

Adopted Levels, Gammas

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja and B. Singh	ENSDF	31-Oct-2015

$Q(\beta^-)=381.6$ 11; $S(n)=8572.9$ 12; $S(p)=6954.3$ 11; $Q(\alpha)=-6714.9$ 16 2012Wa38
 $S(2n)=19949.4$ 12, $S(2p)=17513.7$ 11 (2012Wa38).

Additional information 1.

Structure calculations (levels, transition probabilities, etc.): 2004Ho08, 1999Ca29, 1978Ta07.

CCBA=coupled channels Born approximation.

 ^{58}Co LevelsCross Reference (XREF) Flags

A	^{58}Co IT decay (9.10 h)	H	$^{57}\text{Fe}(p,\gamma)$	O	$^{59}\text{Co}(n,2n\gamma)$
B	$^{51}\text{V}(^{10}\text{B},p2n\gamma)$	I	$^{57}\text{Fe}(d,n),(d,n\gamma)$	P	$^{59}\text{Co}(p,d)$
C	$^{55}\text{Mn}(\alpha,n\gamma)$	J	$^{57}\text{Fe}(^3\text{He},d)$	Q	$^{59}\text{Co}(d,t)$
D	$^{56}\text{Fe}(t,n\gamma)$	K	$^{58}\text{Fe}(p,n),(p,n\gamma)$	R	$^{59}\text{Co}(^3\text{He},\alpha)$
E	$^{56}\text{Fe}(^3\text{He},p)$	L	$^{58}\text{Fe}(^3\text{He},t)$	S	$^{60}\text{Ni}(d,\alpha),(p,d,\alpha)$
F	$^{56}\text{Fe}(^3\text{He},p\gamma)$	M	$^{58}\text{Ni}(d,^2\text{He})$		
G	$^{56}\text{Fe}(\alpha,d)$	N	$^{58}\text{Ni}(t,^3\text{He})$		

E(level) [†]	J ^π @	T _{1/2} [#]	XREF	Comments
0.0 ^h	2 ⁺	70.86 d 6	ABCDEFGHIJKL NOPQRS	$\%E+\%B^+=100$ $\mu=+4.044$ 8 (1972Ni01,2014StZZ) $Q=+0.23$ 3 (1972Ni01,2013StZZ,2014StZZ) J^π : 1,2 from paramagnetic resonance (1957Do38); L(d,n)=3 from $1/2^-$ does not allow J=1. Also L(d, α)=L($^3\text{He},p$)=L(t, ^3He)=2; L($^3\text{He},d$)=1, L(d,t)=1+3. μ,Q : NMR on oriented nuclei (1972Ni01). Others: $\mu=+4.040$ 14 (1957Do38,EPR method), 3.5 3 (1952Da19, nuclear orientation). T _{1/2} : weighted average of 70.77 d 12 (measured value of 70.75 d 7 in 1982HoZJ reanalyzed by 2002Un02, 2012Fi12 and 2014Un01); 70.916 d 15 (1980Ho17), 70.81 d 3 (1976Va30), 70.78 d 4 (1975La16), 71.1 d 2 (1972We17), 70.8 d 9 (1972Cr02), 70.4 d 10 (1972Cr02), 71.5 d 8 (1968De08), 71.3 d 2 (1956Sc87). Other measurements: 72 d 6 (1973ArZI), 71.0 d (1955Co31), 75 d 3 (1952Ru23), 72 d 4 (1952Ho58), 72 d (1941Li01). In the Limitation of Relative Statistical Weight (LRSW) method the uncertainty of 1980Ho17 was increased from 0.015 to 0.022 to reduce its relative weight to 50%. The LRSW method increased the final uncertainty to 0.06 to include the most precise value of 70.916 d. This result agrees with the evaluation of 1991BaZS, except for a small reduction in the uncertainty. In November 2013 DDEP evaluation (www.nucleide.org), T _{1/2} =70.85 d 3, and in 2013Be43 compilation it is listed as 70.83 d 10.
24.95 ^j 6	5 ⁺ ^b	9.10 h 9	ABC GHI K NOPQRS	$\%IT=100$ T _{1/2} : weighted average of 9.15 h 10 (1967St23) and 8.94 h 17 (1970Ca19). Others: 9.0 h 2 (1960Pr05,1952Av17), 9.2 h 2 (1952Ho58, 1950Ch62).
53.15 ^l 7	4 ⁺	10.5 μ s 3	BC HIJK NO QRS	$\%IT=100$ $\mu=+4.184$ 8 (1970Be33,2014StZZ) μ : stroboscopic observation of perturbed angular distribution (1970Be33). T _{1/2} : weighted average of 10.4 μ s 3 in (p,n γ), 11.4 μ s 6 in (α ,n γ) and 10.2 μ s 6 in (γ ,n) (1964Br27). J^π : L($^3\text{He},d$)=3; E2+M1 γ to 5 ⁺ ; γ to 2 ⁺ .

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Adopted Levels, Gammas (continued) ^{58}Co Levels (continued)

E(level) [†]	J ^π @	T _{1/2} [#]	XREF	Comments
111.76 ^h 7	3 ⁺	0.14 ns 3	BCD F H JK NOPQRS	$\mu=+2.22\ 39$ (1972Ha61,2014StZZ) μ : integral PAD (1972Ha61) for T _{1/2} =0.18 ns. T _{1/2} : weighted average of 0.18 ns 3 in (p,n γ) and 0.12 ns 2 in (α ,n γ). J ^π : dipole γ s to 2 ⁺ and 4 ⁺ ; L(³ He,d)=3.
365.66 7	3 ⁺ ^d	1.1 ps +6-3	BCDEF H JK NOPQRS	T _{1/2} : DSA in (α ,n γ).
373.93 ^l 10	5 ⁺ ^{bd}	0.8 ps +5-3	BC G JK NO Q S	T _{1/2} : DSA in (α ,n γ). Other: >0.69 ps in (¹⁰ B,p2n γ) (2006Si37).
457.50 ^h 8	4 ⁺ ^e	0.9 ps 3	BC H JK NOPQRS	T _{1/2} : DSA in (α ,n γ). Other: >0.69 ps in (¹⁰ B,p2n γ) (2006Si37).
885.63 10	3 ⁺ ,4 ⁺ ^e	0.15 ps +5-3	BC G JK NO QRS	T _{1/2} : DSA in (α ,n γ).
1040.12 12	3 ⁺	0.14 ps +6-4	BC H JK n P RS	T _{1/2} : DSA in (α ,ng). J ^π : L(d, α)=2; (M1(+E2)) γ to 4 ⁺ .
1044.26 10	(3 ⁺)	>1.2 ps	C f H n Q S	J ^π : γ s to 2 ⁺ and 5 ⁺ ; γ from 1 ⁺ . T _{1/2} : DSA in (α ,ng).
1050.19 10	1 ⁺ ^e	0.14 ps +6-4	C Ef H JK MNO R	T _{1/2} : DSA in (α ,ng).
1075.5 ⁱ 3	6 ⁺	<0.069 ps	BC G NO QRS	J ^π : L(d, α)=6, L(d,t)=3. T _{1/2} : from DSAM in ⁵¹ V(¹⁰ B,p2n γ).
1133 15			N	
1184.63 ^h 12	5 ⁺ ^e	0.097 ps 14	BC K NO RS	T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2n γ). Other: 0.15 ps +5-3 from DSA in (α ,n γ).
1236.55 13	2 ⁺		C E HIJK NO RS	XREF: I(1290)N(1242). J ^π : 2 ⁺ in (t, ³ He), L(³ He,d)=1.
1351.51 16			C k s	
1353.47 13	(2 ⁺)	0.6 ps +14-4	C H Jk s	T _{1/2} : from (α ,n γ). J ^π : L(³ He,d)=1, γ to 3 ⁺ levels is stronger than to 2 ⁺ .
1369 4	1 ⁺ ^g		e JK	
1376.88 11	1 ⁺ ^g	0.16 ps +9-6	C eF H JK N S	XREF: J(1383)N(1377). T _{1/2} : from (α ,n γ).
1418.12 17	(5) ⁺		C K RS	J ^π : L(d, α)=4.
1424 8	(3 ⁺)		N	J ^π : L(t, ³ He)=2+4.
1424.60 ^l 17	(6 ⁺)	0.076 ps 21	BC	J ^π : $\Delta J=1$ γ to 5 ⁺ , band assignment. T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2n γ).
1434.9 3	1 ⁺ ^{&}	0.6 ps +21-3	C EFGH JK MN S	E(level): 1447 10 from (t, ³ He) is discrepant. T _{1/2} : from (α ,n γ).
1513.32 13	(3 ⁺ ,4,5 ⁺) ^f		C RS	J ^π : γ s to 3 ⁺ and 5 ⁺ .
1522.57 22	(2 ⁺ ,3 ⁺) ^f		C H Jk no	
1524.4 4	(2 ⁺ ,3 ⁺) ^f		C jk no	
1548.81 21	5 ⁺ ^e		C K N RS	
1554.74 14	(1 ⁺ ,2,3 ⁺)		C O	XREF: O(?). J ^π : γ s to 1 ⁺ and 3 ⁺ .
1605.62 15	3 ⁺		C E GH JK N S	J ^π : L(t, ³ He)=4 or 2+4, L(³ He,p)=2+(4).
1669.9 10	3 ⁺		E H JK N S	J ^π : L(³ He,p)=4, γ to 1 ⁺ .
1729.24 18	1 ⁺		C EFgH JK MN RS	XREF: N(1738). J ^π : from L(d, α)=0 where J ^π =0 ⁺ from non spin flip is expected to be weak.
1740.5 4			C gH jK s	J ^π : (3 ⁺ ,4 ⁺ ,5 ⁺) if the L(d, α)=(4) corresponds to this level; or (1 ⁺ ,2 ⁺) from L(³ He,d)=1 and γ to 3 ⁺ ;
1749.35 19	(3,4) ⁺		C gHIjK P s	XREF: I(?). J ^π : (3 ⁺ ,4 ⁺) if the L(d, α)=(4) corresponds to this level and γ to 2 ⁺ ; (2 ⁺) from L(³ He,d)=1 and γ to 4 ⁺ .
1757.2 3	(1 ⁺ ,2,3 ⁺)		C	J ^π : γ s to 1 ⁺ and 3 ⁺ .
1778 5	3 ⁺ ,4 ⁺ ,5 ⁺		K RS	J ^π : L(d, α)=4.

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Adopted Levels, Gammas (continued) ^{58}Co Levels (continued)

E(level) [†]	J ^π @	T _{1/2} [#]	XREF			Comments
1813.3 6	0 ⁺		EF	JK	R	J ^π : L(³ He,p)=0.
1828 4				K	RS	J ^π : L(d,α)=(2,4). E(level): weighted average of 1827 5 (d,α) and 1829 6 (p,n).
1843 4	3 ⁺ ^e			K N	S	E(level): weighted average of 1841 6 (p,n), 1843 10 (t, ³ He), 1844 6 (d,α). J ^π : γs to 2 ⁺ and 4 ⁺ .
1865.8 3	(2 ⁺ ,3,4 ⁺)		C	g jk		J ^π : L-values in several particle transfer reactions strongly suggest 1 ⁺ assignment for a level near 1867 keV. However, in (p,γ) experiment, 1975Er07 suggest 2 ⁺ based on 1814.9γ placed from this level to 53, 4 ⁺ level. Note that the 1814.9γ was not reported in ⁵⁶ Fe(³ He,pγ) reaction where the 1867 level was populated.
1867.7 5	1 ⁺ & ^e		EFgH	jk MN	S	J ^π : L-values in several particle transfer reactions strongly suggest 1 ⁺ assignment for a level near 1867 keV. However, in (p,γ) experiment, 1975Er07 suggest 2 ⁺ based on 1814.9γ placed from this level to 53, 4 ⁺ level. Note that the 1814.9γ was not reported in ⁵⁶ Fe(³ He,pγ) reaction where the 1867 level was populated.
1925 6	(1 ⁺ ,2 ⁺ ,3 ⁺)				S	J ^π : L(d,α)=(2).
1929.03 ^l 21	(7 ⁺)	0.277 ps 28	BC			J ^π : ΔJ=1 γ to (6 ⁺), ΔJ=(2) γ to 5 ⁺ ; band assignment. T _{1/2} : from DSAM in ⁵¹ V(¹⁰ B,p2nγ).
1978.8 10	3 ⁺ ^e		E GH	JK N	S	J ^π : L(³ He,d)=3.
2007 6	2 ⁺ ,3 ⁺ ,4 ⁺			JK N	RS	J ^π : L(³ He,d)=3, L(d,α)=4. J ^π =4 ⁺ ,5 ⁺ in (t, ³ He) rules out 3 ⁺ .
2070 6	4 ⁺			JK N	RS	J ^π : ΔJ=1 γ to 5 ⁺ .
2080.5 3	(6 ⁺)		B			J ^π : ΔJ=1 γ to 5 ⁺ .
2105 3				H N		
2166 6	3 ⁺ ^e			JK N	RS	
2184.8 8			B			
2225 7	(5 ⁺ ,6 ⁺ ,7 ⁺)				RS	J ^π : L(d,α)=(6).
2248.8 10	1 ⁺ & ^e		EFgH	JK MN	RS	
2260 7				N		
2314.1 ⁱ 3	(7 ⁺)	0.16 ps +6-7	B			J ^π : ΔJ=1 γ to 6 ⁺ ; band assignment. T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2nγ).
2335.3 10	1 ⁺ ,2 ⁺ ,3 ⁺		E H K	N R		J ^π : L(³ He,p)=2.
2415.2 3	(7 ⁺)		B	k	s	J ^π : ΔJ=1 γ to (6 ⁺).
2425.5 ^k 3	(7 ⁺)		B	k	s	J ^π : ΔJ=1 γ to (6 ⁺); band assignment.
2444 7	(1 ⁺ ,2 ⁺)			JK n	S	J ^π : L(³ He,d)=(1), and L(d,α)=(2).
2456 7				n	RS	
2477 7	2 ⁺ ^e			H J N	R	XREF: H(?).
2510 8				n	S	
2534.4 10	1 ⁺ &		E H J	n RS		
2605 8	(3 ⁺ ,4 ⁺ ,5 ⁺)		H	P RS		XREF: H(?). J ^π : L(d,α)=(4).
2625 4	0 ⁺ ,1 ⁺ ,2 ⁺		H J	R		XREF: H(?). E(level): weighted average of 2624 8 (³ He,d), and 2625 5 (p,n). J ^π : L(³ He,d)=1.
2631 8	3 ⁺			N RS		J ^π : L(d,α)=4, J ^π =3 ⁺ or 2 ⁺ from (t, ³ He).
2640.7 10	1 ⁺		E H K M			XREF: H(?)M(2660). J ^π : L(p,n)=0 spin-flip transition.
2646 7	(2 ⁺)			J		J ^π : L(³ He,d)=3+(1).
2692 8	7 ⁺ ^b			g	rS	
2695 8	0 ⁺ ,1 ⁺ ,2 ⁺			J N	r	J ^π : L(³ He,d)=1.
2695.3 ^j 3	(6 ⁺)		B	g	r	J ^π : ΔJ=1γ to 5 ⁺ , γ to 6 ⁺ , band assignment.
2733 8	(2 ⁺)		e	J	RS	J ^π : L(³ He,d)=(1+3).
2733.6 3			B			
2735.55 ⁿ 25	(6 ⁺)	0.17 ps 7	B			J ^π : ΔJ=1 γ to 5 ⁺ ; ΔJ=0, dipole γ to (6 ⁺).
2741 15	5 ⁺ ^e		e	N R		

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Adopted Levels, Gammas (continued) ^{58}Co Levels (continued)

E(level) [†]	J ^π @	T _{1/2} [#]	XREF			Comments
2761 8				n	S	
2768.5 ^m 3	(8 ⁺)		B			J ^π : ΔJ=1 γ to (7 ⁺), band assignment.
2781 8	(1 ⁺)			IJ	n S	XREF: I(2770).
						J ^π : L(³ He,d)=1, L(d,α)=(0+2).
2792 8	(1 ⁺)				S	J ^π : L(d,α)=(0+2).
2819 8	3 ⁺ ,4 ⁺ ,5 ⁺				S	J ^π : L(d,α)=4.
2837 9			e g		S	
2844 9	3 ⁻ ,4 ⁻ ,5 ⁻		e g	J		J ^π : L(³ He,d)=4.
2849 9	3 ⁺ ,4 ⁺ ,5 ⁺		e g		n RS	J ^π : L(d,α)=4.
2865 9	(1 ⁺)			Mn	S	J ^π : L(d, ² He)=0(+1).
2884 9	0 ⁺ ,1 ⁺ ,2 ⁺		J	N	RS	J ^π : L(³ He,d)=1.
2907 9					S	
2931 9	7 ⁺ ^b				S	
2946 9	2 ⁺ ,3 ⁺		J	N	RS	J ^π : L(³ He,d)=3, and L(d,α)=2.
2987 9	1 ⁺ ,2 ⁺ ,3 ⁺				S	J ^π : L=2 in (d,α).
2995 9	(0 ⁻ ,1 ⁻)		J			J ^π : L(³ He,d)=(0).
3010 4	2 ⁺ ^e		H J	N	RS	E(level): weighted average of 3007 9 (d,α) and 3011 5 (p,γ).
3044 9					RS	
3062 9	2 ⁺ ,3 ⁺ ,4 ⁺		J		S	J ^π : L(³ He,d)=3.
3068.57 ⁿ 25	(7 ⁺)	0.076 ps +7-28	B			J ^π : ΔJ=1 γ to (6 ⁺).
						T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2nγ).
3072 9	5 ⁺ ^e			N	RS	
3096 9			E G	J	N RS	E(level): most probably a triplet according to 1972Sc13: with levels at 3090 9, L=(1,2) (d,α); 3096 9, L=1 (³ He,d); 3100 10, L=2 (³ He,p); 3100 15, J ^π =2 ⁺ ,3 ⁺ (t, ³ He).
3118 9	(1 ⁺)		H	M	rS	XREF: H(?).
						J ^π : L(d,α)=0; (3 ⁺ ,4 ⁺ ,5 ⁺) if L(d,α)=(4).
3123 9	2 ⁺		J		r	J ^π : L(³ He,d)=1+3.
3146 9	(1 ⁺ ,2 ⁺ ,3 ⁺)			N	rS	J ^π : L(d,α)=(2).
3169 10					rS	
3184 10	1 ⁺				S	J ^π : L(d,α)=0.
3186 10	2 ⁺ ,3 ⁺ ,4 ⁺		J			J ^π : L(³ He,d)=3.
3199 9	0 ⁻ ,1 ⁻		J		S	J ^π : L(³ He,d)=0, L(d,α)=(1).
3214 10	3 ⁺ ^e			N	RS	
3226 10	(2 ⁺)		J	n		J ^π : L(³ He,d)=1+(3).
3232 10	(0 ⁻ ,1 ⁻ ,2 ⁻)			n	S	J ^π : L(d,α)=(1).
3243 9			J	n	RS	
3261 9	(2 ⁺)		J			J ^π : L(³ He,d)=1+(3).
3281.1 4			B			
3284 4	1 ⁺ &		EF	K	N RS	
3337 10	1 ⁺ ,2 ⁺		E G	J	N S	J ^π : L(³ He,d)=1+(3); L(d,α)=2.
3376 10	2 ⁺		J			J ^π : L(³ He,d)=1+3.
3394.7 ^l 4	(8 ⁺)	0.07 ps 4	B		S	J ^π : ΔJ=1 γ to (7 ⁺), band assignment.
						T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2nγ).
3403 15	4 ⁺ ,5 ⁺ ^e		G		N R	
3410 10	(0 ⁻ ,1 ⁻ ,2 ⁻)				S	J ^π : L(d,α)=(1).
3414 10	(2 ⁺)		J			J ^π : L(³ He,d)=1+(3).
3427 5	3 ⁺ ^e		E H	N	RS	
3442 10	(1 ⁺)		J	M		J ^π : L(³ He,d)=1.
3455 10	2 ⁺ ,3 ⁺ ,4 ⁺		J		S	J ^π : L(³ He,d)=3.
3470 10					S	
3484 20	3 ⁺ ,4 ⁺ ,5 ⁺			N	RS	J ^π : L(d,α)=4.
3507 10	(2 ⁻ ,3 ⁻ ,4 ⁻)				S	J ^π : L(d,α)=(3).

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Adopted Levels, Gammas (continued) ^{58}Co Levels (continued)

E(level) [†]	J ^π @	T _{1/2} [#]	XREF				Comments
3512 5	(1) ⁺		H	J	M	S	J ^π : L(³ He,d)=1.
3518 20	(3 ⁺ ,4 ⁺ ,5 ⁺)				N		J ^π : L(t, ³ He)=(4).
3526 10	(2 ⁺)			J		R	J ^π : L(³ He,d)=(1+3).
3533.8 ^m 4	(9 ⁺)		B				J ^π : ΔJ=1 γ to (8 ⁺), band assignment.
3548 10	1 ⁺ ,2 ⁺		E	J	N	RS	J ^π : L(³ He,d)=1; L(³ He,p)=2.
3559 10	(0 ⁻ ,1 ⁻)			J			J ^π : L(³ He,d)=(0).
3574 11						S	
3604 11	(3 ⁺ ,4 ⁺ ,5 ⁺)					S	J ^π : L(d,α)=(4).
3607 11	(2 ⁺)			J			J ^π : L(³ He,d)=(1+3).
3616 7	1 ⁺		E	J	MN		E(level): weighted average of 3613 10 (³ He,p) and 3619 11 (³ He,d).
							J ^π : L(³ He,p)=0+2.
3639 4			EF	J		RS	J ^π : 1 ⁺ from L(³ He,p)=0+2 is not consistent with J ^π =(2 ⁻ ,3 ⁻ ,4 ⁻) from L(d,α)=(3); γs to 1 ⁺ disfavor J ^π =3 ⁻ ,4 ⁻ .
3659 11						S	
3669 10	1 ⁺		E	J	N		J ^π : L(³ He,p)=0+2.
							E(level): weighted average of 3668 11 (³ He,d), 3668 20 (t, ³ He), 3670 10 (³ He,p).
3685 11	0 ⁺ ,1 ⁺ ,2 ⁺			J		r	J ^π : L(³ He,d)=1.
3689 11	(2 ⁻ ,3 ⁻ ,4 ⁻)					rS	J ^π : L(d,α)=(3).
3720 20	(3 ⁺) ^e				N		
3720.5 ⁱ 4			B				
3725 11	(2) ⁺			J			J ^π : L(³ He,d)=3+(1).
3736 11	(0 ⁻ ,1 ⁻ ,2 ⁻)					S	J ^π : L(d,α)=(1).
3750 30	(8) ^{-c}		G				
3759 11						S	
3775 11	0 ⁺ ,1 ⁺ ,2 ⁺		e	J	n	r	J ^π : L(³ He,d)=1.
3776.10 ⁿ 15	(8 ⁺)	0.076 ps 7	B				J ^π : ΔJ=1 γ to (7 ⁺).
							T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2nγ).
3779 11	(0 ⁻ ,1 ⁻ ,2 ⁻)		e		n	rS	J ^π : L(d,α)=(1).
3790 11	(1 ⁻ ,0 ⁻)		e	J		R	J ^π : L(³ He,d)=(0).
3802.4 ^k 4	(8 ⁺)		B				J ^π : ΔJ=1 γ to (7 ⁺).
3804 20	7 ⁺ ^b					S	
3806 11	1 ⁻ ,2 ⁻ ,3 ⁻			J	N	S	J ^π : L(³ He,d)=2.
3833 11						S	
3853 11	0 ⁺ ,1 ⁺ ,2 ⁺			J		S	J ^π : L(³ He,d)=1.
3865.8 4			B				
3869 11	0 ⁺ ,1 ⁺ ,2 ⁺			J		S	J ^π : L(³ He,d)=1.
3890 20	(2 ⁺) ^e				N		
3898 11	1 ⁻ ,0 ⁻			J		RS	J ^π : L(³ He,d)=0.
3916 11	1 ⁻ ,2 ⁻ ,3 ⁻		e	J		RS	J ^π : L(³ He,d)=2.
3925 20	(1 ⁺) ^e		e	G	Mn	R	
3943 11	0 ⁺ ,1 ⁺ ,2 ⁺		e	J	n	RS	J ^π : L(³ He,d)=1.
3957 11	(2) ⁺		E	J	N	S	J ^π : L(³ He,d)=1+(3).
4006 12	0 ⁺ ,1 ⁺ ,2 ⁺		E	J		S	J ^π : L(³ He,d)=1.
4021 20	(3 ⁺) ^e				N		
4030 25	(1 ⁺)				M		J ^π : L(d, ² H)=0.
4049 10	2 ⁺ ^e		E		N		
4082 12	(2) ⁺			J		S	J ^π : L(³ He,d)=1+(3).
4087 20	(4 ⁺) ^e				N		
4097 12				J		RS	E(level),L: possibly doublet with L=(4) and (1) in (³ He,d).
4107 10	(1 ⁺)		E				J ^π : L(³ He,p)=(0+2).
4110 12	(3 ⁺)			J	N	S	J ^π : L(³ He,d)=(2+4).
4127						R	
4175 10			E		N	R	

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Adopted Levels, Gammas (continued) ^{58}Co Levels (continued)

E(level) [†]	J ^π @	T _{1/2} [#]	XREF		Comments
4206 20				N R	
4239.9 ^m 6			B		
4253 10			E		
4287 20				N	E(level): unresolved group in (t, ³ He).
4295.1 ^j 4	(7 ⁺)		B		J ^π : ΔJ=1 γ to (6 ⁺).
4325 10	3 ⁺ ,4 ⁺ ,5 ⁺		E G	R	J ^π : L(³ He,p)=4.
4336.0 5			B		
4400 13				R	
4448 10			E		
4480.1 ⁿ 3	(9 ⁺)	0.076 ps 7	B		J ^π : ΔJ=1 γ to (8 ⁺). T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2nγ).
4555 10			E		
4568.7 ⁱ 7			B		
4650	(5) ⁺ ^c			G	
4708 10			E		
4775.0 7			B		
4790 30	7 ⁺ ^b			S	
4849 10			E		
5040 30	5 ⁺ ^b			S	
5057 10			E		
5058.5 ⁿ 3	(10 ⁺)	0.094 ps 10	B		J ^π : ΔJ=1 γ to (9 ⁺). T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2nγ).
5097.4 ^j 4	(8 ⁺)		B		J ^π : ΔJ=1 γ to (7 ⁺).
5183 10			E		
5306 10			E		
5392 10	1 ⁺ &		E		
5454 10			E		
5493 20			E		
5502.2 ^k 5	(9 ⁺)		B		J ^π : ΔJ=1 γ to (8 ⁺).
5531 10			E		
5651 10	1 ⁺ ^a		E	P	J ^π : L(³ He,p)=0+2.
5685.6 4			B F	P	
5738 8	0 ⁺ ^a		eF L	P	J ^π : IAS of ⁵⁸ Fe g.s.
5756 8	0 ⁺ ^a		eF KL	P	J ^π : IAS of ⁵⁸ Fe g.s.
5852 20			E	P	
5888 20			E		
5948 20			E		
5956.1 6	(10 ⁺)		B		J ^π : ΔJ=1 γ to (9 ⁺).
6002.4 ⁿ 3	(11 ⁺)	0.062 ps 6	B		J ^π : ΔJ=1 γ to (10 ⁺). T _{1/2} : from DSA in ⁵¹ V(¹⁰ B,p2nγ).
6140 19	(1 ⁻ ,0 ⁻)			J S	J ^π : L(³ He,d)=(0).
6400 30	(1) ⁺ ^c			G	
6427.0 ^j 4	(9 ⁺)		B		J ^π : ΔJ=1 γ to (8 ⁺).
6511.4 ⁿ 5			B		
6671.5 6			B		
6790 30	(9) ⁺ ^c			G	
7024.6 ⁿ 6			B		
7685.4 11			B		
7691.7 ^k 9			B		
8044.1 ^j 8	(10 ⁺)		B		J ^π : ΔJ=1 γ to (9 ⁺).
8125.3 23				H	
8127.3 23				H	
8138.3 23				H	
8144.3 23				H	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{58}Co Levels (continued)

E(level) [†]	XREF	E(level) [†]	XREF	E(level) [†]	XREF
8148.2 23	H	8336.9 23	H	8487.2 23	H
8159.1 23	H	8343.7 23	H	8490.1 23	H
8161.9 23	H	8348.6 23	H	8495.1 23	H
8164.9 23	H	8352.6 23	H	8500.0 23	H
8168.8 23	H	8354.5 23	H	8501.9 23	H
8172.8 23	H	8362.4 23	H	8506.8 23	H
8175.7 23	H	8366.3 23	H	8509.8 23	H
8182.6 23	H	8371.2 23	H	8515.7 23	H
8190.4 23	H	8376.2 23	H	8520.6 23	H
8196.3 23	H	8378.1 23	H	8528.5 23	H
8199.3 23	H	8387.9 23	H	8537.3 23	H
8203.2 23	H	8389.9 23	H	8541.2 23	H
8208.1 23	H	8395.8 23	H	8549.1 [‡] 23	H
8210.1 23	H	8397.8 23	H	8552.0 [‡] 23	H
8214.0 23	H	8405.6 23	H	8558.9 23	H
8217.0 23	H	8409.6 23	H	8565.8 23	H
8218.9 23	H	8413.5 23	H	8573.7 23	H
8227.8 23	H	8415.5 23	H	8582.5 23	H
8229.7 23	H	8418.4 23	H	8588.4 23	H
8232.7 23	H	8420.4 23	H	8599.2 23	H
8241.5 23	H	8422.3 23	H	8605.1 23	H
8244.5 23	H	8427.3 23	H	8610.0 23	H
8248.4 23	H	8429.2 23	H	8616.9 23	H
8253.3 23	H	8431.2 23	H	8624.8 [‡] 23	H
8256.3 23	H	8434.1 23	H	8627.7 [‡] 23	H
8263.2 23	H	8437.1 23	H	8635.6 23	H
8265.1 23	H	8440.0 23	H	8643.4 23	H
8272.0 23	H	8445.9 23	H	8650.3 23	H
8274.9 23	H	8449.9 23	H	8653.3 23	H
8278.9 23	H	8451.8 23	H	8668.0 23	H
8283.8 23	H	8456.7 23	H	8672.9 23	H
8289.7 23	H	8459.7 23	H	8677.8 23	H
8295.6 23	H	8464.6 23	H	8687.6 23	H
8299.5 23	H	8469.5 23	H	8694.5 23	H
8309.3 23	H	8473.4 23	H	8699.4 23	H
8312.3 23	H	8476.4 23	H	8706.3 23	H
8315.2 23	H	8478.3 23	H	8709.3 23	H
8319.2 23	H	8483.3 23	H	8715.2 23	H
8327.1 23	H	8484.2 23	H	8721.1 23	H
8335.9 23	H	8486.2 23	H	8725.0 23	H

[†] From least-squares fit to E_γ data for levels populated in γ-ray studies. Others are weighted averages from particle-transfer data. The levels at 1290, 1750 and 2770 in (d,n) are most likely composites of several levels because of the poor energy resolution (FWHM≈300 keV).

[‡] 8549.4+8552.3 and 8625.1+8628.0 doublets are possible candidates for analog states of the 2782, 1⁺ and 2876, 2⁺ levels, respectively, in ^{58}Fe .

[#] From DSAM in (α,nγ) and (^{10}B ,p2nγ), except where noted otherwise.

[@] In in-beam γ-ray studies: $^{55}\text{Mn}(\alpha, n\gamma)$ and $^{51}\text{V}(^{10}\text{B}, p2n\gamma)$, ascending order of spins is assumed as the excitation energy rises. When J^π is deduced from L-transfers in particle transfer reactions, the target J^π values are as follows: 1/2⁻ for ^{57}Fe in (d,n) and (^3He ,d) reactions; 7/2⁻ for ^{59}Co in (d,t) and (p,d) reactions; 0⁺ in (t, ^3He), (d, ^2He), (^3He ,t), (^3He ,p), (p,n), (α,d) and (d,α) reactions.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{58}Co Levels (continued)

- & $J^\pi=1^+$ from $L=0+2$ in $(^3\text{He},p)$.
- ^a $J^\pi=0^+, 1^+$ from $L=0$ in $(^3\text{He},p)$.
- ^b From L and vector analyzing power in (d,α) .
- ^c From DWBA analysis and cross section systematics in (α,d) .
- ^d $L=2+4$ for 366+374 in $(t,^3\text{He})$, $J^\pi=(5)^+$ for $L=4$ component from vector-analyzing power in (α,d) , and $J=3$ for 366 from $\gamma(\theta)$ in $(\alpha,n\gamma)$ establish $J^\pi=3^+$ and 5^+ for the 366 and 374 levels, respectively.
- ^e From CCBA in $(t,^3\text{He})$.
- ^f $L(d,\alpha)=2$ and $L(^3\text{He},d)=1$ for one or more of the 1513, 1523 and 1524 levels, $L(t,^3\text{He})=2$ suggests $2^+, 3^+$ for 1523 or 1524 levels.
- ^g $L(^3\text{He},p)=0+2$ for $E=1372$ 15; $J^\pi=1^+$ for $E=1377$ 10 in $(t,^3\text{He})$ and $L(^3\text{He},d)=1$ for both 1369 and 1383 levels give 1^+ the 1369 and 1376 levels.
- ^h Band(A): g.s. Band.
- ⁱ Band(B): γ cascade based on 6^+ .
- ^j Band(C): γ cascade based on 5^+ .
- ^k Band(D): γ cascade based on 7^+ .
- ^l Band(E): Band based on 4^+ .
- ^m Band(F): γ cascade based on $(8)^+$.
- ⁿ Band(G): Band based on 6^+ .

Adopted Levels, Gammas (continued)

E _i (level)	J _i ^π	$\gamma(^{58}\text{Co})$		E _f	J _f ^π	Mult. [‡]	$\delta^{\#}$	$\alpha^{\textcircled{a}}$	Comments
		E _γ [†]	I _γ [†]						
24.95	5 ⁺	24.889 21	100	0.0	2 ⁺	M3		2.52×10 ³	B(M3)(W.u.)=0.607 11 α(K)=1.84×10 ³ 3; α(L)=592 9; α(M)=84.5 13 α(N)=2.08 3 E _γ : from ⁵⁸ Co IT decay. δ(E4/M3)<0.009 from δ ² =2.7×10 ⁻⁵ 55 (deduced in 2006Ra03 evaluation from measured subshell ratios). See IT decay dataset.
53.15	4 ⁺	28.30 15	43 5	24.95	5 ⁺	E2+M1	-2.3 4	51 4	B(M1)(W.u.)=2.2×10 ⁻⁷ 8; B(E2)(W.u.)=2.7 6 α(K)=41 3; α(L)=8.3 6; α(M)=1.12 9; α(N)=0.0200 14 δ: -0.33 6 or -2.3 4 from γ(θ) data in (d,nγ). However, comparison of experimental and theoretical cross sections and isomer ratios from ⁵⁸ Ni(n,p) and ⁵⁹ Co(n,2n) reactions over incident neutron energy range of 0.97 to 20.35 MeV (1999Av04, 2004Se01, and 2015HoZZ) support δ(E2/M1)=2.3 over 0.33.
		52.96 13	100	0.0	2 ⁺	[E2]		5.97 10	B(E2)(W.u.)=0.33 4 α(K)=5.18 9; α(L)=0.688 12; α(M)=0.0935 17 α(N)=0.00271 5 I _γ : from weighted average of I _γ (28)/I _γ (53)=0.40 3 (α,nγ), 0.62 12 (d,nγ), and 0.56 8 (p,γ).
111.76	3 ⁺	58.49 12	63 6	53.15	4 ⁺	M1(+E2)	-0.02 3	0.177 9	B(M1)(W.u.)=0.28 5; B(E2)(W.u.)=(6.E+1 +15-6) α(K)=0.158 8; α(L)=0.0162 10; α(M)=0.00225 13 α(N)=9.7×10 ⁻⁵ 4 Mult.: B(E1)(W.u.)=0.006 disfavors E1 assignment. B(M1)(W.u.)=(0.064 9); B(E2)(W.u.)=(4 +7-4) α(K)=0.0274 6; α(L)=0.00275 6; α(M)=0.000383 8 α(N)=1.67×10 ⁻⁵ 3 δ: other: -0.04 2 (1972Ha61) in (p,nγ). I _γ : I _γ (112)/I _γ (58)=1.59 14 which is a weighted average of 1.72 21 (α,nγ) and 1.50 18 (p,nγ).
		111.52 15	100	0.0	2 ⁺	(M1(+E2))	-0.02 2	0.0305 6	
365.66	3 ⁺	253.39 24 312.39 16 365.58 12	0.9 2 100 3	111.76 3 ⁺ 53.15 4 ⁺ 0.0 2 ⁺		(M1(+E2))	-0.018 23	1.57×10 ⁻³ 2	I _γ : weak γ. B(M1)(W.u.)=(0.41 +12-23); B(E2)(W.u.)=(2 +5-2) α(K)=0.001415 21; α(L)=0.0001380 20; α(M)=1.92×10 ⁻⁵ 3 α(N)=8.55×10 ⁻⁷ 13
373.93	5 ⁺	320.76 12	100	53.15	4 ⁺	M1+E2	-0.050 25	0.00215 4	B(M1)(W.u.)=0.8 +3-5; B(E2)(W.u.)=4.E+1 4 α(K)=0.00193 3; α(L)=0.000189 3; α(M)=2.64×10 ⁻⁵ 4 α(N)=1.169×10 ⁻⁶ 18 I _γ : from 1971Ro08.
		349.10 16	6.1 2	24.95	5 ⁺	(M1)		1.75×10 ⁻³	Mult.: D+Q from γ(θ) in (α,nγ), M1+E2 from RUL. B(M1)(W.u.)=0.037 +14-24 α(K)=0.001575 23; α(L)=0.0001538 22; α(M)=2.14×10 ⁻⁵ 3

Adopted Levels, Gammas (continued)

$\gamma(^{58}\text{Co})$ (continued)

<u>E_i(level)</u>	<u>J^{π}_i</u>	<u>E_{γ}[†]</u>	<u>I_{γ}[†]</u>	<u>E_f</u>	<u>J^{π}_f</u>	<u>Mult.[‡]</u>	<u>$\delta^{\#}$</u>	<u>$\alpha^{\textcircled{a}}$</u>	<u>Comments</u>
									$\alpha(\text{N})=9.53\times 10^{-7}$ 14 I _{γ} : from 1971Ro08.
457.50	4 ⁺	91.63 3 345.59 12 404.20 25 432.53 12	1.5 1 19.5 8 0.8 1 100 4	365.66 3 ⁺ 111.76 3 ⁺ 53.15 4 ⁺ 24.95 5 ⁺		(M1+E2)	-0.11 5	1.08×10 ⁻³ 2	B(M1)(W.u.)=(0.25 9); B(E2)(W.u.)=(3.E+1 3) $\alpha(\text{K})=0.000974$ 21; $\alpha(\text{L})=9.48\times 10^{-5}$ 21; $\alpha(\text{M})=1.32\times 10^{-5}$ 3 $\alpha(\text{N})=5.88\times 10^{-7}$ 13
885.63	3 ⁺ ,4 ⁺	512.0 4 519.90 14 773.93 12 832.92 31 860.8 5	39 8 46 3 100 4 12 1 29 3	373.93 5 ⁺ 365.66 3 ⁺ 111.76 3 ⁺ 53.15 4 ⁺ 24.95 5 ⁺		D D			
1040.12	3 ⁺	582.87 20	100 5	457.50 4 ⁺		(M1(+E2))	-0.02 6	5.48×10 ⁻⁴	B(M1)(W.u.)=0.37 +11-16; B(E2)(W.u.)=1 +5-1 $\alpha(\text{K})=0.000493$ 8; $\alpha(\text{L})=4.78\times 10^{-5}$ 7; $\alpha(\text{M})=6.66\times 10^{-6}$ 10 $\alpha(\text{N})=2.98\times 10^{-7}$ 5
1044.26	(3 ⁺)	674.5 2 1039.80 25 670.1 5 932.5 2 1044.18 14	51 5 66 9 22 3 100 5	365.66 3 ⁺ 0.0 2 ⁺ 373.93 5 ⁺ 111.76 3 ⁺ 0.0 2 ⁺					I _{γ} : weak γ .
1050.19	1 ⁺	684.09 20 938.16 16 1049.36 27	5 2 59 7 100 11	365.66 3 ⁺ 111.76 3 ⁺ 0.0 2 ⁺					
1075.5	6 ⁺	702.1 2 1050.9 1	15.3 8 100 10	373.93 5 ⁺ 24.95 5 ⁺		D D			
1184.63	5 ⁺	727.13 12 1131.50 16 1159.3 6	100 4 30 3 15 2	457.50 4 ⁺ 53.15 4 ⁺ 24.95 5 ⁺		D			
1236.55	2 ⁺	1124.8 2 1236.52 15	34 4 100 5	111.76 3 ⁺ 0.0 2 ⁺					
1351.51		466.19 25 893.88 16	8 2 100 3	885.63 3 ⁺ ,4 ⁺ 457.50 4 ⁺					
1353.47	(2) ⁺	987.90 16 1241.53 20 1353.5 4	100 14 42 10 35 8	365.66 3 ⁺ 111.76 3 ⁺ 0.0 2 ⁺					
1376.88	1 ⁺	326.36 16 332.50 16 1377.97 20	14 89 4 100 9	1050.19 1 ⁺ 1044.26 (3 ⁺) 0.0 2 ⁺					I _{γ} : branching from 1971Xe01 in (α ,n γ). 1971Ro08 in (α ,n γ) report 25.2 17: 9.2 9: 100 3 at 8 MeV and 29 6: 27.8 9: 100 3 at 10 MeV.
1418.12	(5) ⁺	1044.18 14	100	373.93 5 ⁺					
1424.60	(6) ⁺	1050.81 16	100 11	373.93 5 ⁺		D			

Adopted Levels, Gammas (continued)

$\gamma(^{58}\text{Co})$ (continued)

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}^{$\dagger$}</u>	<u>I_{γ}^{$\dagger$}</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Mult.^{$\ddagger$}</u>	<u>$\delta^{\#}$</u>	<u>$\alpha^@$</u>	<u>Comments</u>
1424.60	(6 ⁺)	1399.1 3	11.6 8	24.95	5 ⁺	D			
1434.9	1 ⁺	1434.91 25	100	0.0	2 ⁺	M1(+E2)	0.00 8	1.36×10 ⁻⁴ 2	B(M1)(W.u.)=(0.012 +7-12) $\alpha(\text{K})=7.93\times 10^{-5}$ 12; $\alpha(\text{L})=7.61\times 10^{-6}$ 11; $\alpha(\text{M})=1.062\times 10^{-6}$ 15 $\alpha(\text{N})=4.78\times 10^{-8}$ 7; $\alpha(\text{IPF})=4.82\times 10^{-5}$ 7
1513.32	(3 ⁺ ,4,5 ⁺)	473.27 16	33 5	1040.12	3 ⁺				
		1139.4 5	25 5	373.93	5 ⁺				
		1147.61 17	100 15	365.66	3 ⁺				
		1488.2 3	95 18	24.95	5 ⁺				
1522.57	(2 ⁺ ,3 ⁺)	1157.0 4	79 21	365.66	3 ⁺				
		1410.75 25	100 21	111.76	3 ⁺				
1524.4	(2 ⁺ ,3 ⁺)	1159.3 6	82 14	365.66	3 ⁺				
		1524.1 4	100 10	0.0	2 ⁺				
1548.81	5 ⁺	473.27 16	50 8	1075.5	6 ⁺				
		663.17 20	100 8	885.63	3 ⁺ ,4 ⁺				
1554.74	(1 ⁺ ,2,3 ⁺)	504.43 12	100 5	1050.19	1 ⁺				
		1189.4 4		365.66	3 ⁺				
		1555.3 3	39 7	0.0	2 ⁺				
1605.62	3 ⁺	1147.61 17		457.50	4 ⁺				
		1494.66 25	100 11	111.76	3 ⁺				
		1606.3 4	35 5	0.0	2 ⁺				
1669.9	3 ⁺	619.9 2	100	1050.19	1 ⁺				
1729.24	1 ⁺	1356.1 & 5	21 7	373.93	5 ⁺	[E4]		3.62×10 ⁻⁴	$\alpha(\text{K})=0.000325$ 5; $\alpha(\text{L})=3.20\times 10^{-5}$ 5; $\alpha(\text{M})=4.46\times 10^{-6}$ 7 $\alpha(\text{N})=1.96\times 10^{-7}$ 3 E _{γ} : this transition to 373.9, 5 ⁺ level is seen only in (α ,n γ) and not in (p, γ) or (³ He,p γ). Its placement from this level is highly questionable in view of E4 required. Either the placement is wrong or it defines another level. Also the existence of another level could explain the different branching ratios in (α ,n γ) compared to (p, γ) or (³ He,p γ).
		1363.14 20	100 6	365.66	3 ⁺				
		1730.5 4	13 4	0.0	2 ⁺				
1740.5		1628.7 4	100	111.76	3 ⁺				
1749.35	(3,4) ⁺	863.3 2	100 12	885.63	3 ⁺ ,4 ⁺				
		1696.9 5	53 6	53.15	4 ⁺				
		1749.4 5	63 10	0.0	2 ⁺				
1757.2	(1 ⁺ ,2,3 ⁺)	707.2 3	69 4	1050.19	1 ⁺				
		1645.2 4	100 15	111.76	3 ⁺				
1813.3	0 ⁺	1817		0.0	2 ⁺				
1865.8	(2 ⁺ ,3,4 ⁺)	979.9 5		885.63	3 ⁺ ,4 ⁺				
		1408.1 4		457.50	4 ⁺				
		1813.3 6		53.15	4 ⁺				
		1866.0 10		0.0	2 ⁺				

Adopted Levels, Gammas (continued)

$\gamma(^{58}\text{Co})$ (continued)							Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	
1867.7	1 ⁺	820		1050.19	1 ⁺		
		1814.9 & 3	67 17	53.15	4 ⁺	[M3]	In view of high and unlikely multipolarity of M3 implied for this transition, evaluators consider this placement, proposed only in (p, γ), uncertain.
		1867.7 3	100 4	0.0	2 ⁺		
1929.03	(7 ⁺)	505.13 5	100 3	1424.60	(6 ⁺)	D	
		1554.7 5	37.1 16	373.93	5 ⁺	(Q)	
1978.8	3 ⁺	934.7 2	100	1044.26	(3 ⁺)		
2080.5	(6 ⁺)	895.3 2	100	1184.63	5 ⁺	D	
2184.8		999.6 7	100	1184.63	5 ⁺		
2248.8	1 ⁺	2247.6 5	100	0.0	2 ⁺		
2314.1	(7 ⁺)	1237.6 1	100	1075.5	6 ⁺	D	
2335.3	1 ⁺ , 2 ⁺ , 3 ⁺	2334.9 5	100	0.0	2 ⁺		
2415.2	(7 ⁺)	990.4 3	100	1424.60	(6 ⁺)	D	
2425.5	(7 ⁺)	1000.7 2	100	1424.60	(6 ⁺)	D	
2534.4	1 ⁺	1181.0 2	100	1353.47	(2 ⁺)		
2640.7	1 ⁺	1590.5 & 10		1050.19	1 ⁺		
2695.3	(6 ⁺)	1270.3 3	36 4	1424.60	(6 ⁺)		
		2670.7 3	100 14	24.95	5 ⁺	D	
2733.6		803.7 1	100	1929.03	(7 ⁺)		
2735.55	(6 ⁺)	1550.7 1	17 1	1184.63	5 ⁺	D	E γ : Level-energy difference=1550.3.
		1659.2 1	100 5	1075.5	6 ⁺	D	
		2361.0 2	52 3	373.93	5 ⁺	D	
		2710 1	10.5 21	24.95	5 ⁺	D	
2768.5	(8 ⁺)	838.6 1	100	1929.03	(7 ⁺)	D	
3068.57	(7 ⁺)	333.06 4	100 5	2735.55	(6 ⁺)	D	
		1644.2 6	7.2 9	1424.60	(6 ⁺)		
		1991.9 1	98 5	1075.5	6 ⁺	D	
3281.1		512.6 2	100	2768.5	(8 ⁺)		
3284	1 ⁺	1416		1867.7	1 ⁺		
		2918		365.66	3 ⁺		
		3284		0.0	2 ⁺		
3394.7	(8 ⁺)	1464.8 2	100	1929.03	(7 ⁺)	D	
3533.8	(9 ⁺)	765.3 2	100	2768.5	(8 ⁺)	D	
3639		2205		1434.9	1 ⁺		
		2261		1376.88	1 ⁺		
		2591		1050.19	1 ⁺		
3720.5		1406.2 5	100 11	2314.1	(7 ⁺)		
		1790.7 4	61 6	1929.03	(7 ⁺)		
3776.10	(8 ⁺)	707.53 5	100 4	3068.57	(7 ⁺)	D	
		1460.5 3	11.3 8	2314.1	(7 ⁺)	D	
3802.4	(8 ⁺)	1376.9 2	100	2425.5	(7 ⁺)	D	
3865.8		332.0 2	100	3533.8	(9 ⁺)		
4239.9		706.1 5	100	3533.8	(9 ⁺)		

Adopted Levels, Gammas (continued)

$\gamma(^{58}\text{Co})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π
4295.1	(7 ⁺)	1599.8 1	100	2695.3 (6 ⁺)		D	8484.2		7249 4	15 3	1236.55	2 ⁺
4336.0		533.6 3	100	3802.4 (8 ⁺)					7432 3	68 6	1050.19	1 ⁺
4480.1	(9 ⁺)	704.0 1	100	3776.10 (8 ⁺)		D			8482 3	100 6	0.0	2 ⁺
4568.7		848.2 5	100	3720.5			8509.8		5872 3	<4	2640.7	1 ⁺
4775.0		1241.2 6	100	3533.8 (9 ⁺)					5890 3	<4	2625	0 ⁺ ,1 ⁺ ,2 ⁺
5058.5	(10 ⁺)	578.35 4	100	4480.1 (9 ⁺)		D			5979 3	<4	2534.4	1 ⁺
5097.4	(8 ⁺)	802.3 1	100	4295.1 (7 ⁺)		D			6407 3	<4	2105	
5502.2	(9 ⁺)	1699.8 3	100	3802.4 (8 ⁺)		D			6530 3	<4	1978.8	3 ⁺
5685.6		627.1 2	100	5058.5 (10 ⁺)					6987 2	36 4	1522.57	(2 ⁺ ,3 ⁺)
5738	0 ⁺	4008		1729.24 1 ⁺					7076 2	13 2	1434.9	1 ⁺
		4690		1050.19 1 ⁺					7138 3	<4	1376.88	1 ⁺
5756	0 ⁺	4026		1729.24 1 ⁺					7157 2	100 7	1353.47	(2) ⁺
5956.1	(10 ⁺)	2422.2 4	100	3533.8 (9 ⁺)		D			7273 2	13 2	1236.55	2 ⁺
6002.4	(11 ⁺)	943.95 7	100	5058.5 (10 ⁺)		D			7461 2	24 2	1050.19	1 ⁺
6427.0	(9 ⁺)	1329.6 2	100	5097.4 (8 ⁺)		D			8145 3	7 2	365.66	3 ⁺
6511.4		509.0 4	100	6002.4 (11 ⁺)					8400 3	11 2	111.76	3 ⁺
6671.5		985.9 4	100	5685.6					8459 3	9 2	53.15	4 ⁺
7024.6		513.2 3	100	6511.4					8485	7 2	24.95	5 ⁺
7685.4		3349.3 9	100	4336.0					8512 3	4 1	0.0	2 ⁺
7691.7		2189.4 7	100	5502.2 (9 ⁺)			8528.5		6778	38 3	1749.35	(3,4) ⁺
8044.1	(10 ⁺)	1617.1 7	100	6427.0 (9 ⁺)		D			7176	100 7	1353.47	(2) ⁺
8395.8		4881 3	4 1	3512 (1) ⁺					7292	21 3	1236.55	2 ⁺
		4965 3	50 4	3427 3 ⁺					7485	72 6	1044.26	(3 ⁺)
		5285 3	100 7	3118 (1) ⁺					8418	17 3	111.76	3 ⁺
		5381 3	11 2	3010 2 ⁺					8476	17 3	53.15	4 ⁺
		5914 & 3	7 2	2477 2 ⁺					8529	83 7	0.0	2 ⁺
		6048 & 3	21 4	2335.3 1 ⁺ ,2 ⁺ ,3 ⁺			8537.3		6808	52 4	1729.24	1 ⁺
		6663 3	29 4	1729.24 1 ⁺					6868	36 4	1669.9	3 ⁺
		6868 3	36 4	1522.57 (2 ⁺ ,3 ⁺)					6931	36 4	1605.62	3 ⁺
		6956 3	7 2	1434.9 1 ⁺					7102	64 4	1434.9	1 ⁺
		7014 4	18 4	1376.88 1 ⁺					7162	28 4	1376.88	1 ⁺
		7039 4	21 4	1353.47 (2) ⁺					7301	8 2	1236.55	2 ⁺
		7155 3	18 4	1236.55 2 ⁺					7494	52 4	1044.26	(3 ⁺)
		7347 3	21 4	1050.19 1 ⁺					8427	28 4	111.76	3 ⁺
		8395 3	18 4	0.0 2 ⁺					8538	100 5	0.0	2 ⁺
8484.2		5835 3	6 2	2640.7 1 ⁺			8552.0		6300 3	29 3	2248.8	1 ⁺
		5851 3	9 2	2625 0 ⁺ ,1 ⁺ ,2 ⁺					6824 2	100 6	1729.24	1 ⁺
		5867 & 3	6 2	2605 (3 ⁺ ,4 ⁺ ,5 ⁺)					7120 3	23 3	1434.9	1 ⁺
		6740 & 3	29 3	1740.5					7319 3	29 3	1236.55	2 ⁺
		6955 3	9 2	1522.57 (2 ⁺ ,3 ⁺)					7502 3	100 6	1050.19	1 ⁺
		7105 3	38 3	1376.88 1 ⁺					7508 &	<16	1044.26	(3 ⁺)
		7130 4	9 3	1353.47 (2) ⁺					8190 4	13 3	365.66	3 ⁺

Adopted Levels, Gammas (continued)

$\gamma(^{58}\text{Co})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π
8552.0		8443 4	6.3 15	111.76	3 ⁺	8610.0		7087	<9	1522.57	(2 ⁺ ,3 ⁺)
		8553 3	19 3	0.0	2 ⁺			7175	55 5	1434.9	1 ⁺
8599.2		6732	25 3	1867.7	1 ⁺			7234	100 5	1376.88	1 ⁺
		7077	<6	1522.57	(2 ⁺ ,3 ⁺)			7257	41 5	1353.47	(2) ⁺
		7164	<6	1434.9	1 ⁺			7373	<9	1236.55	2 ⁺
		7226	44 3	1376.88	1 ⁺			7566	82 5	1044.26	(3 ⁺)
		7247	47 3	1353.47	(2) ⁺			8610	68 5	0.0	2 ⁺
		7363	<6	1236.55	2 ⁺	8624.8		6757	42 3	1867.7	1 ⁺
		7556	97 6	1044.26	(3 ⁺)			6875	100 5	1749.35	(3,4) ⁺
		8600	100 6	0.0	2 ⁺			6895	<5	1729.24	1 ⁺
8610.0		6275	41 5	2335.3	1 ⁺ ,2 ⁺ ,3 ⁺			6955	61 5	1669.9	3 ⁺
		6361	18 5	2248.8	1 ⁺			7189	<5	1434.9	1 ⁺
		6505	41 5	2105				7272	<5	1353.47	(2) ⁺
		6631	18 5	1978.8	3 ⁺			7388	<5	1236.55	2 ⁺
		6742	52 5	1867.7	1 ⁺			7581	58 3	1044.26	(3 ⁺)
		6859	<9	1749.35	(3,4) ⁺			8625	55 3	0.0	2 ⁺
		6880	<9	1729.24	1 ⁺						

[†] Weighted averages of values from (α ,n γ), (¹⁰B,p2n γ), (³He, γ) and (p, γ).

[‡] From $\gamma\gamma(\theta)$ (DCO) in (¹⁰B,p2n γ), $\gamma(\theta)$ in (α ,n γ) and/or (p,n γ) and ΔJ^π , unless indicated otherwise.

From (α ,n γ), except where noted otherwise.

@ From BrIcc v2.3b (16-Dec-2014) [2008Ki07](#), "Frozen Orbitals" appr. If No δ value given, it was assumed 1.00 for E2/M1,

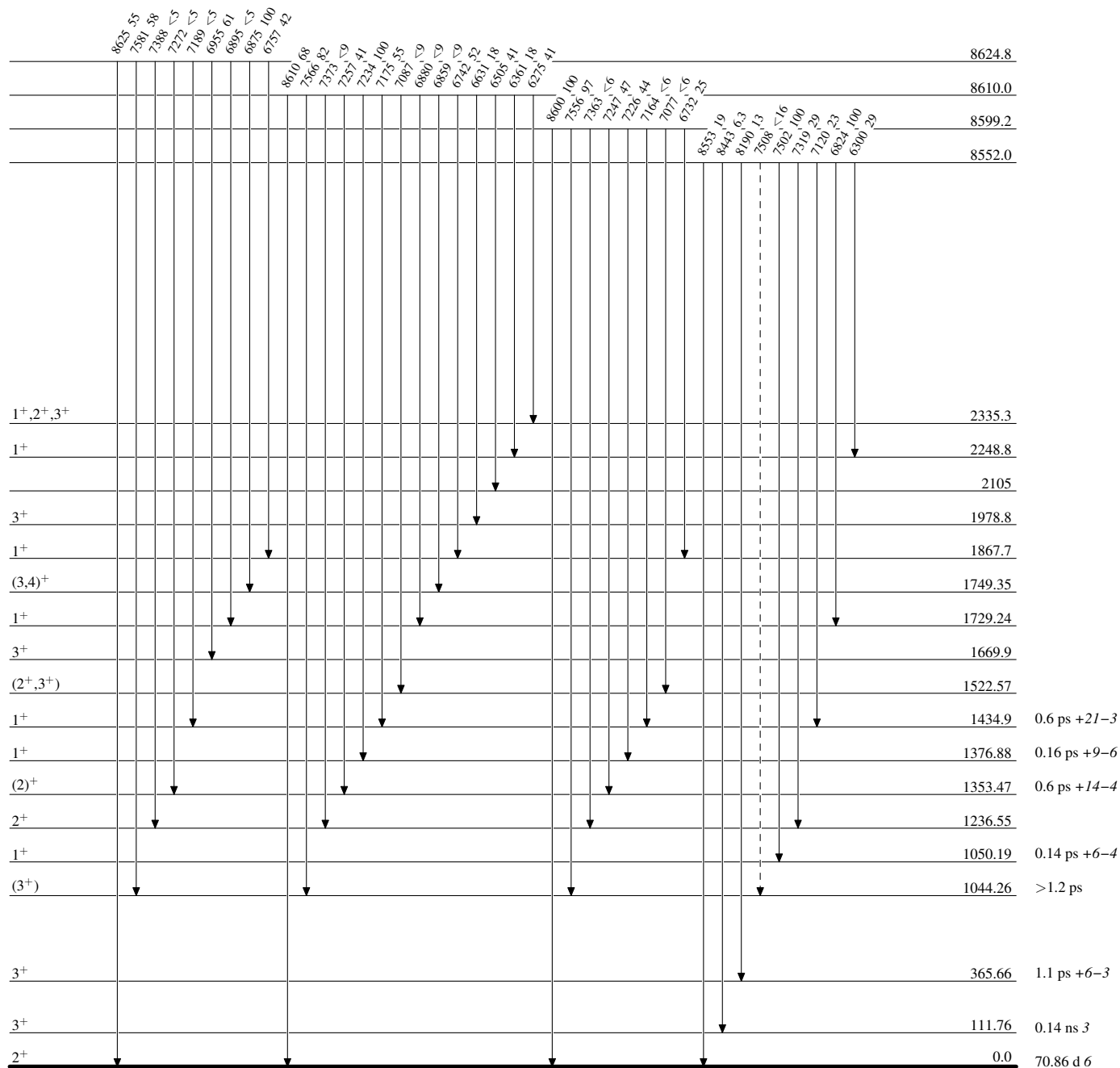
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

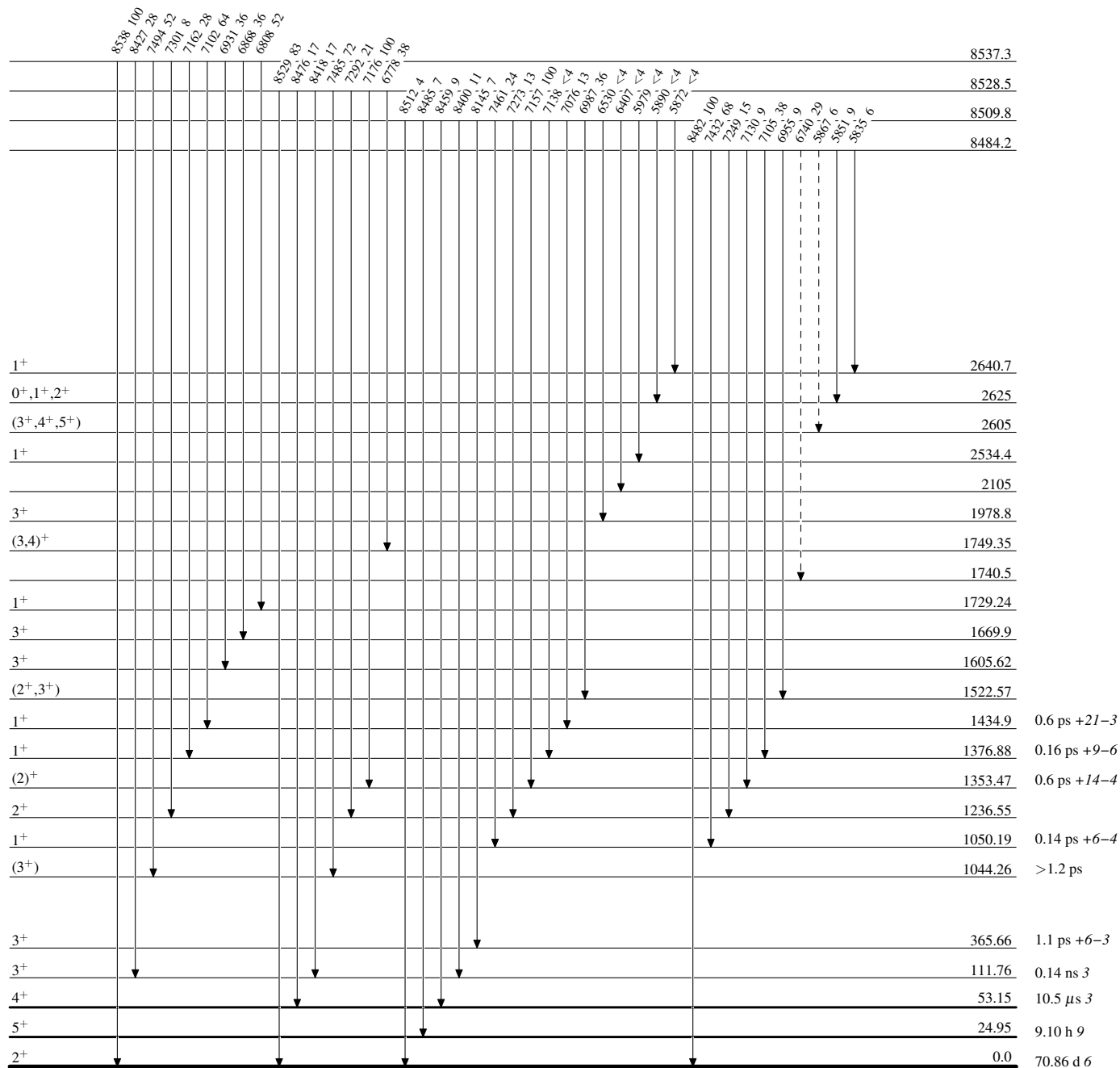
-----► γ Decay (Uncertain) $^{58}_{27}\text{Co}_{31}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{58}_{27}\text{Co}_{31}$

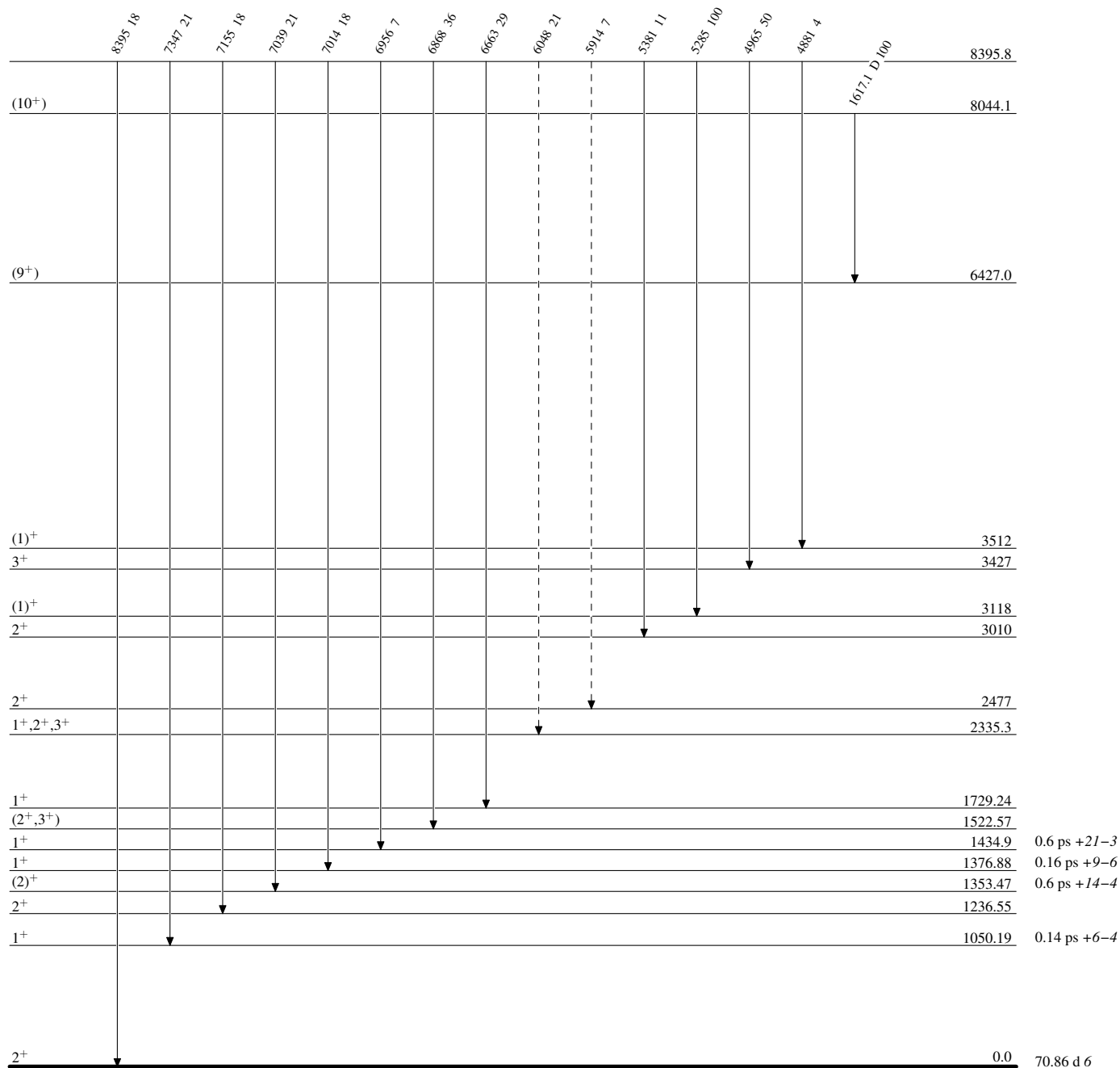
Adopted Levels, Gammas

Legend

Level Scheme (continued)

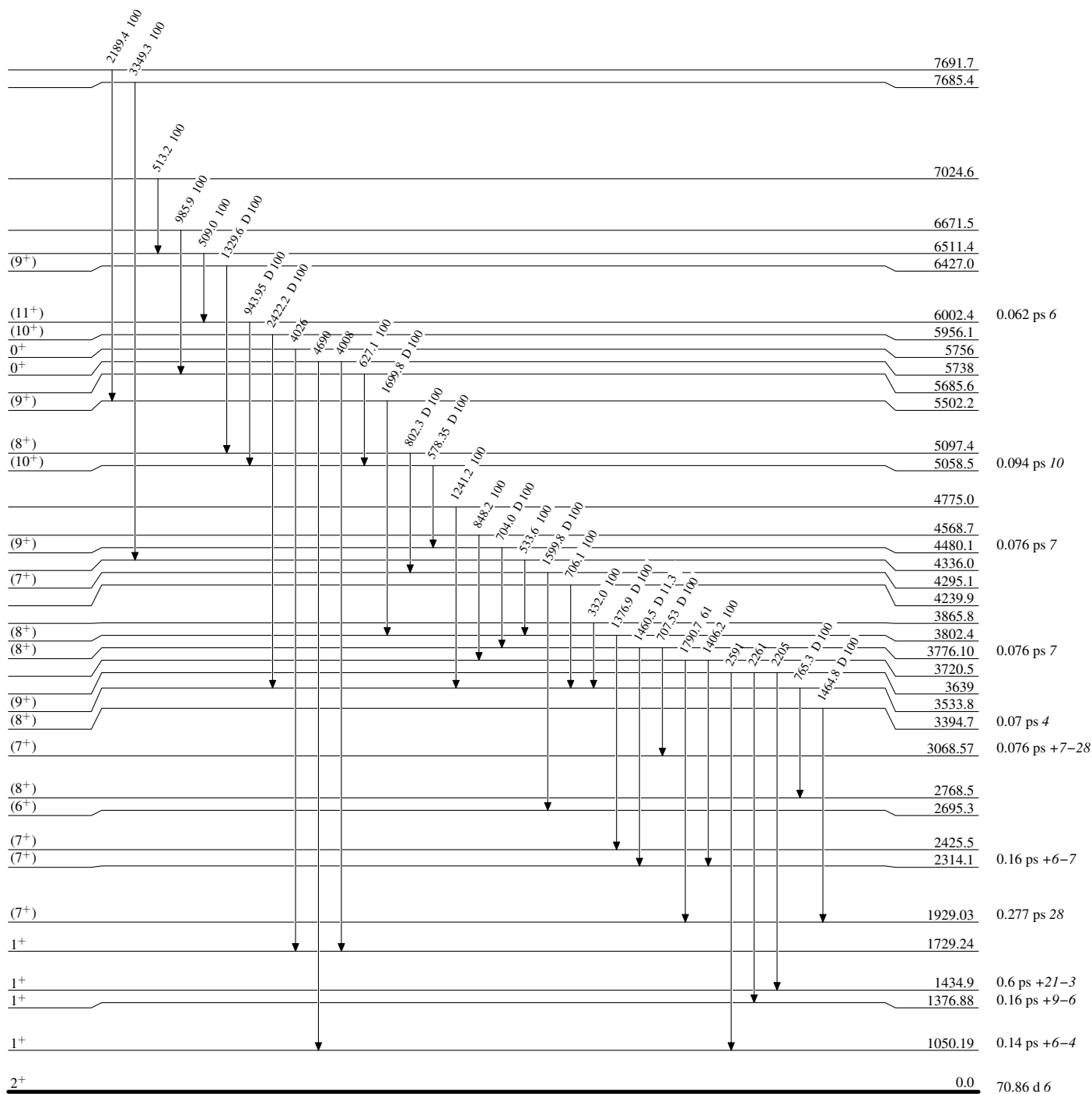
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)



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

Intensities: Relative photon branching from each level

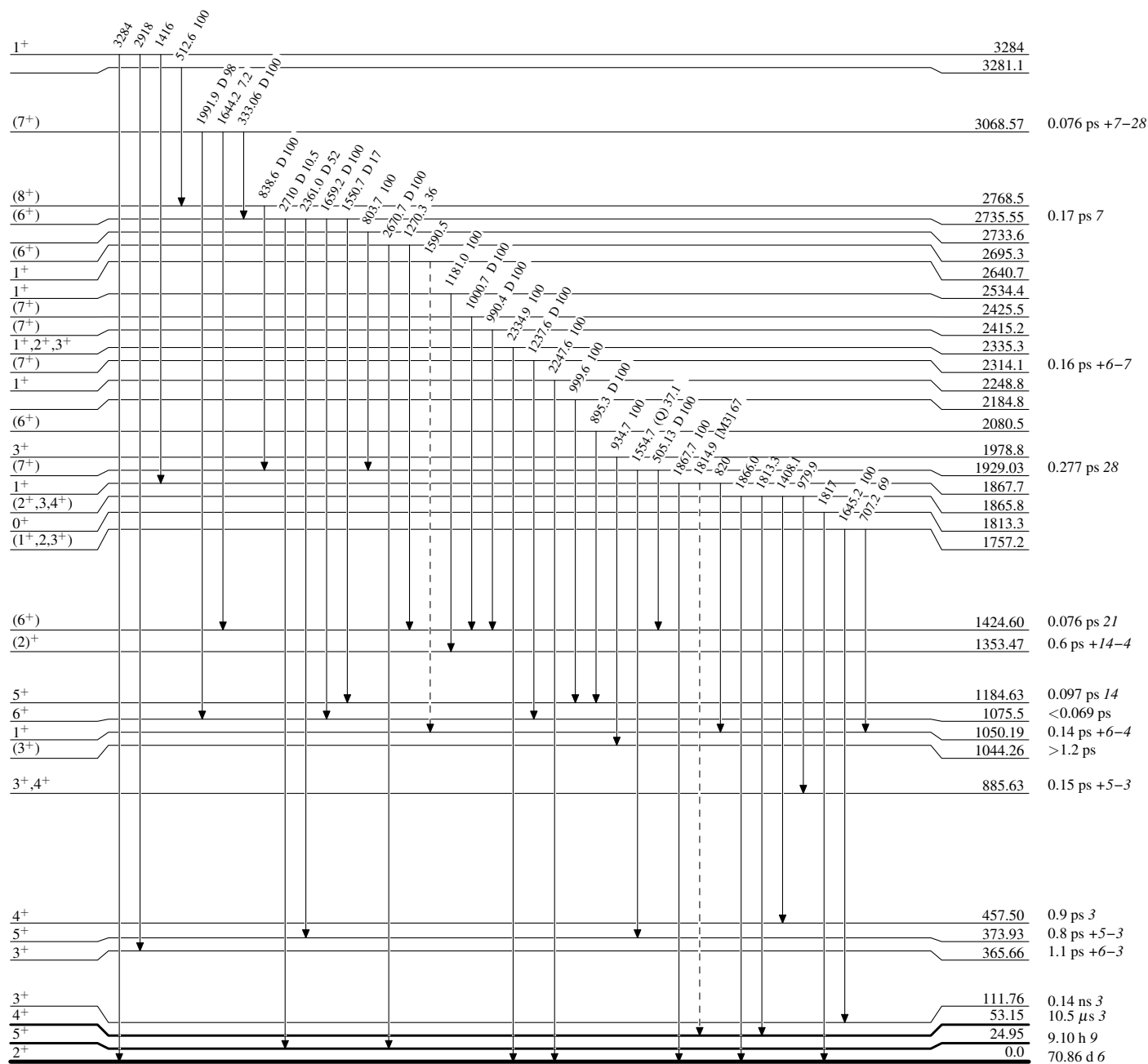


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

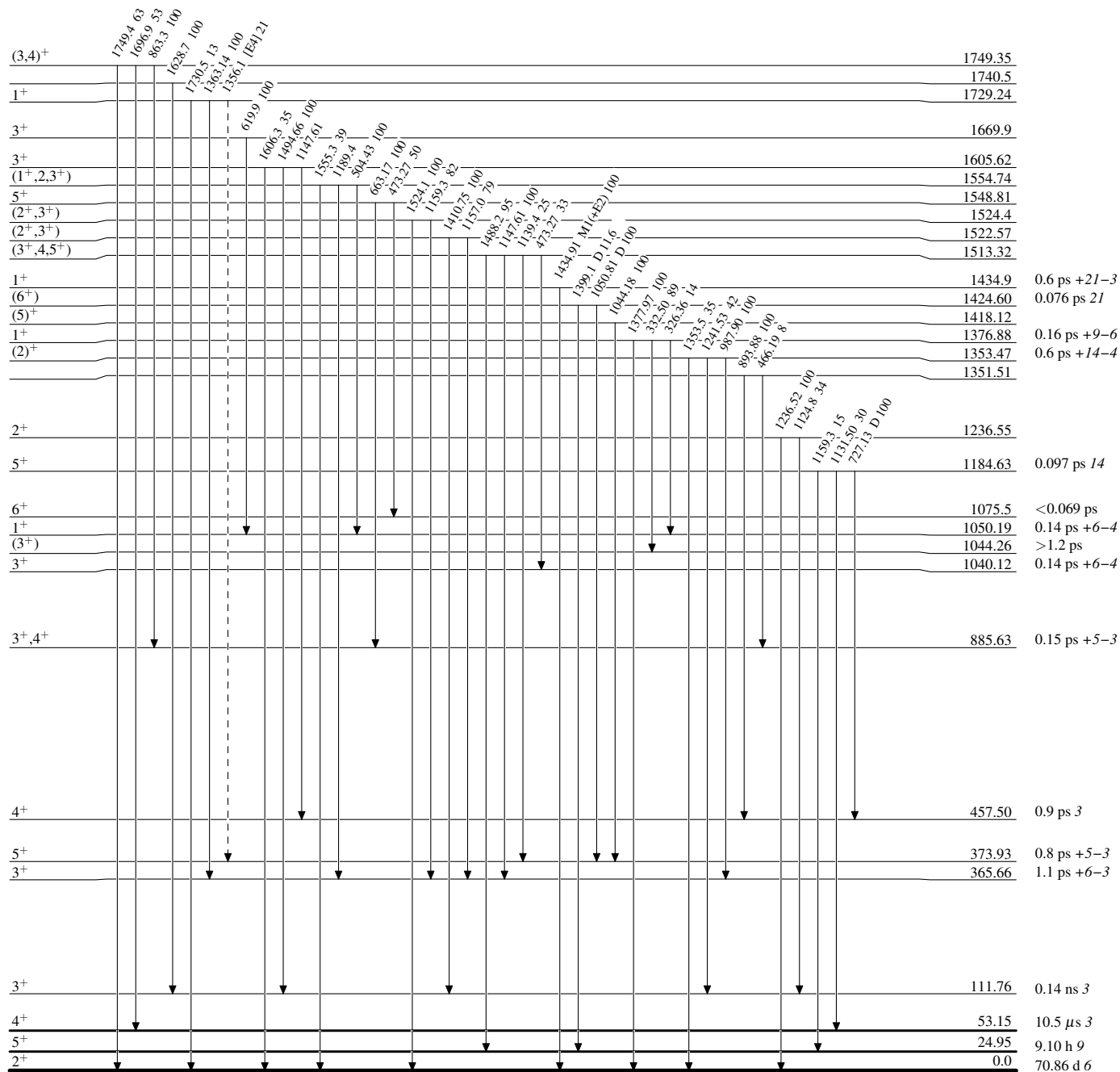
-----► γ Decay (Uncertain) $^{58}_{27}\text{Co}_{31}$

Adopted Levels, Gammas

Legend

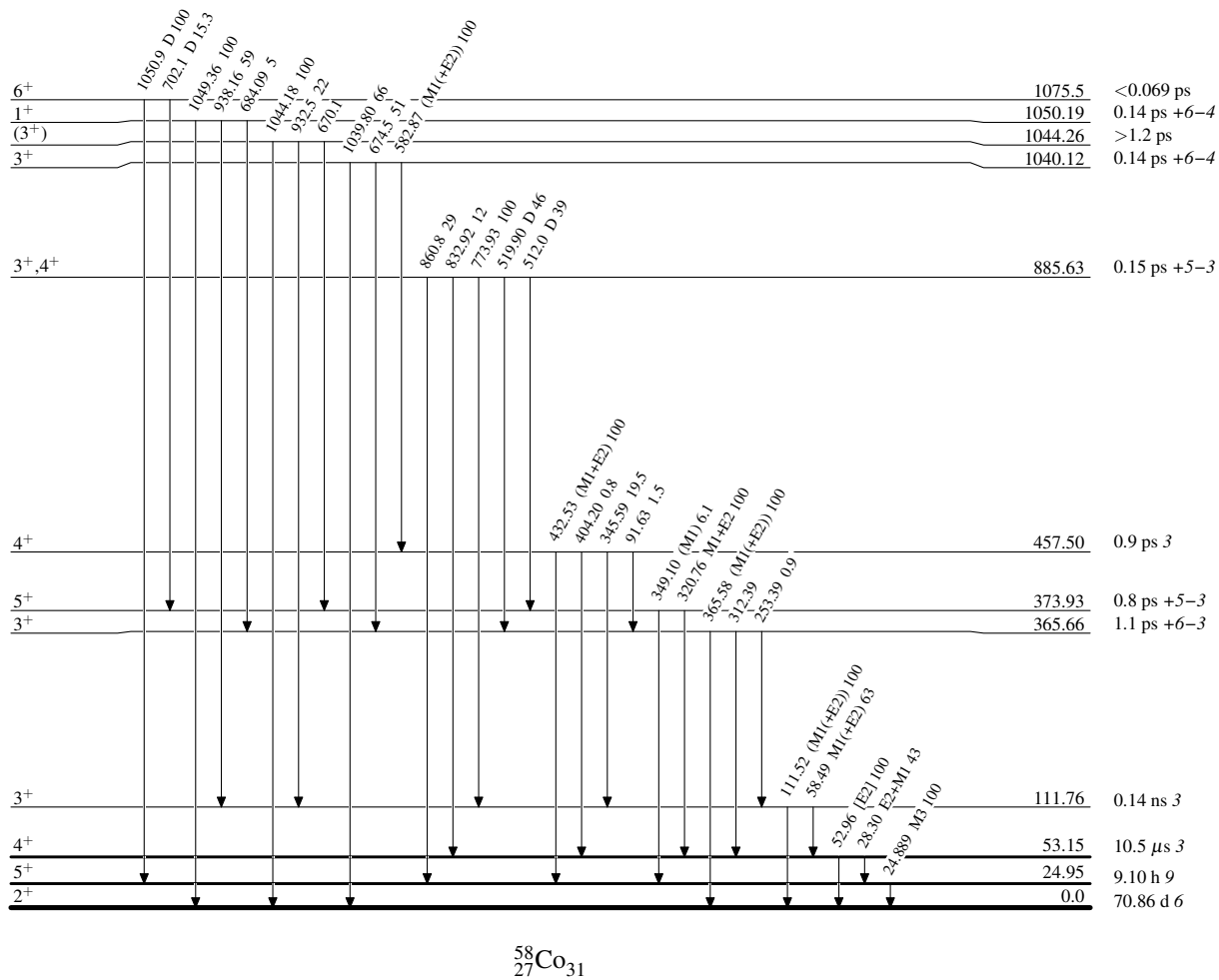
Level Scheme (continued)

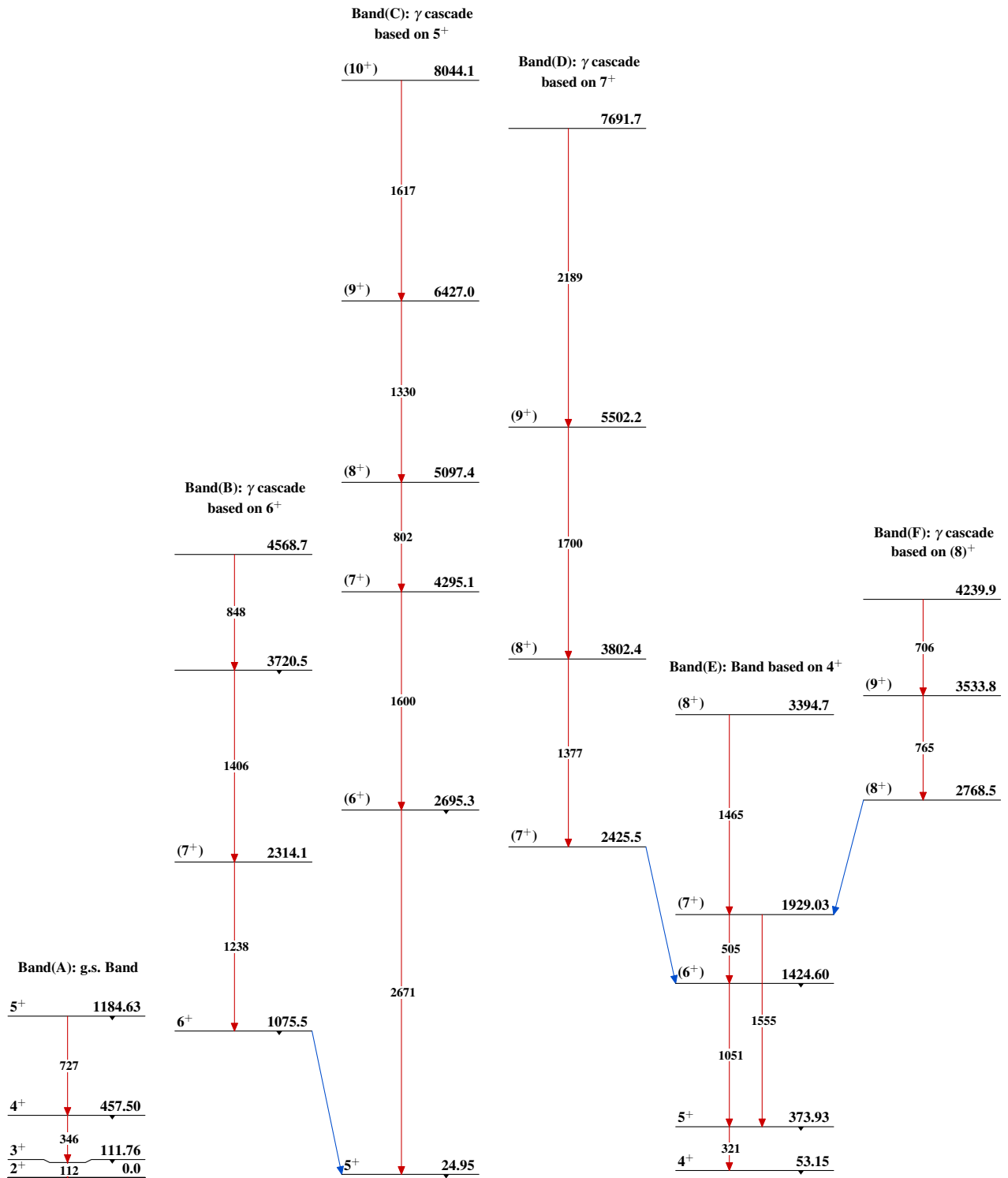
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{58}_{27}\text{Co}_{31}$

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

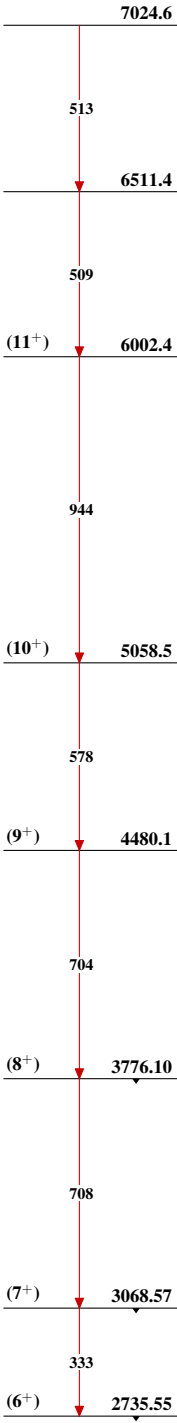
Intensities: Relative photon branching from each level



Adopted Levels, Gammas $^{58}_{27}\text{Co}_{31}$

Adopted Levels, Gammas (continued)

Band(G): Band based on 6^+



$^{58}_{27}\text{Co}_{31}$