00 25	0.28 4	1058.96		264.874	3/2−	
x798.79 16						Eγ: from 1965Ko13. 1970Mi01 attribute 798.98 22 γ with Iγ=0.88 9 to ^{168}Er only. Large intensity of 9.2 18 in 1965Ko13 is assumed by evaluators to belong to ^{168}Er.
810.53 12	2.42 24	810.49		0.0	7/2+	Eγ: placed by evaluators, based on (n,n′γ) results. Unplaced by 1970Mi01, but authors suggested that, although 810.5γ fits well between the 1384.4 and 573.8 levels, it is unreasonable to place it there because of its high intensity.
840.8 5	0.27 8	1254.4		413.272	(7/2)−	Iγ: includes small component from ^{168}Er.
x845.2[bc] 9	0.10 5					
870.5 5	0.17 4	1135.28		264.874	3/2−	
878.52 18	0.46 6	1086.28	1/2,3/2	207.801	1/2−	
x898.52 15	≈0.34					Iγ: 1970Mi01 attribute ≈50% of intensity to ^{168}Er; total Iγ=0.68 8.
909.37 42	0.16 3	1661.9	1/2,3/2	752.78	1/2−,3/2−	
924.56 35	0.25 5	1206.0		281.574	5/2−	
940.8 5	0.13 3	1206.0		264.874	3/2−	
962.7 6	≈0.33	1227.17	1/2,3/2	264.874	3/2−	Iγ: 1970Mi01 attribute ≈60% of intensity to ^{168}Er; total Iγ=0.82 10.
971.0 7	0.46 12	1178.98	1/2,3/2	207.801	1/2−	
989.1[ch] 18	0.13 6	1254.4		264.874	3/2−	
x995.2[d] 6	0.16[d] 6					
x1011.4 7	0.56 12					
1019.37 18	0.77 15	1227.17	1/2,3/2	207.801	1/2−	
x1030.1[b] 7	0.15 5					
1037.83 12	1.16 20	1384.41	1/2,3/2	346.558	5/2−	
x1049.1[c] 9	0.13 6					
x1058.51[b] 30	0.33 7					
x1088.9[c] 10	0.08 4					
x1095.1 10	0.17 8					Eγ: 1970Mi01 indicate that 1095.1γ might belong to ^{168}Er.
x1098.3 10	0.13 6					Eγ: 1970Mi01 indicate 1098.3γ might belong to ^{168}Er.
x1111.3 8	0.12 4					
x1146.68 25						Eγ: total Iγ=0.62 12, possible doublet, also contributed by ^{168}Er.
x1173.41 25						Eγ: total Iγ=0.46 9, impurities contribute.
x1201.7 5						Eγ: total Iγ=0.49 9, predominantly double-escape peak from ^{1}H(n,γ).
x1219.6[bc] 15	0.07 3					
1223.35 30	0.47 10	1754.8	1/2,3/2	531.50	3/2+	
x1273.0 5						Eγ: total Iγ=0.65 13, possible doublet, also contributed by ^{168}Er.
1280.5 5	0.42 13	1545.4	1/2,3/2	264.874	3/2−	
1294.5 5	0.42 11	1641.2	1/2,3/2	346.558	5/2−	
x1298.0[b] 6	0.44 11					
x1305.2 12	0.12 5					
x1341.5[b] 5	0.48 10					
x1353.5 6						Eγ: total Iγ=0.82 22, also contributed by ^{168}Er.
x1373.3 6						Eγ: total Iγ=0.28 7, possible doublet, also contributed by ^{168}Er.

Continued on next page (footnotes at end of table)

^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13 (continued)

γ(^{167}Er) (continued)

Eγ[†]	Iγ[†f]	Ei(level)	J_i^π	Ef	J_f^π	Comments
[x]1381.5 *5*	0.80 *16*					
1384.4 *9*	0.22 *8*	1649.3	1/2,3/2	264.874	3/2⁻	
[x]1432.9[d] *8*	0.18[d] *7*					
[x]1437.7[b] *7*	0.34 *7*					
1441.5 *6*	≈0.38	1649.3	1/2,3/2	207.801	1/2⁻	Iγ: 1970Mi01 attribute ≈25% of intensity to ^{168}Er; total Iγ=0.51 *10*.
1453.9 *5*	0.82 *16*	1661.9	1/2,3/2	207.801	1/2⁻	
[x]1485.2[d] *8*	0.26[d] *5*					
[x]1491.7[b] *15*	0.11 *5*					
[x]1503.0[b] *12*	0.23 *8*					
[x]1523.8[d] *7*	0.37[d] *9*					
[x]1534.4[bc] *25*	0.10 *5*					
[x]1538.0[c] *20*	0.10 *5*					
[x]1554.1[c] *25*	0.11 *5*					
[x]1556.9[d] *15*	0.25[d] *9*					
[x]1708.5 *8*	0.32 *9*					
4331 *5*	0.23 *7*	(6436.32)	1/2⁺	2105	1/2,3/2	
4341 *5*	<0.18	(6436.32)	1/2⁺	2095	1/2,3/2	
4372.0 *15*	0.23 *5*	(6436.32)	1/2⁺	2064.3	1/2,3/2	
4486.7 *11*	<0.39	(6436.32)	1/2⁺	1949.6	1/2,3/2	Iγ: includes component from ^{168}Er; total Iγ=0.39 *9*.
4513[a] *3*	0.074[a] *7*	(6436.32)	1/2⁺	1923	1/2,3/2	
4567.3 *10*	0.18 *5*	(6436.32)	1/2⁺	1869.0	1/2,3/2	
4625.9 *12*	≈0.12	(6436.32)	1/2⁺	1810.4	1/2,3/2	Iγ: 1970Mi01 attribute ≈25% of intensity to ^{168}Er; total Iγ=0.16 *5*.
4644.0 *10*	≈0.06	(6436.32)	1/2⁺	1792.3	1/2,3/2	Iγ: 1970Mi01 attribute ≈60% of intensity to ^{168}Er; total Iγ=0.16 *5*.
4682.0 *9*	0.41 *9*	(6436.32)	1/2⁺	1754.8	1/2,3/2	
4716.6 *9*	0.64 *12*	(6436.32)	1/2⁺	1719.6	1/2,3/2	
4775.3 *9*	0.58 *12*	(6436.32)	1/2⁺	1661.9	1/2,3/2	
4787.0 *15*	0.39 *7*	(6436.32)	1/2⁺	1649.3	1/2,3/2	
4792.8 *20*	0.14 *5*	(6436.32)	1/2⁺	1641.2	1/2,3/2	
4871.0 *15*	0.161 *23*	(6436.32)	1/2⁺	1565.2	1/2,3/2	
4891[a] *3*	0.095[a] *10*	(6436.32)	1/2⁺	1545.4	1/2,3/2	
5051.3 *7*	0.37 *9*	(6436.32)	1/2⁺	1384.41	1/2,3/2	
5210.2 *9*	≈1.13	(6436.32)	1/2⁺	1227.17	1/2,3/2	Iγ: 1970Mi01 attribute ≈15% of intensity to ^{168}Er; total Iγ=1.33 *23*.
5257.7 *6*	0.44 *9*	(6436.32)	1/2⁺	1178.98	1/2,3/2	
5351.0 *9*	≈0.39	(6436.32)	1/2⁺	1086.28	1/2,3/2	Iγ: 1970Mi01 attribute ≈15% of intensity to ^{168}Er; total Iγ=0.46 *7*.
5634.2 *7*	<0.23	(6436.32)	1/2⁺	801.65	(3/2)⁻	
5670[a] *3*	0.058[a] *6*	(6436.32)	1/2⁺	763.47	1/2⁻,3/2⁻	
5682.8[d] *7*	≈0.23[d]	(6436.32)	1/2⁺	752.78	1/2⁻,3/2⁻	Eγ,Iγ: doublet.
5904[a] *3*	0.087[a] *9*	(6436.32)	1/2⁺	531.50	3/2⁺	
6171.2 *5*	2.30 *23*	(6436.32)	1/2⁺	264.874	3/2⁻	Iγ: from 1967Pr11.
6228.23 *35*	9.1 *9*	(6436.32)	1/2⁺	207.801	1/2⁻	

[†] From 1970Mi01, except as noted. Intensities in 1967Pr11 and those of secondary γ rays of 1970Mi01 were normalized to those of 1965Ko13 (intensity scale used in calibration) through Iγ=6.8 for 531.5γ. Iγ of primary γ rays in 1970Mi01 were normalized to those in 1967Pr11 through Iγ=2.30 for 6171.2γ.

[‡] From 1965Ko13, energies are from bent crystal spectrometer.

Continued on next page (footnotes at end of table)

^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13 (continued)

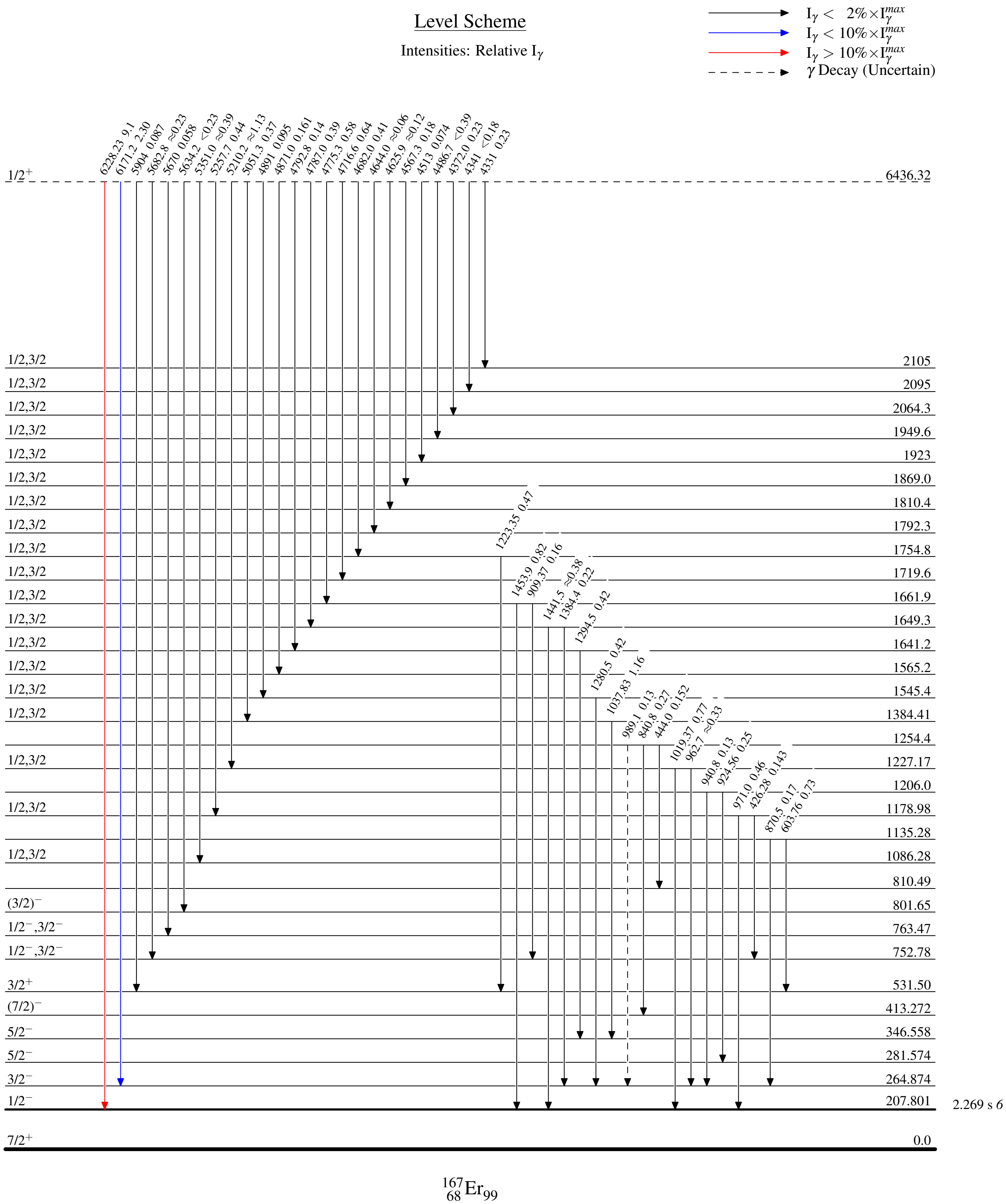
γ(^{167}Er) (continued)

[#] The γ-ray is questionable (1965Ko13).
[@] Below 200 keV, the intensities from 1970Mi01 are affected by the pulse-shape discrimination used.
[&] Weighted average of values from 1965Ko13 and 1970Mi01.
[a] From 1967Pr11.
[b] Transition may belong to ^{168}Er, either totally or partially (evaluators). Assignment is based on evaluated data for ^{167}Er(n,γ) E=thermal (1988Sh11).
[c] Assignment to ^{167}Er is uncertain or line itself is uncertain (1970Mi01).
[d] Includes component from ^{168}Er.
[e] Probable doublet.
[f] For intensity per 100 neutron captures, multiply by 1.05 *30*.
[g] 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.
[h] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13

Level Scheme

Intensities: Relative I_γ



^{166}Er(n,γ) E=thermal 1970Mi01,1965Ko13

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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