

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	S. -c. Wu	NDS 91,1 (2000)	15-Jul-2000

$Q(\beta^-) = -7052.39$ 10; $S(n) = 13189.2$ 9; $S(p) = 10344.8$ 7; $Q(\alpha) = -8004.7$ 4 [2012Wa38](#)

Note: Current evaluation has used the following Q record \$ -7051.4 10 13189.8 8 10345.0 7 [1995Au04](#).

Data from (p, γ) are often inconsistent with data from other experiments. The evaluator has excluded part of the (p, γ) data from the

Adopted Levels, gammas file.

Isotope shifts: [1996Lu12](#), [1996Fu23](#), [1995Ga44](#), [1992Az03](#).

Other reactions:

$^{27}\text{Al}(^{19}\text{F},\gamma)$: [1993Fe01](#).

$^{46}\text{Ti}(t,t')$: [1994So26](#).

$^{46}\text{Ti}(^{58}\text{Ni},^{58}\text{Ni})$: [1997Ku25](#), [1994Ab33](#).

 ^{46}Ti Levels

Band(α,t) $K^\pi = 0^+$ g.s. band. See ($^{28}\text{Si},2\alpha2p\gamma$), ($^9\text{Be},3n\gamma$), ($^9\text{Be},2pn\gamma$) or ($^{12}\text{C},\alpha2p\gamma$).

Band(O,S) $K^\pi = 3^-$ band. See ($^{28}\text{Si},2\alpha2p\gamma$), ($^9\text{Be},3n\gamma$), ($^9\text{Be},2pn\gamma$) or ($^{12}\text{C},\alpha2p\gamma$).

Cross Reference (XREF) Flags

A	$^{46}\text{Sc} \beta^-$ decay	L	$^{44}\text{Ca}(^{16}\text{O},^{14}\text{C})$	W	$^{46}\text{Ti}(p,p')$, (pol p,p')
B	$^{46}\text{V} \beta^+$ decay	M	$^{45}\text{Sc}(p,\gamma)$: primary γ 's	X	$^{46}\text{Ti}(p,p'\gamma)$, (pol p,p'\gamma)
C	$^{12}\text{C}(^{40}\text{Ca},\alpha2p\gamma)$	N	$^{45}\text{Sc}(p,\gamma)$: secondary γ 's	Y	$^{46}\text{Ti}(d,d')$
D	$^{28}\text{Si}(^{28}\text{Si},2\alpha2p\gamma)$	O	$^{45}\text{Sc}(^3\text{He},d)$	Z	$^{46}\text{Ti}(^3\text{He},^3\text{He}')$
E	$^{32}\text{S}(^{16}\text{O},2p\gamma)$	P	$^{45}\text{Sc}(\alpha,t)$	Others:	
F	$^{39}\text{K}(^{12}\text{C},\alpha p\gamma)$	Q	$^{45}\text{Sc}(^{16}\text{O},^{15}\text{N})$	AA	$^{46}\text{Ti}(\alpha,\alpha'), (\alpha,\alpha'\gamma)$
G	$^{40}\text{Ar}(^9\text{Be},3n\gamma)$	R	$^{46}\text{Ti}(\gamma,\gamma')$	AB	Coulomb excitation
H	$^{40}\text{Ca}(^9\text{Be},2pn\gamma)$	S	$^{46}\text{Ti}(e,e'p)$	AC	$^{47}\text{Ti}(p,d)$
I	$^{42}\text{Ca}(^6\text{Li},d)$	T	$^{46}\text{Ti}(e,e')$	AD	$^{47}\text{Ti}(d,t)$
J	$^{43}\text{Ca}(\alpha,n\gamma)$	U	$^{46}\text{Ti}(n,n')$	AE	$^{47}\text{Ti}(^3\text{He},\alpha)$
K	$^{44}\text{Ca}(^3\text{He},n)$	V	$^{46}\text{Ti}(n,n'\gamma)$	AF	$^{48}\text{Ti}(p,t)$

E(level)	J^π	$T_{1/2}$	XREF		Comments
0.0	0^+	stable	A B C D E F G H I J K	L M N O P Q R S T U V W X Y Z	XREF: Others: AA , AB , AC , AD , AE , AF
889.286 3	$2^+ \#$	5.32 ps 15	A B C D E F G H I J K	L M N O P Q R S T U V W X Y Z	XREF: Others: AA , AB , AC , AD , AE , AF $\mu = +0.98$ 24 (1981Sh19 , 1989Ra17) $Q = -0.21$ 6 (1989Ra17) J^π : E2 γ to 0^+ . $T_{1/2}$: weighted average of 4.69 ps 34 ($^{46}\text{Sc} \beta^-$ decay), 4.5 ps 5 ($^{16}\text{O},2p\gamma$), 5.6 ps 2 (Coulomb excitation, $B(E2) = 0.090$ 4), 7.5 ps 14 (γ,γ') and 1.4 ps +35-7 (p, γ) (1987Mo17).
2009.846 5	$4^+ \#$	1.62 ps 10	A C D E F G H I J	L M N O P Q T V W X Y Z	XREF: Others: AA , AB , AC , AD , AE , AF J^π : L=4 in (p,p') and (p,t). $T_{1/2}$: weighted average of 1.6 ps 1 (coulomb excitation), 1.8 ps 2 ($^{16}\text{O},2p\gamma$), 1.5 ps 3 ($^9\text{Be},3n\gamma$), 1.3 ps 6 ($\alpha,n\gamma$) and 1.5 ps 3 (p, γ); other: 3.2 ps +12-6 ($\alpha,\alpha'\gamma$).
2611.0 2	0^+	76 ^{&} fs 21	B	J V W X Y Z	XREF: Others: AF E(level): from (p,p'\gamma). J^π : L=0 in (p,t).
2961.8 2	$2^+ @$	166 fs 7	J M N O P	T V W X Y	J^π : L=2 in (p,p'). $T_{1/2}$: from (p, γ). Others: 150 fs 40 ($\alpha,n\gamma$) and 49 fs 8

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Adopted Levels, Gammas (continued) ^{46}Ti Levels (continued)

E(level)	J ^π	T _{1/2}	XREF					Comments
								(p,p'γ).
3058.46 12	3 ⁻	7 ^{&} ps 2	CDEFGH	J	MNO		VWXY	XREF: Others: AA J ^π : L=3 in (p,p') and (p,t). T _{1/2} : from (α,nγ); other: 2 ps +2-1 (p,γ).
3168.00 10	1 ⁻ @	176 fs 24	C	J	MN	R	VWX	J ^π : from L=1 in (p,p'). T _{1/2} : weighted average of 150 fs 40 (α,nγ) and 191 fs 30 (p,γ); 28 fs 8 from (γ,γ') and 49 fs 9 from (p,p'γ) not used.
3213				J			V	E(level): from (n,n'γ).
3217.3								
3235.7 2	2 ⁺ @	29 fs 6		J	MNO	Q	T VWXY	XREF: Others: AA, AC, AE, AF J ^π : L=2 in (p,p') and (p,t). However, L=5 in (α,α'). T _{1/2} : weighted average of 28 fs 10 (α,nγ) and 29 fs +7-3 (p,γ); 13 fs 2 from (p,p'γ) not used.
3298.86 16	6 ⁺ #	0.99 ps 9	CDEFGH	J	MNOPQ		VW	XREF: Others: AD, AE, AF J ^π : L=6 in (p,p'). T _{1/2} : weighted average of 1.0 ps 5 (¹⁶ O,2pγ), 1.0 ps 2 (⁹ Be,3nγ), 1.1 ps 3 (α,nγ), and 0.97 ps 11 (p,γ).
3338 18							W	E(level): from (p,p').
3441.39 17	4 ⁻ #	66 ps 4	CDE	GH	J	MNO	VWX	J ^π : γ from 6 ⁻ , γ to 3 ⁻ is ΔJ=1, D. T _{1/2} : weighted average of 58 ps 7 (¹⁶ O,2pγ) and 68 ps 4 (⁹ Be,2pnγ); 10 ps +7-4 from (α,nγ) not used.
3553.1							V	E(level): from (n,n'γ).
3569.3 3	3 ⁻ ‡	50 fs +19-16	C		MN		VWX	XREF: Others: AA, AC, AF J ^π : L=3 in (p,p'). T _{1/2} : from (p,p'γ); 211 fs 24 from (p,γ) was not used.
3571.7 2	0 ⁺ ‡	192 fs +16-13		J	MNOP		V XY	XREF: Others: AF J ^π : L=0 in (p,t). T _{1/2} : weighted average of 180 fs 40 (α,nγ) and 194 fs +17-14 (p,γ).
3579.8		70 fs 30		J	MN		V	XREF: Others: AE E(level): from (n,n'γ). E(level)=3582 from (α,nγ); 3583 3 from weighted average of values from (p,γ) and (³ He,α).
3610.2				J			VW	E(level): from (n,n'γ). E(level)=3608 from (α,nγ).
3677	2 ⁻						T W	Observed in (e,e') and (p,p'). J ^π : from σ(θ) in (e,e'). J ^π : from σ(θ) in (e,e').
3696	2 ⁺						T	
3723.8 4	(2) ⁺ ‡	57 fs 4	C	J	MNO		VWX	XREF: Others: AF J ^π : L=1 in (³ He,d); L=(2) in (p,t). However, L=(4) in (p,p'). T _{1/2} : weighted average of 59 fs 4 (p,γ), 52 fs 14 (α,nγ); 33 fs +16-11 from (p,p'γ) not included.
3731	1 ⁺						T	J ^π : from σ(θ) in (e,e').
3737.9 3	(1,2 ⁺)						X	E(level): from (p,p'γ).
3771.5	+						V	J ^π : γ to 0 ⁺ . XREF: Others: AC E(level): from (n,n'γ). E(level)=3780 15 from (p,d). J ^π : L=1+3 in (p,d).
3826.43 18	5 ⁻	3.7 ^{&} ps 21	C	H	J	MN	V	XREF: Others: AA J ^π : γ(θ) in (¹² C,α2pγ); γ to 3 ⁻ , 6 ⁺ .
3845.0 5	2 ⁺ ‡	8.9 fs 21		J	MNO		V X	XREF: Others: AE, AF J ^π : L=2 in (p,t).

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Adopted Levels, Gammas (continued) ^{46}Ti Levels (continued)

E(level)	J ^π	T _{1/2}	XREF				Comments
3848 5	(4 ⁺)					W	T _{1/2} : weighted average of 10 fs 4 (p,γ) and 8.5 fs 25 (p,p'γ); other: <0.024 ps from (α,nγ).
3852.44 16	5 ^{-#}	4.8 ps 8	CD	GH	J	V	J ^π : L=(4) in (p,p').
3856 4					MN	Q	J ^π : γ to 3 ⁻ , 6 ⁺ ; γ(θ) in (¹² C,α2pγ).
3872	1 ⁺					T	T _{1/2} : weighted average of 3.8 ps 17 (⁹ Be,3nγ), 4.9 ps 10 (⁹ Be,2pnγ), and 12 ps 5 (α,nγ).
3889.3 14	2 ⁺	0.38& ps 7			JKL	VWX	XREF: Others: AC
3905.6 3	(1,2 ⁺)	22 fs 4			J MN	V X	J ^π : from σ(θ) in (e,e').
3926 8	(2 ⁺) [‡]					OP	J ^π : γ to 0 ⁺ .
3941.9	4 ⁺	<0.02 ps			J MN	Q VW	T _{1/2} : from (p,p'γ); other: 38 ps +14-9 (p,γ).
4003.1					J	VW	XREF: Others: AE, AF
4025.3	2 ⁺					O T VWX	E(level): weighted average of values from (α,t), (³ He,α), and (p,t).
4038.8					J MN	V	J ^π : L=(2)in (p,t).
4130.1	2 ⁺ [‡]					MNOP VW	XREF: Others: AC, AD, AE
4178.7	3 ^{-‡}				J	V	E(level): from (n,n'γ). E(level)=3941 from (α,nγ);
4191.5	3 ⁻				J MNO	VW	3941 3 from weighted average of values from (p,γ), (p,p'), (p,d) and (³ He,α).
4315.8 10	1 ⁺	2.7 fs 4	B			R T VWX	J ^π : L=4 in (p,p').
4322.6 13							XREF: Others: AC
4372.0	3 ⁻						E(level): from (n,n'γ). E(level)=4003 from (α,nγ).
4398 8	(5 ⁻ ,6 ⁺) [‡]					O	XREF: Others: AE
4417.1 5	6 ⁻	0.45& ps 17	C	H	J MN	VW	E(level): from (n,n'γ). E(level)=4029 5 from weighted average of values from (p,p') and (³ He,α).
4437 15							J ^π : from σ(θ) in (e,e'); γ's to 4 ⁺ and 0 ⁺ levels.
4500 10							E(level): from (n,n'γ). E(level)=4040 from (α,nγ);
4523.4 10	4 ⁺	0.07& ps 3	C	G	J MN	V	4040 4 from (p,γ).

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Adopted Levels, Gammas (continued) ^{46}Ti Levels (continued)

E(level)	J ^π	T _{1/2}	XREF		Comments
4527 5	(6 ⁺)		MNOPQ	W	XREF: Others: AE J ^π : L=(6) in (p,p').
4573 20					XREF: Others: AE E(level): from (³ He,α).
4617			O		
4662.30 18	6 ⁻ #	1.4 ps 4	CD GH J	V	J ^π : γ to 4 ⁻ is ΔJ=2, E2; γ to 5 ⁻ is ΔJ=1, D. T _{1/2} : from (⁹ Be,3nγ).
4675 10	0 ⁺ ‡				XREF: Others: AF J ^π : L=0 in (p,t).
4697	(2 ⁺)		J MN	W	XREF: Others: AE J ^π : L=(2) in (p,p').
4726.4 10	(5 ⁻ ,6 ⁺)		C J OP		XREF: Others: AA J ^π : from γ(θ) in (¹² C,α2pγ).
4791 4	(3 ⁻)‡			W	XREF: Others: AE , AF E(level): weighted average of values from (p,p'), (3He,a) and (p,t).
4827.2 22	3 ⁻		MN	W	J ^π : L=(3) in (p,t).
4845	+		O		J ^π : L=3 in (p,p').
4896.9 3	8 ⁺ #	0.49 ps 6	CD FGH J	W	J ^π : L=1+3 in (³ He,d). J ^π : γ to 6 ⁺ is ΔJ=2, Q; RUL.
					T _{1/2} : weighted average of 0.45 ps 9 (⁹ Be,3nγ), 0.6 ps 2 (⁹ Be,2pnγ), 0.39 ps 12 (α,nγ) and 0.92 ps 23 (²⁸ Si,2α2pγ).
4950 10	2 ⁺ ‡		O		XREF: Others: AF E(level): from (p,t).
5000 10					J ^π : L=2 in (p,t). XREF: Others: AF E(level): from (p,t).
5023.7 12	3 ⁻		C G J MNO	W	XREF: Others: AA , AE J ^π : L=3 in (p,p'); L=0 in (³ He,d). However, L=4 in (α,α').
5079 4	(4 ⁺)		MN	W	J ^π : L=(4) in (p,p').
5094	+		O		J ^π : L=1 in (³ He,d).
5117 20					XREF: Others: AE E(level): from (³ He,α).
5154 10				W	E(level): from (p,p').
5180	+		MNO Q		J ^π : L=3 in (¹⁶ O, ¹⁵ N).
5197.60 18	7 ⁻ #	0.83 ps 3	CD GH J		J ^π : γ to 5 ⁻ is ΔJ=2, Q; RUL. T _{1/2} : from (α,nγ). Other: 0.6 ps 2 (⁹ Be,3nγ).
5206 9	3 ⁻			W	XREF: Others: AE , AF E(level): weighted average of values from (p,p') (³ He,α) and (p,t).
5230 10	2 ⁺			T W	J ^π : L=3 in (p,p'); L=(4) in (p,t). E(level): from (p,p').
5280	6 ⁺		J		J ^π : from σ(θ) in (e,e'). XREF: Others: AA J ^π : L=6 from (α,α').
5321	2 ⁺		O T		XREF: Others: AE E(level): from (e,e').
5361 9	(5 ⁻ ,6 ⁺)		P	W	J ^π : from σ(θ) in (e,e').
5363	2 ⁺		O T		J ^π : L=(5,6) in (p,p'). E(level): from (e,e').
5409 10	3 ⁻			W	J ^π : from σ(θ) in (e,e'). J ^π : L=3 in (p,p').

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Adopted Levels, Gammas (continued) ^{46}Ti Levels (continued)

E(level)	J $^{\pi}$	T _{1/2}	XREF		Comments
5515 10	2 ⁺			W	J $^{\pi}$: L=2 in (p,p').
5530 4	3 ⁻		MNOP		XREF: Others: AE , AF
					J $^{\pi}$: L=3 in (p,t).
5604 10	(2 ⁺)			W	J $^{\pi}$: L=(2) in (p,p').
5610 30	0 ⁺		K O		J $^{\pi}$: L=0 in (^3He ,n).
5700 9	(2 ⁺)			W	XREF: Others: AE
					J $^{\pi}$: L=(2) in (p,p').
5794 4	4 ⁺		MN	W	J $^{\pi}$: L=4 in (p,p').
5811	+		O		J $^{\pi}$: L=0 in (^3He ,d).
5828 10	3 ⁻			W	J $^{\pi}$: L=3 in (p,p').
5840	+				XREF: Others: AD
					J $^{\pi}$: L=3 in (d,t).
5872 10	(2 ⁺)			W	XREF: Others: AA
					J $^{\pi}$: L=(2) in (p,p').
5903 20	+		O		XREF: Others: AE
					E(level): from (^3He , α).
5950 4	3 ⁻		MN	W	J $^{\pi}$: L=1+3 in (^3He ,d).
5965 26	(6 ⁺) [‡]		OP		J $^{\pi}$: L=3 in (p,p').
					XREF: Others: AF
5992 10	(4 ⁺)			W	J $^{\pi}$: L=(6) in (p,t).
6021	+		O		J $^{\pi}$: L=(4) in (p,p').
6025			J		J $^{\pi}$: L=1 in (^3He ,d).
6094	3 ⁻ ,4 ⁻		O		J $^{\pi}$: L=0 in (^3He ,d).
6118 10	2 ⁺			W	XREF: Others: AF
					E(level): from (p,p').
6134	2 ⁺		O	T	J $^{\pi}$: L=2 in (p,p').
6150.5 4	8 ⁻ #	0.31 ps 3	CD GH J		J $^{\pi}$: from $\sigma(\theta)$ in (e,e').
					J $^{\pi}$: γ to 6 ⁻ is $\Delta J=2$, Q; RUL.
					T _{1/2} : weighted average of 0.46 ps 12 (^9Be ,3n γ) and 0.30 ps 3 (^{28}Si ,2 α 2p γ).
6200.4 9	8 ⁺	<0.19 ps	CD G J		J $^{\pi}$: from (^{28}Si ,2 α 2p γ); however, J=(7) from (^{12}C , α 2p γ).
					T _{1/2} : from (^{28}Si ,2 α 2p γ).
6217 10	3 ⁻		O	W	J $^{\pi}$: L=3 in (p,p').
6241.9 3	10 ⁺ #	0.84 ps 4	CD FGH J		J $^{\pi}$: γ to 8 ⁺ is $\Delta J=2$, E2; no γ to J<8.
					T _{1/2} : weighted averaged of 0.83 ps 4 (α ,n γ), 1.0 ps 3 (^9Be ,3n γ), 0.9 ps 2 (^9Be ,2pn γ) and 1.7 ps 4 (^{28}Si ,2 α 2p γ).
6251			O		
6266 6			MN	W	
6305 20					XREF: Others: AE
					E(level): from (^3He , α).
6338 10	4 ⁺		O	W	J $^{\pi}$: L=4 in (p,p').
6360	1 ⁺			W	J $^{\pi}$: L=0 in (p,p').
6395 6	4 ⁺		K MN	W	XREF: Others: AA
					E(level): weighted average of values from (^3He ,n), (p, γ) and (p,p').
					J $^{\pi}$: L=4 in (p,p').
6398	1 ⁺			T	J $^{\pi}$: from $\sigma(\theta)$ in (e,e').
6424	+		O		J $^{\pi}$: L=1 in (^3He ,d).
6458 10	3 ⁻			W	J $^{\pi}$: L=3 in (p,p').
6513 10				W	E(level): from (p,p').
6550	+		O		J $^{\pi}$: L=1 in (^3He ,d).

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Adopted Levels, Gammas (continued) ^{46}Ti Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF		Comments
6574 10				W	E(level): from (p,p').
6616	+		0		J^π : L=1 in ($^3\text{He},d$).
6685 10	4 ⁺			W	J^π : L=4 in (p,p').
6739 10	(4) ⁺		0	W	J^π : L=(4) in (p,p'); L=1+3 in ($^3\text{He},d$).
6794 10				W	E(level): from (p,p').
6830.3 5	9 ⁻ #	0.52 ps 6	CD GH		J^π : γ to 7 ⁻ is $\Delta J=2$, Q; γ to 8 ⁺ is $\Delta J=1$, D; RUL. $T_{1/2}$: weighted average of 0.52 ps 8 from ($^9\text{Be},3n\gamma$) and 0.53 ps 10 ($^{28}\text{Si},2\alpha2p\gamma$).
6851	+		0	W	J^π : L=1+3 in ($^3\text{He},d$).
6890 10	4 ⁺		0	W	XREF: Others: AF
6958 10	(3 ⁻)			W	J^π : L=(3,4) in (p,p'); L=1 in ($^3\text{He},d$).
6974	+		0		J^π : L=(3) in (p,p').
7019 10	(3 ⁻ ,4 ⁺)			W	J^π : L=1+3 in ($^3\text{He},d$).
7041	+		0		J^π : L=(3,4) in (p,p').
7101	+		0		J^π : L=1+3 in ($^3\text{He},d$).
7120 10	(3 ⁻)			W	J^π : L=1 in ($^3\text{He},d$).
7147	+		0		J^π : L=(3) in (p,p').
					XREF: Others: AF
					E(level): from ($^3\text{He},d$).
					J^π : L=1 in ($^3\text{He},d$).
7172 10				W	E(level): from (p,p').
7180	1 ⁺			W	J^π : L=0 in (p,p').
7201	+		0		J^π : L=1 in ($^3\text{He},d$).
7238 10				W	E(level): from (p,p').
7288	+		0		J^π : L=1+3 in ($^3\text{He},d$).
7312 10	3 ⁻			W	J^π : L=3 in (p,p').
7350 30	+		K 0		E(level): from ($^3\text{He},n$).
					J^π : L=1 in ($^3\text{He},d$).
7392 10	(3 ⁻)			W	J^π : L=(3) in (p,p').
7410	1 ⁺			W	J^π : L=0 in (p,p').
7429	+		0		J^π : L=1 in ($^3\text{He},d$).
7472 10				W	E(level): from (p,p').
7534 10	(3 ⁻)			W	XREF: Others: AF
					J^π : L=(3) in (p,p').
7558	+		0		J^π : L=1 in ($^3\text{He},d$).
7584	+		0		J^π : L=1 in ($^3\text{He},d$).
7608 10	+		0	W	E(level): from (p,p').
					J^π : L=1 in ($^3\text{He},d$).
7630	1 ⁺			W	J^π : L=0 in (p,p').
7660 10				W	E(level): from (p,p').
7710 10	+		0	W	E(level): from (p,p').
					J^π : L=1 in ($^3\text{He},d$).
7730	1 ⁺			W	J^π : L=0 in (p,p').
7735 10				W	E(level): from (p,p').
7788 10	+		0	W	E(level): from (p,p').
					J^π : L=1 in ($^3\text{He},d$).
7849	+		0		J^π : L=1 in ($^3\text{He},d$).
7874 10				W	E(level): from (p,p').
7917	+		0		J^π : L=1 in ($^3\text{He},d$).
7937 10				W	E(level): from (p,p').
7941.8 4	11 ⁺ #	0.31 ps 8	CD GH		J^π : γ to 10 ⁺ is $\Delta J=1$, M1; no γ to J<10. $T_{1/2}$: from ($^9\text{Be},3n\gamma$); <0.07 ps from ($^9\text{Be},2pn\gamma$) and <0.07 ps from ($^{28}\text{Si},2\alpha2p\gamma$).

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Adopted Levels, Gammas (continued) ^{46}Ti Levels (continued)

E(level)	J ^π	T _{1/2}	XREF		Comments
7960.8 8	10 ⁻ #	<0.30 ps	CD	H	J ^π : γ to 8 ⁻ is ΔJ=2, Q; no γ to J<8. T _{1/2} : from (²⁸ Si,2α2pγ).
7979	+			0	J ^π : L=1 in (³ He,d).
8013 10				W	E(level): from (p,p').
8020 30	(0 ⁺)		K		J ^π : L=(0) in (³ He,n).
8040 10				0	E(level): from (p,p').
8088	+			0	J ^π : L=1 in (³ He,d).
8134 10				W	E(level): from (p,p').
8182	+			0	J ^π : L=1 in (³ He,d).
8217.5 3	12 ⁺ #	0.51 ps 5	CD	GH	J ^π : γ to 11 ⁺ is ΔJ=1, M1; γ to 10 ⁺ is ΔJ=2, E2. T _{1/2} : weighted average of 0.57 ps 6 (⁹ Be,3nγ), 0.35 ps 9 (⁹ Be,2pnγ) and 0.58 ps 6 (²⁸ Si,2α2pγ).
8230 10	+			0	E(level): from (p,p'). J ^π : L=1 in (³ He,d).
8283.9 13	10,11,12 ⁺	<0.17 ps	CD		J ^π : from (²⁸ Si,2α2pγ) and (¹² C,α2pγ). T _{1/2} : from (²⁸ Si,2α2pγ).
8293	+			0	J ^π : L=1 in (³ He,d).
8346	+			0	J ^π : L=1 in (³ He,d).
8384	+			0	J ^π : L=1+3 in (³ He,d).
8460	1 ⁺			W	J ^π : L=0 in (p,p').
8467	+			0	J ^π : L=1+3 in (³ He,d).
8530	+			0	J ^π : L=1 in (³ He,d).
8574	+			0	J ^π : L=1+3 in (³ He,d).
8621	+			0	J ^π : L=1 in (³ He,d).
8662	+			0	J ^π : L=1 in (³ He,d).
8701	+			0	J ^π : L=1 in (³ He,d).
8716.2 12	11 ⁻ #	<0.29 ps	CD		J ^π : γ only to 9 ⁻ . T _{1/2} : from (²⁸ Si,2α2pγ).
8761	+			0	J ^π : L=1 in (³ He,d).
8808	+			0	J ^π : L=1 in (³ He,d).
8860	+			0	J ^π : L=1 in (³ He,d).
8940	+			0	J ^π : L=1 in (³ He,d).
8984	+			0	J ^π : L=1 in (³ He,d).
9000	1 ⁺			W	J ^π : L=0 in (p,p').
9070	+			0	J ^π : L=1 in (³ He,d).
9111	+			0	J ^π : L=1+3 in (³ He,d).
9141				0	
9168 7	4 ⁺ ‡			0	XREF: Others: AF E(level): from (p,t). J ^π : L=4 in (p,t). J ^π : L=0 in (p,p').
9170	1 ⁺			W	
9205 9	6 ⁺ ‡			0	XREF: Others: AE , AF J ^π : L=6 in (p,t).
9253	+			0	J ^π : L=1 in (³ He,d).
9304	+			0	J ^π : L=1 in (³ He,d).
9345	+			0	J ^π : L=1 in (³ He,d).
9399 30	+			0	XREF: Others: AE E(level): from (³ He,α). J ^π : L=1 in (³ He,d).
9420	1 ⁺			W	J ^π : L=0 in (p,p').
9426	+			0	J ^π : L=3 in (³ He,d).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{46}Ti Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF		Comments
9474	+		0		XREF: Others: AE E(level): from ($^3\text{He},d$). J^π : L=1 in ($^3\text{He},d$).
9519	-		0		J^π : L=2 in ($^3\text{He},d$).
9550	1^+		0	W	J^π : L=0 in (p,p').
9572	+		0		J^π : L=3 in ($^3\text{He},d$).
9615 6	$2^{+ \frac{1}{2}}$		0		XREF: Others: AF J^π : L=2 in (p,t).
9649	+		0		J^π : L=1 in ($^3\text{He},d$).
9670	1^+		0	W	J^π : L=0 in (p,p').
9682			0		
9718	-		0		J^π : L=2 in ($^3\text{He},d$).
9761			0		
9770	1^+		0	W	J^π : L=0 in (p,p').
9790			0		
9852 [†] 19			0		XREF: Others: AE
9864			0		
9870	1^+		0	W	J^π : L=0 in (p,p').
9973 [†] 19	+		0		XREF: Others: AE J^π : L=3 in ($^3\text{He},d$).
10000	1^+		0	W	J^π : L=0 in (p,p').
10038 [†] 19			0		XREF: Others: AE
10041.6 8	$12^+, 14^{+ \frac{1}{2}}$	0.6 ps 2	CD GH		$T_{1/2}$: from ($^9\text{Be}, 3n\gamma$); <0.6 ps from ($^{28}\text{Si}, 2\alpha 2p\gamma$). J^π : γ to 11^+ is $\Delta J=1$; γ to 12^+ is $\Delta J=0$, D+Q.
10180	1^+		0	W	J^π : L=0 in (p,p').
10212 25			0		
10256 25			0		
10321 25			0		
10347 30					XREF: Others: AE Observed in ($^3\text{He},\alpha$).
10350	1^+		0	W	J^π : L=0 in (p,p').
10374 25			0		
10380 3				D	
10441 25			0		
10523 [†] 19	+		0		XREF: Others: AE J^π : L=3 in ($^3\text{He},d$).
10602 25			0		
10661 [†] 19			0		XREF: Others: AE
10730 25			0		
10782 25	+		0		J^π : L=3 in (p,p').
10866 22			0		XREF: Others: AF E(level): weighted average of values from ($^3\text{He},d$) and (p,t).
10938 19	+		0		XREF: Others: AE E(level): weighted average of values from ($^3\text{He},d$) and ($^3\text{He},\alpha$). J^π : L=1 in ($^3\text{He},d$).
10980 25			0		
11050	1^+		0	W	J^π : L=0 in (p,p').
11051 25			0		
11110 25			0		
11167 25			0		
11299 25			0		

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Adopted Levels, Gammas (continued)

^{46}Ti Levels (continued)			
E(level)	J^π	XREF	Comments
11354 3	3	M	J^π : from $\gamma(\theta)$ in (p, γ).
11374.2 23		M	
11426 19		K O	E(level): weighted average of values from (^3He ,n) and (^3He ,d).
11450	1^+		J^π : L=0 in (p,p').
11570	1^+		J^π : L=0 in (p,p').
11698 3	(2,3)	M	J^π : from $\gamma(\theta)$ in (p, γ).
11840	1^+		J^π : L=0 in (p,p').
12200	1^+		J^π : L=0 in (p,p').
12460 30	0^+	K	J^π : L=0 in (^3He ,n).
12650	1^+		J^π : L=0 in (p,p').
12974 4		D	
13070	1^+		J^π : L=0 in (p,p').
13169 4		D	
13310	1^+		J^π : L=0 in (p,p').
14153 6	0^+		XREF: Others: AF
			J^π : from L=0 in (p,t).
14300 60	(0^+)	K	J^π : from L=(0) in (^3He ,n).

[†] Weighted average of values from (^3He ,d) and (^3He , α).

[‡] From L(p,t).

Based on analysis of $\gamma(\theta)$ from (^{28}Si ,2 α 2p γ), (^9Be ,2pn γ) or (^{12}C , α 2p γ).

@ From $\gamma(\theta)$ and γ linear polarization in (p,p' γ).

& From (α ,n γ).

Adopted Levels, Gammas (continued)

$\gamma(^{46}\text{Ti})$

γ 's from capture states in (p, γ) not included; see (p, γ).

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}</u>	<u>I_{γ}</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Mult.</u>	<u>δ</u>	<u>α^a</u>	<u>Comments</u>
889.286	2 ⁺	889.277 3	100	0.0	0 ⁺	E2		0.00017	E _{γ} ,Mult., α : from ⁴⁶ Sc β^- decay. B(E2)(W.u.)=19.5 6.
2009.846	4 ⁺	1120.545 4	100	889.286	2 ⁺	E2			E _{γ} ,Mult.: from ⁴⁶ Sc β^- decay. B(E2)(W.u.)=20.2 13.
		2010	1.3×10 ⁻⁵ 10	0.0	0 ⁺	[E4]			B(E4)(W.u.)=4.E+2 3 E _{γ} : assumed from ⁴⁶ Sc β^- decay scheme and photoneutrons from Be. I _{γ} : from ⁴⁶ Sc β^- decay.
2611.0	0 ⁺	1721.81 12	100	889.286	2 ⁺				B(E2)(W.u.)=50 14
2961.8	2 ⁺	2072.6 & 2	100.0 & 6	889.286	2 ⁺	E2+M1	-1.21 14		B(M1)(W.u.)=0.0058 9; B(E2)(W.u.)=5.2 6 Mult., δ : from (p,p' γ),(pol p,p' γ).
3058.46	3 ⁻	2962.3 & 7 96.5	4.4 & 6 11 3	0.0 2961.8	0 ⁺ 2 ⁺	[E1]		0.0324	B(E2)(W.u.)=0.064 16 α (K)=0.0289; α (L)=0.00261 B(E1)(W.u.)=0.008 4
		1048.76 7	100 3	2009.846	4 ⁺	E1+M2	0.11 3		E _{γ} ,I _{γ} : from (p,p' γ) based on coincidence data. B(E1)(W.u.)=5.7×10 ⁻⁵ 17; B(M2)(W.u.)=2.9 18 E _{γ} : weighted average of values from (²⁸ Si,2 α 2p γ), (¹⁶ O,2p γ), (⁹ Be,2pn γ), and (p,p' γ). I _{γ} ,Mult., δ : from (p,p' γ). Large B(M2)(W.u.) suggests that δ is too large.
3168.00	1 ⁻	2169 ^b 2278.8 2	<3.3 100 2	889.286	2 ⁺				
		3168.1 1	83 2	0.0	0 ⁺	[E1]			B(E1)(W.u.)=4.3×10 ⁻⁵ 6
3213		2324 [@]	100 [@]	889.286	2 ⁺				
3235.7	2 ⁺	2346.5 2	100.0 13	889.286	2 ⁺				
		3235.7 7	18.8 13	0.0	0 ⁺	[E2]			B(E2)(W.u.)=0.89 20
3298.86	6 ⁺	1289.1 1	100	2009.846	4 ⁺	E2 [†]			B(E2)(W.u.)=16.4 15 E _{γ} : weighted average of values from (²⁸ Si,2 α 2p γ), (¹⁶ O,2p γ), (⁹ Be,3n γ), (⁹ Be,2pn γ) and (¹² C, α 2p γ). E _{γ} : weighted average of values from (²⁸ Si,2 α 2p γ), (⁹ Be,2pn γ), (α ,n γ), and (p,p' γ). I _{γ} : weighted average of values from (¹⁶ O,2p γ), (α ,n γ), and (p,p' γ). E _{γ} : weighted average of values from (²⁸ Si,2 α 2p γ), (⁹ Be,2pn γ), (α ,n γ), and (p,p' γ). I _{γ} : weighted average of values from (¹⁶ O,2p γ), (α ,n γ), and (p,p' γ).
3441.39	4 ⁻	382.95 7	100 3	3058.46	3 ⁻				
		1431.79 17	35 3	2009.846	4 ⁺				

Adopted Levels, Gammas (continued)

$\gamma(^{46}\text{Ti})$ (continued)							Comments
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	
3569.3	3^-	1559.6 & 2	100	2009.846	4^+	[E1]	B(E1)(W.u.)=0.0022 8 I_γ : from ($^{12}\text{C}, \alpha 2p\gamma$).
		2680 $\ddagger$	27 $\ddagger$	889.286	2^+	[E1]	B(E1)(W.u.)=0.00012 4
3571.7	0^+	2682.5 & 2	100 &	889.286	2^+	[E2]	B(E2)(W.u.)=2.17 18
3579.8		1573 @ 1	100 @	2009.846	4^+		
		2691 #	<2	889.286	2^+		I_γ : from (p, γ).
3610.2		2719 @ 1	100 @	889.286	2^+		
3723.8	$(2)^+$	1713.0 @ 10	32 @ 9	2009.846	4^+		
		2834.6 3	100 @ 9	889.286	2^+		E_γ : weighted average of values from ($\alpha, n\gamma$) and (p,p' γ).
3737.9	$(1,2^+)$	3737.9 & 3	100 &	0.0	0^+		
3826.43	5^-	529 $\ddagger$	30 $\ddagger$	3298.86	6^+		
		768.0 1	70 $\ddagger$	3058.46	3^-		E_γ : from ($^9\text{Be}, 2pn\gamma$).
		1818 $\ddagger$	100 $\ddagger$	2009.846	4^+		
3845.0	2^+	2955.8 & 4	100 &	889.286	2^+		
3852.44	5^-	411.1 @ 2	5 @ 4	3441.39	4^-		I_γ : =10 from ($^{12}\text{C}, \alpha 2p\gamma$).
		553 1		3298.86	6^+		E_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$); I_γ =10 from ($^{12}\text{C}, \alpha 2p\gamma$).
		794.2 1	14 @ 6	3058.46	3^-		E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 2pn\gamma$) and ($\alpha, n\gamma$).
		1842.65 8	100 @ 6	2009.846	4^+		E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 3n\gamma$), ($^9\text{Be}, 2pn\gamma$), and ($\alpha, n\gamma$).
3856		1847	100	2009.846	4^+		E_γ, I_γ : from (p, γ).
3889.3	2^+	720 &	100 & 9	3168.00	1^-		
		2990 &	25 & 9	889.286	2^+		
3905.6	$(1,2^+)$	1290 &	43 &	2611.0	0^+		Not observed in (p, γ).
		1890 &	<30 &	2009.846	4^+		I_γ : =24 from (p, γ).
		3016.3 & 4	43 &	889.286	2^+		I_γ : =73 from (p, γ).
		3905.7 & 4	100 &	0.0	0^+		
3941.9	4^+	1932	100	2009.846	4^+		E_γ : from ($\alpha, n\gamma$) and (p, γ); ΔE not given.
4003.1		944.1 @	100 @	3058.46	3^-		
4025.3	2^+	860 &	100 & 8	3168.00	1^-		
		2030 &	49 & 8				
		3140 &	100 & 8	889.286	2^+		
		4020 &	22 & 8	0.0	0^+		
4038.8		985 #		3058.46	3^-		
		3151 @	100 @	889.286	2^+		
4130.1	2^+	2128 #b	100	2009.846	4^+		

Adopted Levels, Gammas (continued)

$\gamma(^{46}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	Comments
4178.7	3 ⁻	2168.0 @ 10	100 @ 9	2009.846	4 ⁺		
		3290.3 @ 15	35 @ 9	889.286	2 ⁺		
4191.5	3 ⁻	2182.0 @ 10	19 @ 10	2009.846	4 ⁺		
		3301.8 @ 15	100 @ 10	889.286	2 ⁺		
4315.8	1 ⁺	4316 & 1	100 &	0.0	0 ⁺		
4322.6		1024 ‡	100 ‡	3298.86	6 ⁺		
4372.0	3 ⁻	2362 @	100 @	2009.846	4 ⁺		
4417.1	6 ⁻	588.3 @ 9	<5.3 @	3826.43	5 ⁻		
		974.2 2	100 @	3441.39	4 ⁻		E_γ : weighted average of values from (⁹ Be,2pn γ) and (α ,n γ).
4523.4	4 ⁺	1082		3441.39	4 ⁻		E_γ : from (¹² C, α 2p γ).
		1225 #	100 15	3298.86	6 ⁺		I_γ : from (p, γ).
		1273 #	54 15				I_γ : from (p, γ).
4662.30	6 ⁻	810.0 2	19 @ 6	3852.44	5 ⁻		E_γ : weighted average of values from (²⁸ Si, α 2p γ),(⁹ Be,2pn γ) and (α ,n γ).
		1220.8 1	100 @ 9	3441.39	4 ⁻		E_γ : weighted average of values from (²⁸ Si, α 2p γ),(⁹ Be,3n γ), (⁹ Be,2pn γ) and (α ,n γ).
		1364.0 @ 8	38 @ 9	3298.86	6 ⁺		
4697	(2 ⁺)	2687 @	100 @	2009.846	4 ⁺		
4726.4	(5 ⁻ ,6 ⁺)	2715 @	100 @	2009.846	4 ⁺		
4827.2	3 ⁻	1592 #	100	3235.7	2 ⁺		E_γ, I_γ : from (p, γ).
		1659 #	27	3168.00	1 ⁻		E_γ, I_γ : from (p, γ).
		2818 #	10	2009.846	4 ⁺		E_γ, I_γ : from (p, γ).
4896.9	8 ⁺	1597.9 2	100	3298.86	6 ⁺	E2 ⁺	B(E2)(W.u.)=11.3 14
							E_γ : weighted average of values from (²⁸ Si,2 α 2p γ), (⁹ Be,3n γ), (⁹ Be,2pn γ) and (¹² C, α 2p γ).
5023.7	3 ⁻	1725	100	3298.86	6 ⁺		
5079	(4 ⁺)	1843 #	100	3235.7	2 ⁺		
5180	+	2128 #b	100	3058.46	3 ⁻		
5197.60	7 ⁻	471 ‡	8 ‡	4726.4	(5 ⁻ ,6 ⁺)		
		535		4662.30	6 ⁻		E_γ : from (²⁸ Si,2 α 2p γ) and (α ,n γ).
		1345.1 1	100 ‡	3852.44	5 ⁻	[E2]	B(E2)(W.u.)=11.2 4
							E_γ : weighted average of values from (²⁸ Si,2 α 2p γ), (⁹ Be,3n γ) and (⁹ Be,2pn γ).
							Separated by 0.8 8 from γ in decay of 6242 level according to (⁹ Be,2pn γ).
		1370 ‡	33 ‡	3826.43	5 ⁻		
5280	6 ⁺	1427 @	100 @	3852.44	5 ⁻		
5530	3 ⁻	2230 #	100	3298.86	6 ⁺		E_γ, I_γ : from (p, γ).

Adopted Levels, Gammas (continued)

$\gamma(^{46}\text{Ti})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α^a	Comments
5530	3 ⁻	2361 [#]	67	3168.00	1 ⁻			E_γ, I_γ : from (p, γ).
5794	4 ⁺	2224 [#]	100	3571.7	0 ⁺			
5950	3 ⁻	2715 [#]	100	3235.7	2 ⁺			
6025		1363 [@]	100 [@]	4662.30	6 ⁻			
6150.5	8 ⁻	1488.2 3	100	4662.30	6 ⁻	E2 [†]		B(E2)(W.u.)=22 2 E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 3n\gamma$) and ($^9\text{Be}, 2pn\gamma$). I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$). E_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$). I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$). B(E2)(W.u.)=1.7 2.
		1734 1	16.5	4417.1	6 ⁻	E2 [†]		
6200.4	8 ⁺	1304 1	65	4896.9	8 ⁺	M1 [†]		E_γ, I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$).
		2902	100	3298.86	6 ⁺	E2 [†]		E_γ, I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$).
6241.9	10 ⁺	1345.1 1	100	4896.9	8 ⁺	E2 [†]		B(E2)(W.u.)=15.6 7 E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 3n\gamma$), ($^9\text{Be}, 2pn\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$). Separated by 0.8 8 from γ in decay of 5197 level according to ($^9\text{Be}, 2pn\gamma$).
6266		2679 [#]	100	3579.8				
6395	4 ⁺	2203 [#]	100	4191.5	3 ⁻			
6830.3	9 ⁻	1632.6 5	100	5197.60	7 ⁻	E2 [†]		E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 3n\gamma$) and ($^9\text{Be}, 2pn\gamma$). I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$). B(E2)(W.u.)=8.2 9.
		1933 1	16.5	4896.9	8 ⁺	E1 [†]		B(E1)(W.u.)=2.0×10 ⁻⁵ 2 E_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$). I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$).
7941.8	11 ⁺	1699.8 4	100	6241.9	10 ⁺	M1 [†]		B(M1)(W.u.)=0.014 4 E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 3n\gamma$) and ($^9\text{Be}, 2pn\gamma$).
7960.8	10 ⁻	1810.7 7	100	6150.5	8 ⁻	E2 [†]		E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^9\text{Be}, 2pn\gamma$).
8217.5	12 ⁺	275.3 1	45	7941.8	11 ⁺	M1 [†]	0.00154	B(M1)(W.u.)=0.64 6 E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 3n\gamma$) and ($^9\text{Be}, 2pn\gamma$). I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$). E_γ : weighted average of values from ($^{28}\text{Si}, 2\alpha 2p\gamma$), ($^9\text{Be}, 3n\gamma$) and ($^9\text{Be}, 2pn\gamma$). I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$). B(E2)(W.u.)=3.8 4.
		1976.2 9	100	6241.9	10 ⁺	E2 [†]		
8283.9	10,11,12 ⁺	2041	100	6241.9	10 ⁺	(E2+M1)		E_γ, I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$).
8716.2	11 ⁻	1887 1	100	6830.3	9 ⁻	E2 [†]		E_γ, I_γ : from ($^{28}\text{Si}, 2\alpha 2p\gamma$) and ($^{12}\text{C}, \alpha 2p\gamma$).

Adopted Levels, Gammas (continued)

$\gamma(^{46}\text{Ti})$ (continued)

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}</u>	<u>I_{γ}</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Mult.</u>	<u>Comments</u>
10041.6	12 ⁺ , 14 ⁺	1823.1 5	100	8217.5	12 ⁺	E2 [†]	B(E2)(W.u.)=5 2 E _{γ} : weighted average of values from (²⁸ Si,2 α 2p γ), (⁹ Be,3n γ) and (⁹ Be,2pn γ).
		2100		7941.8	11 ⁺		E _{γ} : from (¹² C, α 2p γ).
10380		2163		8217.5	12 ⁺		E _{γ} : from (²⁸ Si,2 α 2p γ).
12974		2594		10380			E _{γ} : from (²⁸ Si,2 α 2p γ).
13169		195 1		12974			E _{γ} : from (²⁸ Si,2 α 2p γ).

[†] From (²⁸Si,2 α 2p γ) and/or (⁹Be,2pn γ).

[‡] From (¹²C, α 2p γ).

From (p, γ); ΔE not given.

@ From (α ,n γ).

& From (p,p' γ).

^a Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

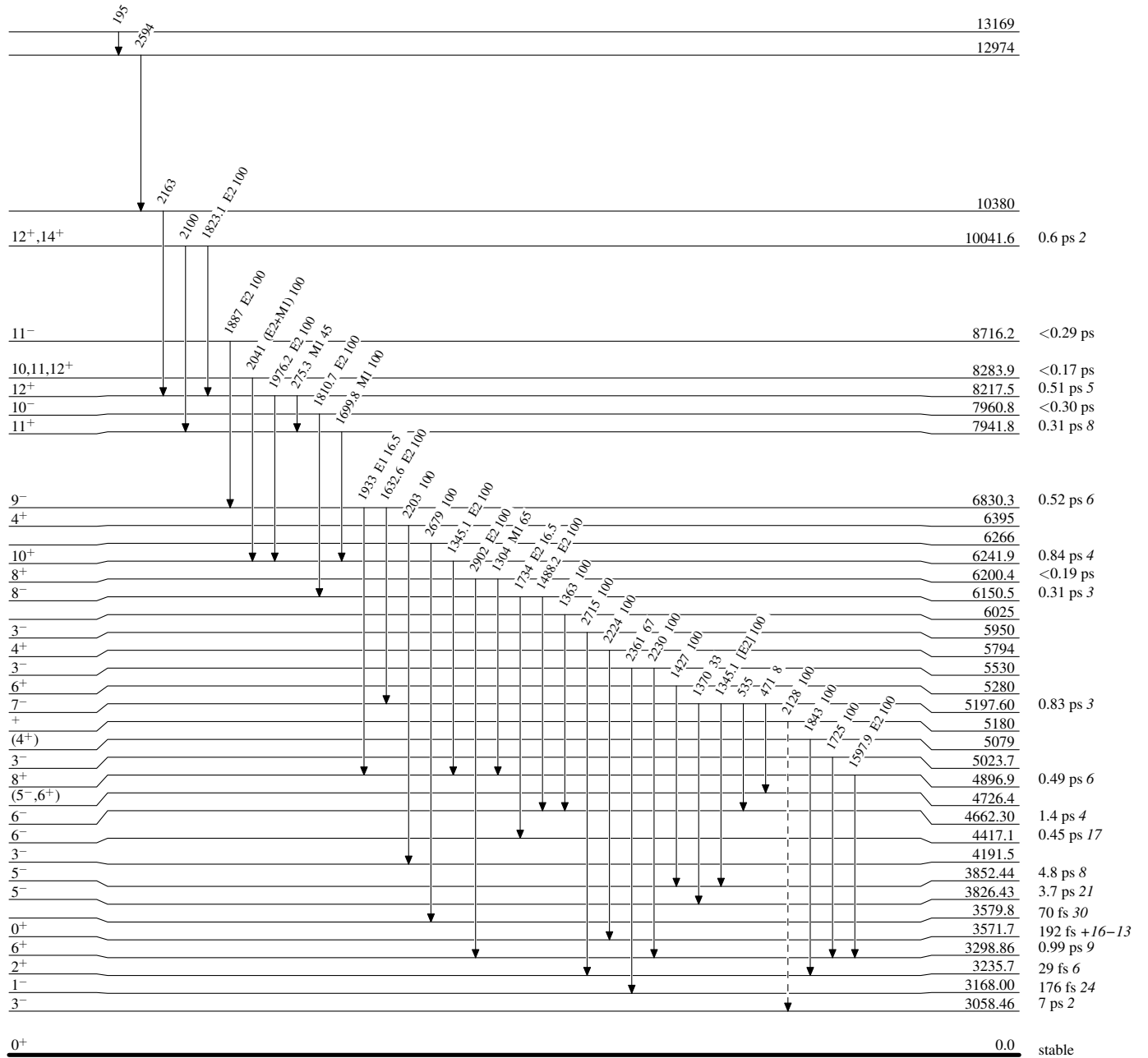
^b Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

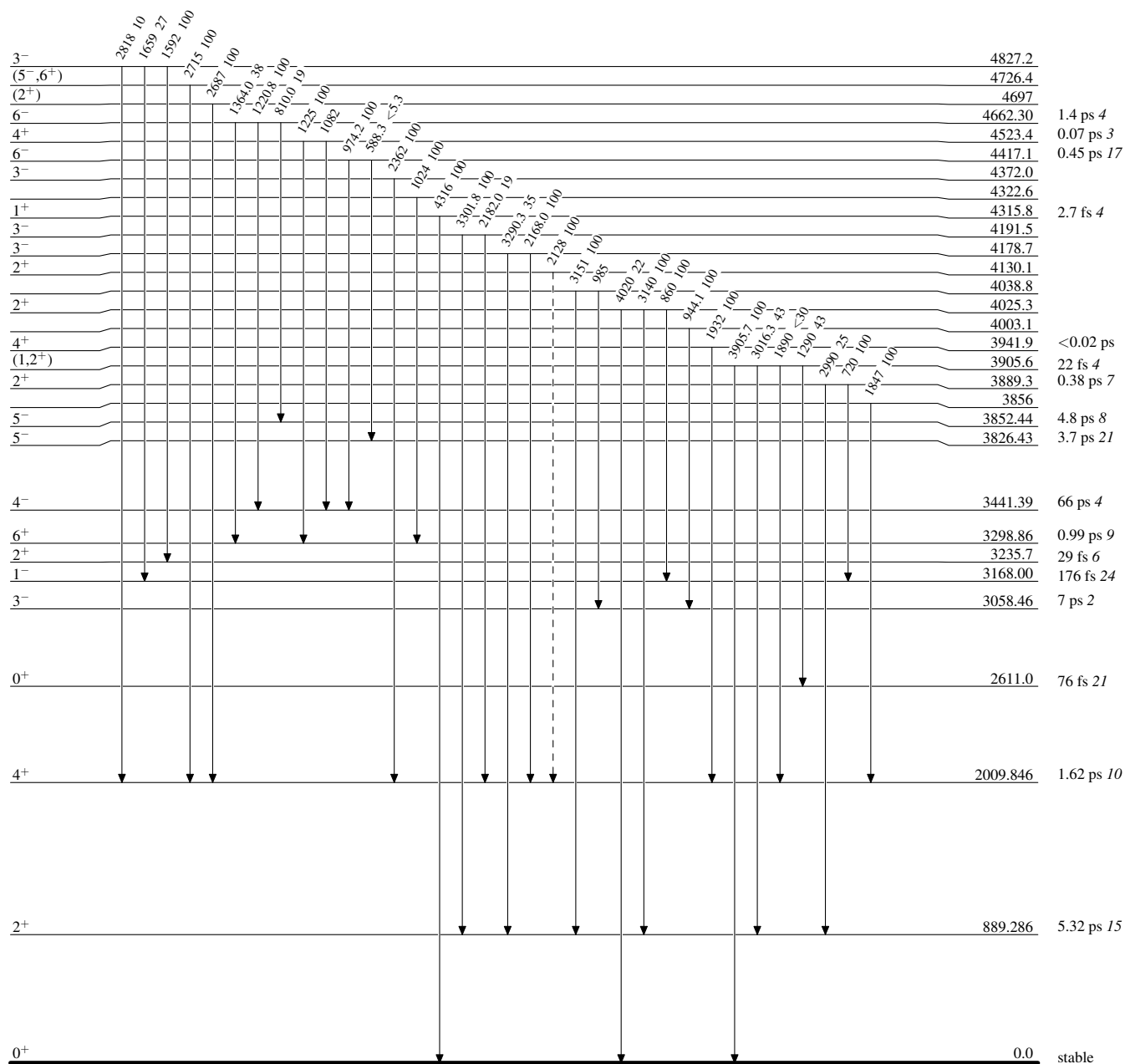
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)