Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 114, 1189 (2013)	1-Apr-2013

Q(β^-)=4642.26 *12*; S(n)=7725.10 *6*; S(p)=9552.89 *13*; Q(α)=−10857.4 *913* 2012Wa38

There are 62 neutron resonances for the ^{27}Al+n reaction in the 5 keV to 828 keV energy range (2006MuZX).

Other Reactions:
^{28}Si(n,p)^{28}Al: 1993Po05, 1984Br03, 1982Br04, 1982Ul01.
^{26}Mg(α,d)^{28}Al: 1966Ri04, 1976De24.

^{28}Al Levels

Cross Reference (XREF) Flags

A	^{28}Mg β^- decay	F	^{27}Al(d,pγ)
B	^{2}H(^{27}Al,pγ)	G	^{28}Si(μ^-,$\nu\gamma$)
C	^{26}Mg(^{3}He,p),(^{3}He,pγ)	H	^{29}Si(d,^{3}He)
D	^{27}Al(n,γ) E=thermal	I	^{30}Si(pol d,α),(d,α),(d,$\alpha\gamma$)
E	^{27}Al(d,p)		

E(level)†	J$^\pi$	T$_{1/2}$#	XREF	Comments
0.0	3$^+$	2.245 min *2*	ABCDEFGHI	%β^-=100 μ= 3.242 *5*; Q= 0.175 *14* μ,Q: From 2011StZZ. J$^\pi$: L=2 in (^{3}He,p),(^{3}He,pγ); from the decay study of isobaric triplet ^{28}Mg-^{28}Al-^{28}Si (1954Sh28). π=unnatural in (pol d,α). T$_{1/2}$: weighted average: 2.238 min *6* (1963We19), 2.240 min *7* (1969Wy01), 2.247 min *18*, (1970Ry05), 2.243 min *5* (1972Em01), 2.2405 min *8* (1971Va35), 2.2488 min *2* (1978Be61). An uncertainty of 0.1% introduced by the evaluator.
30.6382 *7*	2$^+$	2.07 ns *5*	A CDEFGHI	μ=+4.27 *40* J$^\pi$: L=2 in (^{3}He,p),(^{3}He,pγ) and from the decay study of isobaric triplet ^{28}Mg-^{28}Al-^{28}Si (1954Sh28). π=natural in (pol d,α). μ: From 2011StZZ. T$_{1/2}$: From (n,γ).
972.35 *3*	0$^+$	33 ps *2*	A CDEFGHI	J$^\pi$: L=0 in (^{3}He,p),(^{3}He,pγ), 941.79γ E2 to 2$^+$, J$^\pi$=0$^+$ in (pol d,α) based on low cross section. T$_{1/2}$: From Groningen thesis (1975) − by Du Marchie van Voorthuysen.
1013.637 *9*	3$^+$	103 fs *14*	BCDEFGHI	J$^\pi$: L=2 in (^{3}He,p),(^{3}He,pγ); L=0+2 in (d,p); π=unnatural in (pol d,α), 983γ M1+E2 to 2$^+$, 1013γ to 3$^+$. T$_{1/2}$: Weighted average of 104 fs *14* (1994Ka26), 90 fs *14* (1972Ma14), and 132 fs *21* (1977El04). Uncertainty is the lowest experimental value.
1372.917 *20*	1$^+$	223 fs *35*	A CDEFGHI	J$^\pi$: feeding from ^{28}Mg β^- decay: J$^\pi$(^{28}Mg)=0$^+$. L=0+2 in (^{3}He,p),(^{3}He,pγ), L=2 in (d,p), π=unnatural in (pol d,α). T$_{1/2}$: From (d,pγ).
1620.30 *4*	1$^+$	92 fs *22*	A CDEFGhI	J$^\pi$: feeding from ^{28}Mg β^- decay: J$^\pi$(^{28}Mg)=0$^+$; 1589.7γ M1+E2 to 2$^+$. L=0+2 in (d,p). T$_{1/2}$: From (d,pγ).
1622.907 *20*	2$^+$	63 fs *10*	CDEFGhI	J$^\pi$: L=0+2 in (d,p). 1622γ to 3$^+$, 1592γ to 2$^+$. T$_{1/2}$: Weighted average of 58 fs *16* (1990Ku22), 49 fs *14* (1972Ma14), and 139 fs *28* (1977El04).
2138.910 *10*	2$^+$	8 fs *1*	BCDEFGHI	J$^\pi$: L=2 in (^{3}He,p),(^{3}He,pγ); L=0+2 in (d,p). J$^\pi$=3$^+$ is rejected from (μ^-,$\nu\gamma$) (1972Mi11), π=natural in (pol d,α). T$_{1/2}$: Others: <10.4 fs (1972Ma14), 3 fs *2* (1990Ku22), 56 fs *14* (1977El04).

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Adopted Levels, Gammas (continued)

^{28}Al Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[#]	XREF	Comments
2201.43 *3*	1^+	32 fs *2*	BCDEFGHI	Jπ: 1229.8γ to 0^+, 2170.7γ to 2^+, L=0+2 in (^{3}He,p),(^{3}He,pγ); L=2 in (d,p), π=unnatural in (pol d, α). $T_{1/2}$: Weighted average of 41 fs *4* ((^{27}Al,pγ)−1994Ka26), 42 fs *7*, 27 fs *3* ((μ⁻,νγ)−1997Mo11,1995Br15), 24 fs *7*, and 83 fs *49* ((d,pγ)- 1972Ma14 and 1977El04).
2271.745 *19*	4^+	22 fs *3*	BCDEFGHI	Jπ: L=2 in (d,p), π=natural in (pol d, α), 2271γ to 3^+, and 310.2γ from 5^+ state at 2582 keV. $T_{1/2}$: Others: 10 fs *6* (1972Ma14), 42 fs *14* (1977El04).
2486.20 *6*	2^+	66 fs *7*	BCDEFGHI	Jπ: L=2 in (^{3}He,p),(^{3}He,pγ), L=0+2 in (d,p), π=natural in (pol d, α), γ rays to 1^+, 2^+, and 3^+ states. $T_{1/2}$: Others: 69 fs *21* (1972Ma14), 76 fs *28* (1977El04).
2581.81 *22*	5^+	313 fs *25*	BCDEF HI	Jπ: From a combination of measurements of relative parities together with cross-section and vector-analyzing power angular distribution ((pol d,α),(d,α),(d,αγ)). L=4 in (^{3}He,p),(^{3}He,pγ). $T_{1/2}$: Weighted average of 284 fs *35* ((^{27}Al,pγ) − 1994Ka26), 381 fs *69*, 416 fs *69*, and 284 fs *49* ((d,pγ) − 1972Ma14, 1977El04, and 1975Fr11).
2656.30 *4*	4^+	22 fs *3*	BCDEF HI	Jπ: L=4 in (^{3}He,p),(^{3}He,pγ), L=2 in (d,p), π=natural in (pol d,α), 1642γ and 2656γ to 3^+. $T_{1/2}$: Others: 21 fs *8* (1972Ma14), 49 fs *21* (1977El04).
2987.94 *12*	$(3,1)^+$	62[@] fs *55*	cDEF HI	Jπ: L=(2) in (d,p), L=2 in (d,^{3}He), π=unnatural in (pol d,α), from shell model calculations, $J^\pi=3^+$ is proposed in 1994Ve02 − (d,^{3}He).
3011 *3*	0^+		c E HI	Jπ: from L=2 in (d,p), L=0 component for the doublet (2987 keV) in (^{3}He,p), and not populated in (n,γ).
3105 *1*	1^+	15 fs *3*	BC EFGHI	E(level): From (^{3}He,pγ). Jπ: L=2 in (d,p), L=0+2 in (d,^{3}He), π=unnatural in (pol d,α), 3074γ to 2^+, from the weak L=0 component in (d,^{3}He) $J^\pi=1^+$ is proposed in 1994Ve02.
3296.34 *4*	(3^+)	8 fs *3*	BCDEF I	Jπ: L=2 in (^{3}He,p),(^{3}He,pγ); L=0+2 in (d,p); π=unnatural in (pol d,α), γ rays to 2^+. $T_{1/2}$: Other: 97 fs *21* (1977El04).
3347.19 *4*	2^+	6 fs *2*	BCDEF HI	Jπ: L=2 in (^{3}He,p),(^{3}He,pγ); L=0+2 in (d,p); π=natural in (pol d,α), γ rays to 1^+,2^+,3^+. $T_{1/2}$: Other: 97 fs *35* (1977El04).
3465.294 *10*	4^-	44 fs *2*	BCDEF HI	Jπ: L=1+3 in (d,p), π=unnatural in (pol d,α), 1193.49γ to 4^+, 2451.54γ to 3^+. $T_{1/2}$: Other: 62 fs *8* (1977El04).
3542.1 *6*	$(1)^+$		C E GHI	Jπ: L=2 in (d,p), π=unnatural in (pol d,α), 1919γ to 2^+, and γ ray feeding this state.
3591.457 *9*	(3^-)	29 fs *4*	B DEF I	Jπ: L=1+3 in (d,p), π=natural in (pol d,α), 3591γ to 3^+, 3561γ to 2^+. $T_{1/2}$: Other: 69 fs *14* (1977El04).
3601 *5*			C H	
3670.69 *7*	3^+	132[@] fs *42*	CDEF I	Jπ: L=0+2 in (d,p), π=unnatural in (pol d,α), γ rays to 2^+.
3709.222 *16*	$(2,3)^+$	187[@] fs *21*	CDEF HI	Jπ: L=2 in (^{3}He,p); L=0+2 in (d,p).
3760 *3*	0^+		E HI	Jπ: L=0 in (d,^{3}He) and low cross section in (pol d,α).
3875.773 *11*	2^-	19 fs *2*	B DEFG I	Jπ: L=1+3 in (d,p); π=unnatural in (pol d,α), γ rays to 3^+ and 1^+. $T_{1/2}$: Other: 55 fs *14* (1977El04).
3901.00 *4*	$(1,3)^+$	187[@] fs *28*	CDEF HI	Jπ: L=2 in (d,p), π=unnatural in (pol d,α), 2277γ to 2^+, 2887γ, 3900 to 3^+.
3935.603 *18*	2^+	21 fs *7*	BCDEF HI	XREF: C(3948). Jπ: L=0+2 in (d,p), π=natural in (pol d,α), γ rays to 3^+ and 2^+. $T_{1/2}$: Other: <42 fs (1977El04).
4033 *2*	5^-	108 fs *43*	C EF I	XREF: E(4044). Jπ: L=1+3 in (d,p), π=natural in (pol d,α), 567γ to 4^-, 1761γ to 4^+, the large (2J+1)S(d,p) excludes L=1 component and $J^\pi=3^-$ (1971Ca27 and 1975Fr11). $T_{1/2}$: From (d,pγ).
4115 *4*	1^+		C E GHI	XREF: C(4127).

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Adopted Levels, Gammas (continued)

^{28}Al Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[#]	XREF	Comments
				E(level): From (pol d,α). Jπ: L=0+2 in (^{3}He,p), L=2 in (d,p), π=unnatural in (pol d,α).
4244.49 *10*	2$^+$	42[@] fs *21*	CDEF HI	XREF: C(4254). Jπ: L=0+2 in (d,p), L=2 in (^{3}He,p), π=natural in (pol d,α).
4313 *3*	(1,3,5)$^+$		E HI	Jπ: L=2 in (d,p), π=unnatural in (pol d,α).
4385 *4*	*a*		I	
4461.97 *10*	(2,4)$^+$		DE HI	Jπ: L=2 in (d,p), π=(natural) in (pol d,α).
4516.94 *18*	3$^+$‡		HI	Jπ: L=2 in (pol d,α).
4596.56 *4*	3$^+$‡	159[@] fs *83*	CD FGHI	XREF: C(4608). Jπ: L=2 in (^{3}He,p), (d,^{3}He), and (pol d,α).
4691.097 *6*	3$^-$	4.9 fs *6*	BCDEF HI	Jπ: L=1+3 in (d,p), L=(2) in (^{3}He,p), π=(natural) in (pol d,α), γ rays to 3$^+$, 2$^+$, and 4$^+$ states. $T_{1/2}$: Other: 35 fs *9* (1977El04).
4739 *2*	(0 to 5)$^+$		E I	Jπ: L=(0)+2 in (d,p).
4764.922 *10*	2$^-$	3.5 fs *14*	BCDEF HI	Jπ: L=1+3 in (d,p), π=unnatural in (pol d,α), γ rays to 3$^+$, 2$^+$, 1$^+$, 3$^-$ states. $T_{1/2}$: Other: 35 fs *9* (1977El04).
4848.73 *10*	1$^+$		C E GHI	E(level): From a reinterpretation by the reviewer of the ^{27}Al(n,γ) spectrum of 1982Sc14 (please see table 28c in 1998En04). Jπ: L=0+2 in (^{3}He,p), L=(0$^+$)2 in (d,p), π=unnatural in (pol d,α).
4903.577 *6*	2$^-$	5.7 fs *8*	BCDEF I	Jπ: L=1+3 in (^{3}He,p), L=1+3 in (d,p), π=unnatural in (pol d,α). $T_{1/2}$: Other: 39 fs *6* (1977El04).
4928 *3*	&		E HI	
4997.01 *5*	2$^-$		GH	Jπ: L=1 in (d,^{3}He), π=natural in (pol d,α), γ rays to 3$^+$, 2$^+$, and 1$^+$ states.
4999 *8*	2$^+$		E I	Jπ: L=0+2 in (d,p), π=natural in (pol d,α).
5015.51 *3*	3$^+$		CDE I	Jπ: L=0+2 in (d,p); π=unnatural in (pol d,α), γ rays to 2$^+$, 3$^+$, and 4$^+$.
5134.849 *8*	3$^-$	5.6 fs *7*	BCDEF I	Jπ: L=1+3 in (d,p), π=natural in (pol d,α), γ rays to 3$^+$ and 2$^+$. $T_{1/2}$: Other: 28 fs *7* (1977El04).
5165 *2*	6$^-$,(4$^-$,5$^-$)	<49 fs	EF I	Jπ: L=3 in (d,p); also L=(5) in ^{26}Mg(α,d)–1976De24. The large (2J+1)S(d,p) value suggest Jπ=6$^-$ (1975Fr11). $T_{1/2}$: From 1975Fr11.
5176.96 *6*	(1$^+$ to 3$^+$)	7 fs *3*	B D I	Jπ: γ rays to 1$^+$,2$^+$, and 3$^+$ states.
5190.4 *3*	*a*		I	π=tentative.
5287 *5*	*a*		I	
5333 *5*			H	
5344.75 *12*			D	
5377.83 *4*		4 fs *2*	B D H	
5406 *5*	(0 to 2)$^-$		H	Jπ: L=1 in (d,^{3}He).
5442.267 *8*	2$^-$	3.3 fs *10*	BCD FGH	XREF: C(5452). Jπ: L=1 in (^{3}He,p), γ rays to 1$^+$,2$^+$,3$^+$ states. $T_{1/2}$: Other: 21 fs *7* (1977El04).
5530 *8*			C	
5741.115 *13*	(1 to 4$^+$)	4 fs *1*	B D GH	Jπ: γ rays to 2$^+$. The strength of (n,γ) primary excludes Jπ=0$^+$.
5761.12 *21*			C E H	
5797.537 *18*	2$^-$	<4 fs	B D H	Jπ: L=1 in (^{3}He,p),(^{3}He,pγ); γ rays to 1$^+$, 2$^+$, 3$^+$ states.
5809.0 *6*			C E	
5860.78 *3*	(2,3$^+$)	<7 fs	BCD H	Jπ: γ rays to 1$^+$, 2$^+$, 3$^+$ states. J≠1 from pol ^{27}Al(pol n,γ).
5904.3 *6*	(1,2,3)$^+$		C E	Jπ: L=2 in (^{3}He,p).
5925.1 *18*			E	
5956.8 *4*			E	
5981.2 *6*			E	
5992.58 *10*	0$^+$		C	T=2 Jπ: L=0 in (^{3}He,p).
6004.8 *4*		<35 ns	EF	

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Adopted Levels, Gammas (continued)

^{28}Al Levels (continued)

E(level)†	Jπ	$T_{1/2}$#	XREF	Comments
6019.59 *3*	2^-		D H	Jπ: L=1 in (d,^{3}He); γ rays to 3^+ and 2^+.
6063.8 *5*			E H	
6070.9 *5*	$(0,1)^+$		C E	Jπ: L=0,(+2) in (^{3}He,p).
6160.3 *6*			E	
6198.874 *12*	(2^+ to 4^+)	<4 fs	B D	Jπ: γ rays to 2^+ to 4^+.
6238.2 *7*	$(0,1,2)^-$		C E	XREF: C(6253). Jπ: L=1 in (^{3}He,p).
6316.798 *9*	2^+	<4 fs	BCD H	Jπ: γ rays to 3^+, 0^+, 4^+, and 3^- states.
6329.1 *4*			E H	
6419.71 *9*	(1^+,2^+)		D GH	Jπ: γ rays to 0^+, 2^+, 3^+.
6441.443 *11*	(3^+,4)		D	Jπ: γ rays to 3^+, 4^+, 5^+; the strength of the (n,γ) primary excludes $J^\pi=5^+$.
6453.6 *5*			E H	
6462.2 *8*			E H	
6480.5 *5*			E	
6493.3 *8*			E H	
6512.5 *5*			E	
6564.1 *5*			E	
6568.6 *4*			E	
6571.6 *6*			C E	
6584			E H	
6623.06 *4*	(1^+ to 4^+)		CD	Jπ: γ rays to 3^+ and 2^+.
6651.14 *5*	(1 to 2)$^-$		D H	Jπ: L=1 in (d,^{3}He).
6671.1 *9*			C E	
6720.3 *5*			E H	
6756.68 *5*	(2^+,3)		D	Jπ: γ rays to 2^+, 4^+, 2^- states.
6772.8 *9*			C E	
6787.6 *6*			E	
6809.2 *9*			E	
6826.0 *5*			E	
6835 *10*			E	
6853 *10*			C E	
6893.695 *23*	(2^+,3)		DE	Jπ: γ rays to 2^+, 2^-, 3^+, 4^+ states.
6911 *8*			C	
6931 *10*			E	
6967 *10*			E	
7022 *10*			E	
7087 *10*			E	
7118 *10*	$(1,2,3)^+$		C E	XREF: C(7133). Jπ: L=2 in (^{3}He,p).
7146 *10*			E	
7176.47 *5*	(1^+,2^+,3^+)		DE	Jπ: γ rays to 1^+ and 3^+ states.
7194 *8*			C	
7243 *10*			E	
7258 *8*			C	
7269.47 *6*	(2^+,3^+,4^+)		DE	Jπ: γ ray feeding 2^+ to 4^+ states.
7318 *8*			C	
7341 *10*			C E	
7408.77 *11*	(1^+ to 4^+)		E	Jπ: γ rays to 2^+ and 3^+ states.
7444 *10*			C E	
7457 *10*			E	
7502 *10*			C E	
7592 *10*			C E	
7654 *10*			E	
7669 *10*			C E	
7700 *10*			E	

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Adopted Levels, Gammas (continued)

^{28}Al Levels (continued)

† From a least-squares fit to γ-ray energies for levels with measured γ rays − those were available in the literature. Calculated γ rays were obtained after the least-squares fit. Levels without depopulating γ rays are from reference dataset/s (weighted average).
‡ Two possibilities 1^+,3^+ from L=2 and unnatural parity (pol d,α). The analyzing power data, negative at forward angles, excludes 1^+ ((pol d,α) − 1978Ik01).
# From 1994Ka26−(^{27}Al,pγ), except otherwise noted.
@ From 1977El04.
& Unnatural.
a Natural.

γ(^{28}Al)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.	δ	Comments
30.6382	2^+	30.6382 *7*	100	0.0	3^+	M1		B(M1)(W.u.)=0.370 *9* Mult.: α(K)exp=0.032 *66* (1954Sh28). δ: Weighted average of −0.03 *5* (1971Bo36), −0.03 *2* (1972La28), and +0.004 *6* (1972He22) is +0.001 *6*.
972.35	0^+	941.79 *6*	100	30.6382	2^+	E2		B(E2)(W.u.)=4.6 *3*
1013.637	3^+	983.018 *16*	100 *11*	30.6382	2^+	M1+E2	+0.13 *5*	B(M1)(W.u.)=0.14 *3*; B(E2)(W.u.)=12 *10* δ: From 1971Bo36.
		1013.676 *21*	61 *7*	0.0	3^+	[M1]		B(M1)(W.u.)=0.078 *16*
1372.917	1^+	359.28#	<0.5#	1013.637	3^+			
		400.58 *3*	63 *7*	972.35	0^+	[M1]		B(M1)(W.u.)=0.54 *12*
		1342.30 *11*	100 *10*	30.6382	2^+	M1+E2	−0.14 *5*	B(M1)(W.u.)=0.022 *5*; B(E2)(W.u.)=1.2 *9* δ: Weighted average of −0.25 *12* (1971Bo36), −0.04 *6* (1972La28), and −0.35 *10* (1972He22).
		1372.8 *2*	15 *8*	0.0	3^+	[E2]		B(E2)(W.u.)=9 *5* E_γ: From ^{28}Mg β$^-$ decay.
1620.30	1^+	247.38#	<2.1#	1372.917	1^+			
		606.65#	<2.1#	1013.637	3^+			
		647.93 *7*	4.4 *25*	972.35	0^+	[M1]		B(M1)(W.u.)=0.034 *22* I_γ: Other: 1.8 in ^{28}Mg β$^-$ decay.
		1589.72 *8*	100 *13*	30.6382	2^+	M1+E2	+0.18 *9*	B(M1)(W.u.)=0.051 *16*; B(E2)(W.u.)=3 *+4−3* δ: From 1971Bo36. Other: +0.2 *4* (1972La28).
		1620.0 *4*	6.4	0.0	3^+			E_γ,I_γ: From ^{28}Mg β$^-$ decay.
1622.907	2^+	249.99#	<4#	1372.917	1^+			
		609.26#	<3#	1013.637	3^+			
		650.54#	<2#	972.35	0^+			
		1592.29 *12*	7.8 *11*	30.6382	2^+			
		1622.87 *6*	100 *11*	0.0	3^+	[M1]		B(M1)(W.u.)=0.073 *16*
2138.910	2^+	515.99#	<6#	1622.907	2^+			
		518.60#	<4#	1620.30	1^+			
		765.97#	<2#	1372.917	1^+			
		1125.54 *21*	13 *3*	1013.637	3^+			
		1166.51#	<4#	972.35	0^+			
		2108.24 *4*	100 *4*	30.6382	2^+			
		2138.828 *18*	79 *4*	0.0	3^+			
2201.43	1^+	62.52#	<4.4#	2138.910	2^+			
		578.51#	6# *4*	1622.907	2^+			
		581.12#	<3.2#	1620.30	1^+			

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Adopted Levels, Gammas (continued)

$\gamma(^{28}Al)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	Comments
2201.43	1^+	828.49[#]	<3.2[#]	1372.917	1^+		
		1187.74[#]	<5.7[#]	1013.637	3^+		
		1229.8 *4*	20[@] *3*	972.35	0^+	[M1]	B(M1)(W.u.)=0.054 *10* E_γ: From (^{3}He,p),(^{3}He,pγ).
		2170.70 *3*	100[@] *4*	30.6382	2^+		
		2201.25[#]	<7.6[#]	0.0	3^+		
2271.745	4^+	132.83[#]	<5[#]	2138.910	2^+		
		648.82[#]	<5[#]	1622.907	2^+		
		1258.05[#]	<4[#]	1013.637	3^+		
		2240.92[#]	<2.5[#]	30.6382	2^+		
		2271.650 *23*	100 *5*	0.0	3^+	[M1]	B(M1)(W.u.)=0.079 *13*
2486.20	2^+	214.45[#]	<1.6[#]	2271.745	4^+		
		347.29[#]	<1.6[#]	2138.910	2^+		
		863.26[#]	18[#] *5*	1622.907	2^+		
		865.87 *15*	100 *13*	1620.30	1^+	[M1]	B(M1)(W.u.)=0.30 *6*
		1113.24[#]	<3.3[#]	1372.917	1^+		
		1472.48[#]	<3.3[#]	1013.637	3^+		
		1513.76[#]	10[#] *3*	972.35	0^+		
		2455.8 *3*	6.7 *13*	30.6382	2^+		
		2486.09 *7*	33 *2*	0.0	3^+	[M1]	B(M1)(W.u.)=0.0042 *7*
2581.81	5^+	310.2[#]	6[#] *2*	2271.745	4^+	[M1]	B(M1)(W.u.)=0.13 *5*
		1568.08[#]	<5.3[#]	1013.637	3^+		
		2582.2 *5*	100[@] *2*	0.0	3^+	[E2]	B(E2)(W.u.)=2.9 *3*
2656.30	4^+	384.55[‡]	<1.3[@]	2271.745	4^+		
		517.38[‡]	<1.3[@]	2138.910	2^+		
		1033.35[‡]	<4[@]	1622.907	2^+		
		1642.35 *10*	100[@] *5*	1013.637	3^+	[M1]	B(M1)(W.u.)=0.16 *3*
		2625.40[‡]	<5.3[@]	30.6382	2^+		
		2656.34 *7*	33[@] *5*	0.0	3^+		E_γ,I_γ: γ-ray energy reported in (n,γ)−1982Sc14, but not placed in the level scheme. Placement of γ ray is from (d,pγ). Iγ in 1982Sc14 is 14.5 *9*.
2987.94	$(3,1)^+$	1364.99 *20*	100 *16*	1622.907	2^+		
		1975.2 *5*	7 *2*	1013.637	3^+		
		2987.69 *17*	84 *11*	0.0	3^+		
3105	1^+	3074[#]	100[#]	30.6382	2^+		
3296.34	(3^+)	1157.38[#]	23[#] *11*	2138.910	2^+		
		1673.43 *11*	55 *7*	1622.907	2^+		
		3265.49 *4*	100 *7*	30.6382	2^+		
3347.19	2^+	1975.2 *5*	5 *2*	1372.917	1^+		
		3316.34 *5*	5 *1*	30.6382	2^+		
		3346.97 *4*	100 *6*	0.0	3^+		
3465.294	4^-	1193.64 *10*	8.5 *14*	2271.745	4^+	[E1]	B(E1)(W.u.)=0.00073 *13*
		2451.48 *4*	5.5 *3*	1013.637	3^+	[E1]	B(E1)(W.u.)=5.5×10^{-5} *5*
		3465.067 *10*	100 *3*	0.0	3^+	[E1]	B(E1)(W.u.)=0.000352 *22*
3542.1	$(1)^+$	1919.1[‡]	100	1622.907	2^+		
3591.457	(3^-)	1968.35 *12*	2.13 *21*	1622.907	2^+	[E1]	B(E1)(W.u.)=4.2×10^{-5} *8*
		2577.725 *21*	46.8 *21*	1013.637	3^+	[E1]	B(E1)(W.u.)=0.00041 *6*
		3560.547 *19*	19.8 *11*	30.6382	2^+	[E1]	B(E1)(W.u.)=6.6×10^{-5} *10*
		3591.211 *11*	100 *3*	0.0	3^+	[E1]	B(E1)(W.u.)=0.00032 *5*

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Adopted Levels, Gammas (continued)

$\gamma(^{28}Al)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	Comments
3670.69	3^+	2047.70 *23*	96 *14*	1622.907	2^+		
		3639.88 *9*	100 *7*	30.6382	2^+		
3709.222	$(2,3)^+$	1437.40[#]	58[#] *13*	2271.745	4^+		
		1570.22[#]	42[#] *13*	2138.910	2^+		
		3678.15 *5*	69 *4*	30.6382	2^+		
		3708.976 *16*	100 *4*	0.0	3^+		
3875.773	2^-	2255.42 *5*	20.4 *15*	1620.30	1^+	[E1]	B(E1)(W.u.)=0.00054 *8*
		2502.85 *7*	5.9 *4*	1372.917	1^+	[E1]	B(E1)(W.u.)=0.000113 *15*
		2862.24 *22*	1.4 *2*	1013.637	3^+		
		2902.7 *7*	0.4 *2*	972.35	0^+		
		3875.480 *11*	100 *4*	0.0	3^+	[E1]	B(E1)(W.u.)=0.00052 *6*
3901.00	$(1,3)^+$	2276.7 *11*	17 *13*	1622.907	2^+		
		2887.22 *4*	100 *4*	1013.637	3^+		
		3900.65 *7*	100 *4*	0.0	3^+		
3935.603	2^+	2921.84 *3*	85 *3*	1013.637	3^+		
		3904.76 *8*	61 *3*	30.6382	2^+		
		3935.276 *23*	100 *6*	0.0	3^+		
4033	5^-	567[#]	100[#] *6*	3465.294	4^-		
		1761[#]	96[#] *6*	2271.745	4^+	[E1]	B(E1)(W.u.)=0.00061 *25*
4115	1^+	1976[b]	<29[b]	2138.910	2^+		
		2492[b]	68[b] *35*	1622.907	2^+		
		2742[b]	68[b] *44*	1372.917	1^+		
		4084[b]	100[b] *59*	30.6382	2^+		
		4114[b]	<59[b]	0.0	3^+		
4244.49	2^+	3230.68 *20*	48 *5*	1013.637	3^+		
		4213.49 *11*	100 *5*	30.6382	2^+		
4461.97	$(2,4)^+$	3448.03 *23*	76 *12*	1013.637	3^+		
		4461.60 *10*	100 *7*	0.0	3^+		
4516.94	3^+	2893.87[a] *17*	100	1622.907	2^+		
4596.56	3^+	2974.0 *3*	19 *2*	1622.907	2^+		
		4565.67 *15*	22 *2*	30.6382	2^+		
		4596.14 *4*	100 *6*	0.0	3^+		
4691.097	3^-	2419.36 *8*	2.98 *21*	2271.745	4^+	[E1]	B(E1)(W.u.)=0.00019 *3*
		2552.07 *12*	2.00 *17*	2138.910	2^+	[E1]	B(E1)(W.u.)=0.000111 *17*
		3068.16 *10*	1.72 *13*	1622.907	2^+		
		4660.039 *8*	55 *2*	30.6382	2^+	[E1]	B(E1)(W.u.)=0.00050 *7*
		4690.677 *7*	100 *3*	0.0	3^+	[E1]	B(E1)(W.u.)=0.00090 *12*
4764.922	2^-	1173.4 *3*	7.1 *16*	3591.457	(3^-)		
		2563.51 *23*	1.8 *2*	2201.43	1^+		
		2625.903 *16*	24.9 *13*	2138.910	2^+	[E1]	B(E1)(W.u.)=0.0018 *8*
		3392.00 *10*	10.4 *6*	1372.917	1^+	[E1]	B(E1)(W.u.)=0.00035 *14*
		3750.83 *18*	0.64 *5*	1013.637	3^+		
		4733.847 *12*	100 *5*	30.6382	2^+	[E1]	B(E1)(W.u.)=0.0012 *5*
		4764.45 *3*	16.6 *9*	0.0	3^+		
4848.73	1^+	4817.21[‡]	100	30.6382	2^+		
4903.577	2^-	3889.73 *6*	7.2 *3*	1013.637	3^+		
		4903.115 *6*	100 *4*	0.0	3^+	[E1]	B(E1)(W.u.)=0.00102 *16*
4997.01	2^-	3623.74[a] *7*	100 *7*	1372.917	1^+		
		4965.8[a] *4*	10 *1*	30.6382	2^+		
		4996.64[a] *7*	74 *3*	0.0	3^+		
5015.51	3^+	2743.74 *19*	33 *4*	2271.745	4^+		
		4001.70 *5*	100 *6*	1013.637	3^+		
		4984.30 *4*	84 *4*	30.6382	2^+		

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Adopted Levels, Gammas (continued)

γ(^{28}Al) (continued)

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.	Comments
5134.849	3⁻	4119.9 *4*	1.3 *3*	1013.637	3⁺		
		5103.718 *15*	13.1 *8*	30.6382	2⁺		
		5134.342 *9*	100.0 *8*	0.0	3⁺	[E1]	B(E1)(W.u.)=0.00085 *11*
5165	6⁻,(4⁻,5⁻)	1132#	100#	4033	5⁻		
5176.96	(1⁺ to 3⁺)	2691.0 *3*	41 *8*	2486.20	2⁺		
		3803.7 *5*	16 *4*	1372.917	1⁺		
		4162.4[c] *5*	27[c] *7*	1013.637	3⁺		
		5176.44 *6*	100 *4*	0.0	3⁺		
5190.4		3569.9[a] *3*	100	1620.30	1⁺		
5344.75		4330.75[a] *12*	100	1013.637	3⁺		
5377.83		3754.70 *15*	54 *4*	1622.907	2⁺		
		5377.27 *4*	100 *6*	0.0	3⁺		
5442.267	2⁻	3303.150 *13*	57 *3*	2138.910	2⁺	[E1]	B(E1)(W.u.)=0.0021 *7*
		3820.9 *4*	1.7 *4*	1620.30	1⁺		
		4068.99 *4*	7.9 *4*	1372.917	1⁺		
		5411.069 *8*	100 *5*	30.6382	2⁺	[E1]	B(E1)(W.u.)=0.0008 *3*
		5441.9 *3*	0.75 *10*	0.0	3⁺		
5741.115	(1 to 4⁺)	3254.9 *3*	3.9 *5*	2486.20	2⁺		
		4119.9[c] *4*	7[c] *1*	1620.30	1⁺		
		5709.852 *13*	100 *5*	30.6382	2⁺		
5761.12		5729.6[a] *4*	35 *4*	30.6382	2⁺		
		5760.57[a] *24*	100 *4*	0.0	3⁺		
5797.537	2⁻	4424.24 *3*	94 *5*	1372.917	1⁺		
		4783.0 *5*	2.9 *8*	1013.637	3⁺		
		5766.250 *22*	100 *5*	30.6382	2⁺		
		5796.94 *4*	32.6 *18*	0.0	3⁺		
5860.78	(2,3⁺)	3659.08 *9*	41 *3*	2201.43	1⁺		
		3721.52 *22*	19.4 *19*	2138.910	2⁺		
		4237.43[c] *10*	39[c] *3*	1622.907	2⁺		
		5829.89 *24*	8.4 *7*	30.6382	2⁺		
		5860.13 *3*	100 *5*	0.0	3⁺		
5992.58	0⁺	2450.4[&] *6*	21[&] *5*	3542.1	(1)⁺		
		3790.1[&] *4*	100[&] *9*	2201.43	1⁺		
		4371.9[&] *5*	79[&] *9*	1620.30	1⁺		
		4619.3[&] *12*	33[&] *7*	1372.917	1⁺		
6019.59	2⁻	4396.40 *6*	31.0 *16*	1622.907	2⁺		
		5005.45 *9*	25.7 *16*	1013.637	3⁺		
		5988.32 *15*	12.3 *10*	30.6382	2⁺		
		6018.88 *3*	100 *5*	0.0	3⁺		
6198.874	(2⁺ to 4⁺)	3926.86 *24*	3.3 *4*	2271.745	4⁺		
		4059.78 *19*	4.4 *3*	2138.910	2⁺		
		4575.557 *21*	43 *3*	1622.907	2⁺		
		5184.99 *13*	4.4 *3*	1013.637	3⁺		
		6198.138 *12*	100 *3*	0.0	3⁺		
6316.798	2⁺	2724.6 *5*	1.0 *3*	3591.457	(3⁻)		
		3020.3 *7*	3.5 *10*	3296.34	(3⁺)		
		4045.00 *23*	1.15 *10*	2271.745	4⁺		
		5302.650 *14*	23.5 *10*	1013.637	3⁺		
		5344.24 *17*	0.85 *5*	972.35	0⁺		
		6316.017 *10*	100 *5*	0.0	3⁺		
6419.71	(1⁺,2⁺)	4280.37 *10*	100 *6*	2138.910	2⁺		
		5446.88 *15*	20.6 *12*	972.35	0⁺		
		6420.0 *5*	3.5 *6*	0.0	3⁺		
6441.443	(3⁺,4)	3859.47 *24*	6.7 *9*	2581.81	5⁺		

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Adopted Levels, Gammas (continued)

$\gamma(^{28}Al)$ (continued)

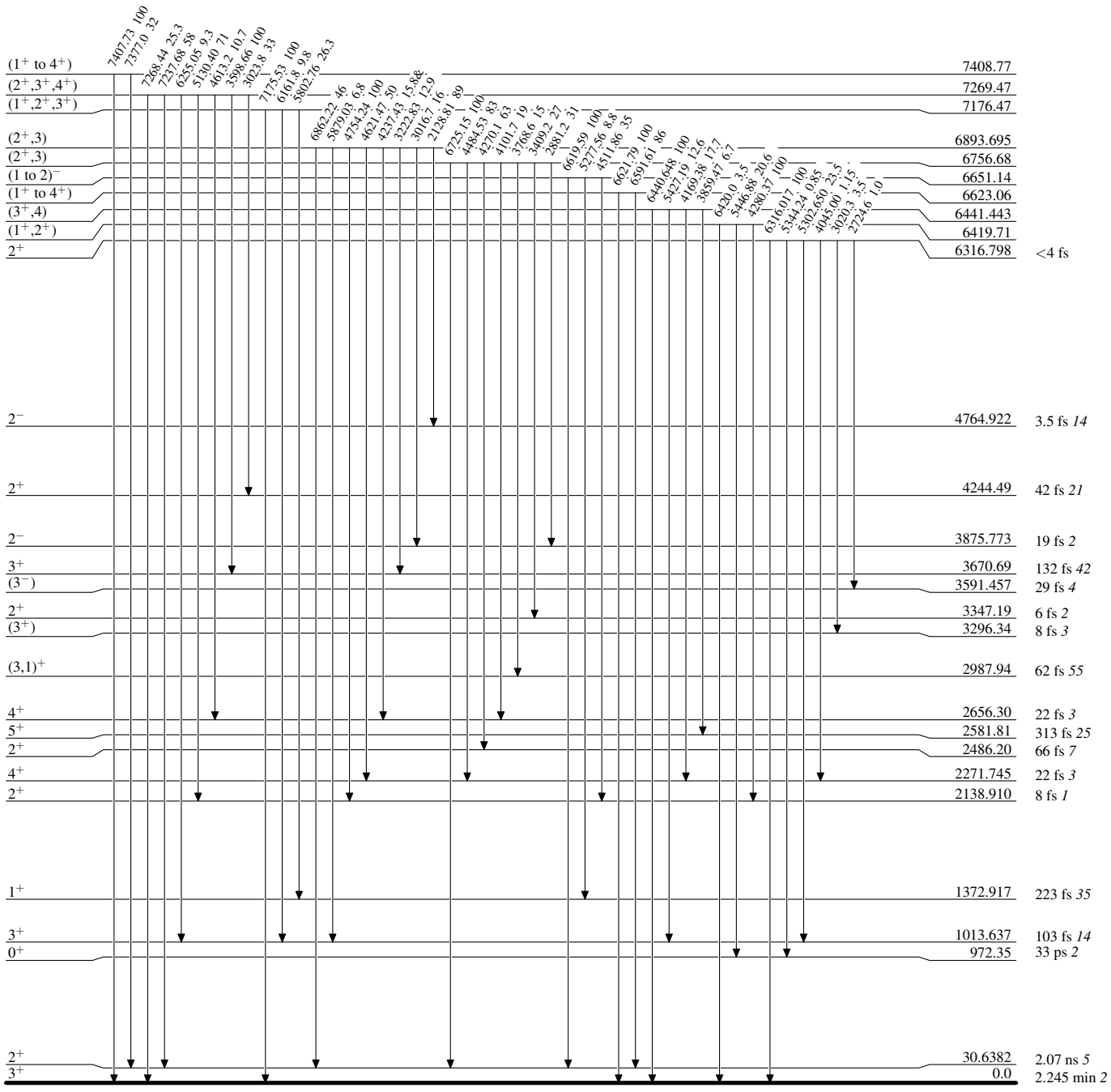
E_i(level)	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π
6441.443	(3+,4)	4169.38 *6*	17.7 *10*	2271.745	4+
		5427.19 *7*	12.6 *7*	1013.637	3+
		6440.648 *11*	100 *3*	0.0	3+
6623.06	(1+ to 4+)	6591.61 *4*	86 *5*	30.6382	2+
		6621.79 *18*	100 *11*	0.0	3+
6651.14	(1 to 2)−	4511.86 *5*	35 *2*	2138.910	2+
		5277.56 *16*	8.8 *4*	1372.917	1+
		6619.59 *14*	100 *8*	30.6382	2+
6756.68	(2+,3)	2881.2 *3*	31 *6*	3875.773	2−
		3409.2 *3*	27 *3*	3347.19	2+
		3768.6 *4*	15 *2*	2987.94	(3,1)+
		4101.7 *5*	19 *6*	2656.30	4+
		4270.1 *3*	63 *8*	2486.20	2+
		4484.53 *6*	83 *6*	2271.745	4+
		6725.15 *8*	100 *6*	30.6382	2+
6893.695	(2+,3)	2128.81 *7*	89 *5*	4764.922	2−
		3016.7 *7*	16 *5*	3875.773	2−
		3222.83 *12*	12.9 *8*	3670.69	3+
		4237.43[c] *10*	15.8[c] *13*	2656.30	4+
		4621.47 *5*	50 *3*	2271.745	4+
		4754.24 *4*	100 *5*	2138.910	2+
		5879.03 *24*	6.8 *5*	1013.637	3+
		6862.22 *4*	46 *2*	30.6382	2+
7176.47	(1+,2+,3+)	5802.76 *10*	26.3 *15*	1372.917	1+
		6161.8 *3*	9.8 *15*	1013.637	3+
		7175.53 *5*	100 *5*	0.0	3+
7269.47	(2+,3+,4+)	3023.8 *8*	33 *13*	4244.49	2+
		3598.66 *12*	100 *7*	3670.69	3+
		4613.2 *4*	10.7 *13*	2656.30	4+
		5130.40 *15*	71 *6*	2138.910	2+
		6255.05 *23*	9.3 *7*	1013.637	3+
		7237.68 *8*	58 *3*	30.6382	2+
		7268.44 *14*	25.3 *13*	0.0	3+
7408.77	(1+ to 4+)	7377.0[a] *3*	32 *3*	30.6382	2+
		7407.73[a] *11*	100 *8*	0.0	3+

[†] From (n,γ), except otherwise noted. For γ-ray energies only statistical uncertainty is given. In order to obtain total uncertainty 8 or 11 ppm has to be added in quadrature below or above 2.2 MeV, respectively.
[‡] Calculated by the evaluator from level energy differences. Recoil energy has been subtracted.
[#] γ-ray energy calculated from level energy differences. Recoil energy has been subtracted. γ-ray branching from (d,p),(d,pγ).
[@] From (d,p),(d,pγ).
[&] From (^{3}He,p),(^{3}He,pγ).
[a] The γ ray is introduced by the reviewer of the ^{27}Al(n,γ) spectrum of 1982Sc14. Please see Table 28d in 1998En04.
[b] γ-ray energy calculated from level energy differences. Recoil energy has been subtracted. γ-ray branching from (μ^-,$\nu\gamma$).
[c] Multiply placed with undivided intensity.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

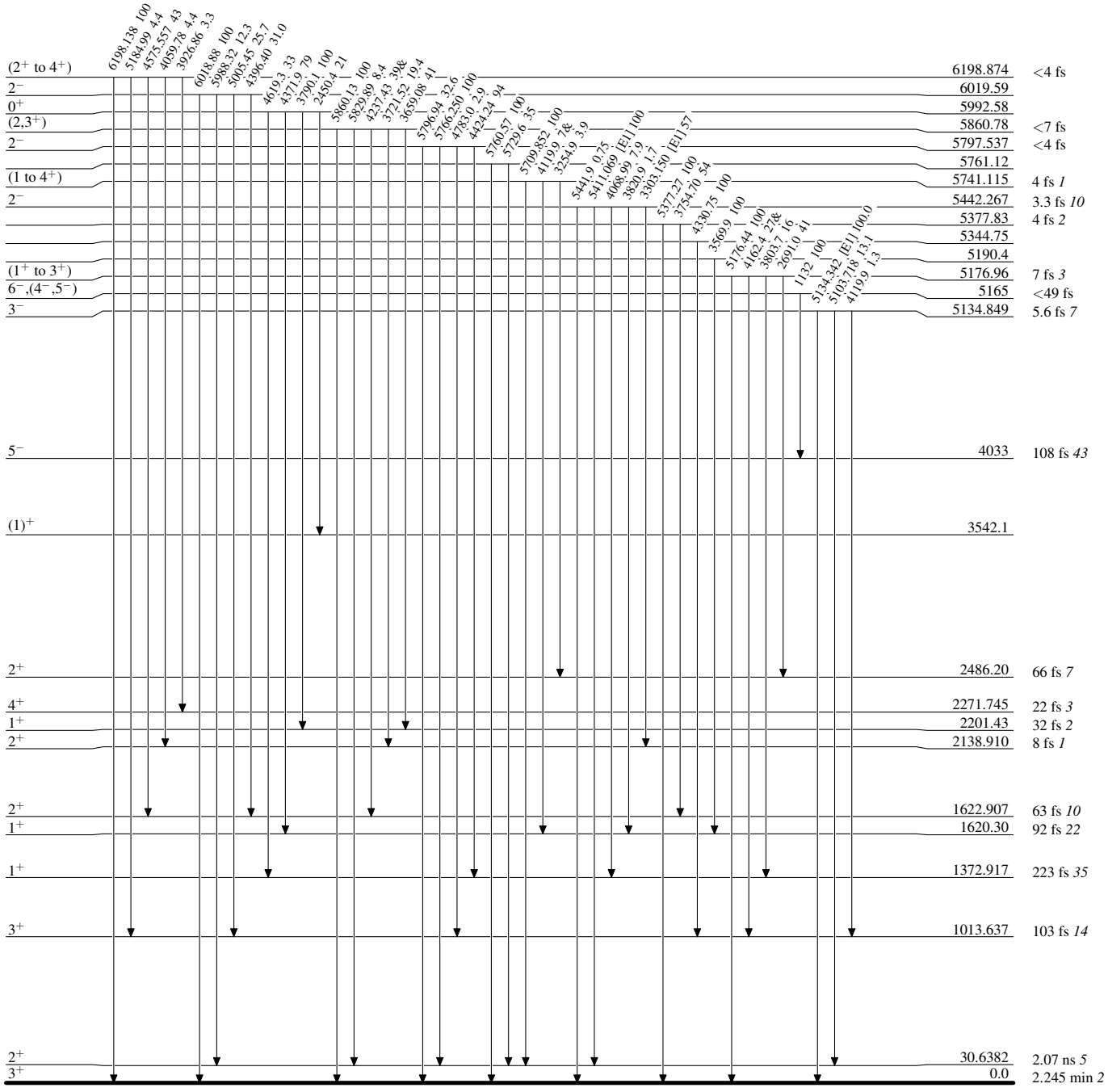


$^{28}_{13}Al_{15}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

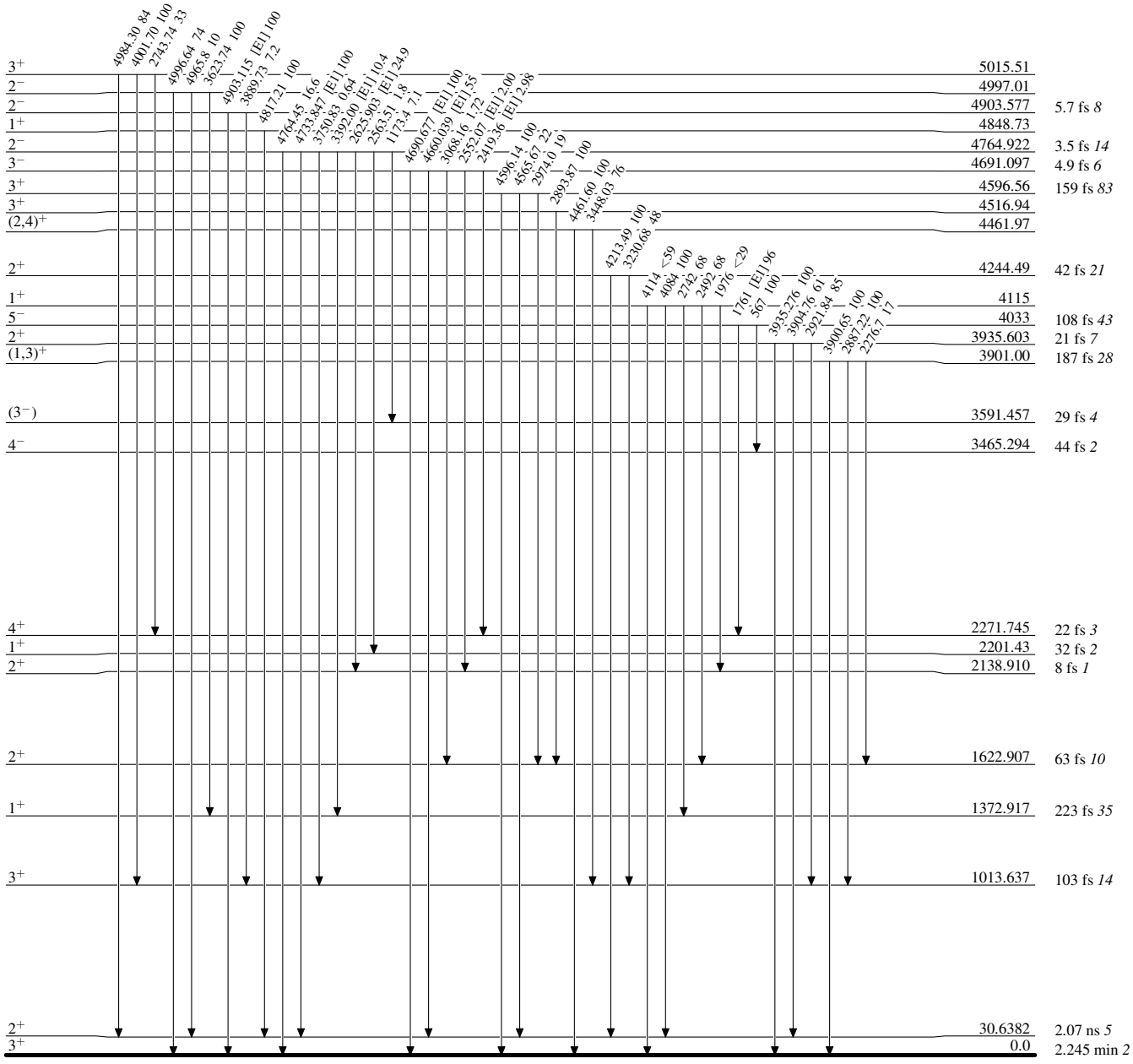


$^{28}_{13}Al_{15}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

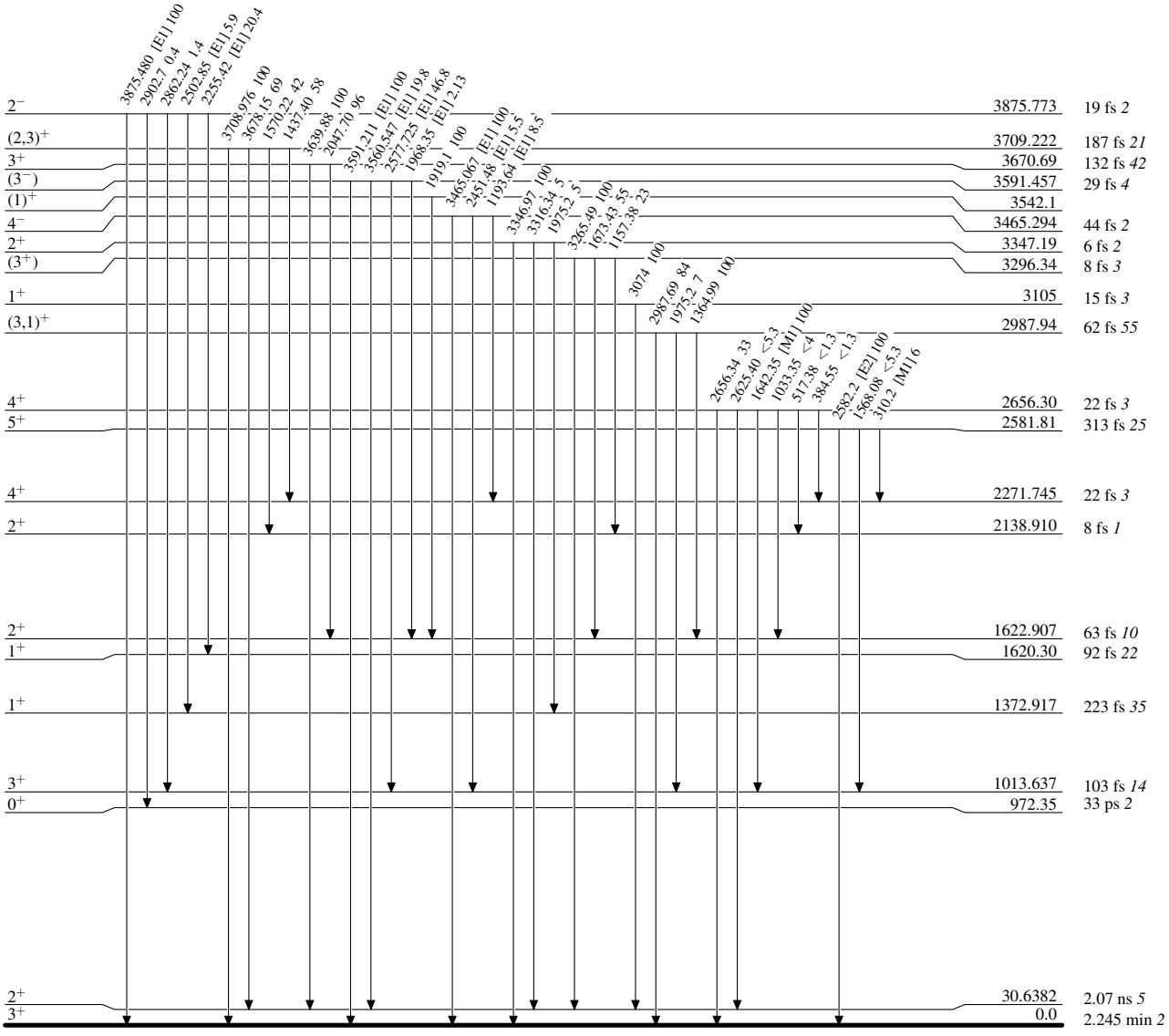


$^{28}_{13}Al_{15}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

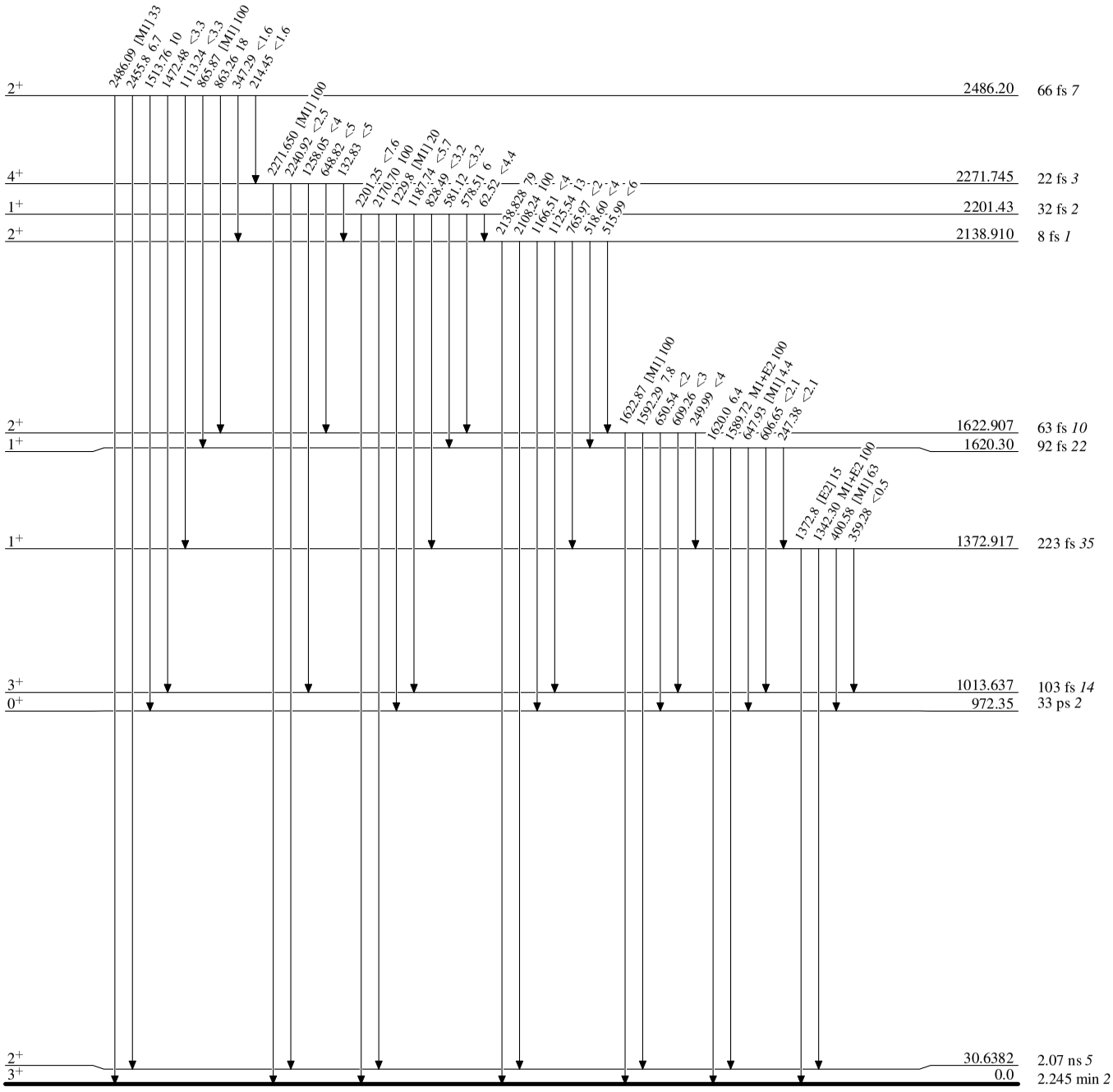


$^{28}_{13}Al_{15}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

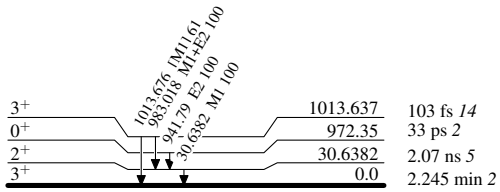


$^{28}_{13}Al_{15}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



$^{28}_{13}Al_{15}$