

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Yang Dong, Huo Junde		NDS 121, 1 (2014)	20-Jun-2014

$Q(\beta^-) = -8244.55$ 9; $S(n) = 13378.5$ 16; $S(p) = 8853.8$ 5; $Q(\alpha) = -8417.1$ 8 [2012Wa38](#)

[Additional information 1.](#)

Multipole giant resonance, see (e,e') ([2006Kh14](#)).

 ^{54}Fe LevelsCross Reference (XREF) Flags

A	$^{54}\text{Fe}(e,e')$	N	$^{54}\text{Fe}(\text{pol } d,d'),(d,d')$	Others:
B	$^{54}\text{Fe}(p,p')$	O	$^{52}\text{Cr}(\alpha,2n\gamma)$	AA Coulomb excitation
C	$^{52}\text{Cr}(^3\text{He},n)$	P	$^{58}\text{Ni}(d,^6\text{Li})$	AB $^{54}\text{Fe}(^6\text{Li},^6\text{Li}'),(\text{pol } ^7\text{Li},^7\text{Li}')$
D	$^{54}\text{Fe}(n,n'\gamma)$	Q	$^{40}\text{Ca}(^{16}\text{O},2p\gamma)$	AC $^{54}\text{Fe}(^{16}\text{O},^{16}\text{O}')$
E	$^{54}\text{Fe}(^3\text{He},2pn\gamma)$	R	$^{45}\text{Sc}(^{12}\text{C},2np\gamma)$ E=40 MeV	AD $^{60}\text{Ni}(p,X\gamma)$
F	$^{52}\text{Cr}(^{16}\text{O},^{14}\text{C})$	S	$^{54}\text{Co } \varepsilon$ decay (1.48 min)	AE $\text{Ni}(\pi^+,x\gamma), (\pi^-,X\gamma)$
G	$^{54}\text{Fe}(\pi,\pi')$	T	$^{50}\text{Cr}(^6\text{Li},pn\gamma),(^7\text{Li},2np\gamma)$	AF $\text{Ni}(K^-,x\text{ ray}\gamma)$
H	$^{50}\text{Cr}(^6\text{Li},d)$	U	$^{51}\text{V}(^6\text{Li},3n\gamma),(^7\text{Li},4n\gamma)$	AG $^{54}\text{Co } \varepsilon$ decay (193.28 ms)
I	$^{54}\text{Fe}(p,p'\gamma)$	V	$^{58}\text{Ni}(^3\text{He},^7\text{Be})$	AH $^{28}\text{Si}(^{36}\text{Ar},2\alpha 2p\gamma)$
J	$^{56}\text{Fe}(p,t)$	W	$^{28}\text{Si}(^{28}\text{Si},2p\gamma)$	AI $^{54}\text{Mn } \beta^-$ decay
K	$^{54}\text{Fe}(\alpha,\alpha')$	X	$^{50}\text{Cr}(\alpha,\gamma)$	AJ $^9\text{Be}(^{55}\text{Co},X\gamma)$
L	$^{54}\text{Fe}(n,n')$	Y	$^{54}\text{Fe}(\gamma,\gamma')$	AK $^{58}\text{Ni } \alpha$ decay
M	$^{54}\text{Fe}(\text{pol } p,p'),(\text{pol } P,P'\gamma)$	Z	$^{54}\text{Fe}(\alpha,\alpha'\gamma)$	

E(level) [†]	J ^{π&}	T _{1/2} [@]	XREF	Comments
0.0	0 ⁺	stable	ABCDEFGHIJKLMN OPQRSTUVWXYZ	XREF: Others: AA , AB , AC , AD , AE , AF , AG , AH , AI , AJ , AK the double β decay of ^{54}Fe was investigated, upper limit on the half-time $>4.4 \times 10^{20}$ y, see 1998Bi13 .
1408.19 19	2 ⁺	0.76 ps 2	ABCDEFGHIJKLMN OPQRSTUVWXYZ	XREF: Others: AA , AB , AC , AD , AE , AF , AG , AH , AJ , AK $\mu = +2.40$ 49; $Q = -0.05$ 14 (1981Le02) $B(E2)\uparrow = 0.062$ 5 (2001Ra27) μ, Q : Compiled by 2011StZZ . J^π : from L=2 in ($^3\text{He},n$), ($^6\text{Li},d$). $T_{1/2}$: from Coulomb excitation (2000Sp08). Others: 0.76 ps +35–22 in (p,p' γ); 2.3 ps +25–16 from DSAM in ($\alpha,\alpha'\gamma$). μ : Weighted average values from 1977Br23 and 1977Fa07 . $B(E2)\uparrow$: Others: 0.0676 38 for $^{54}\text{Fe}+^{16}\text{O}$ and $^{54}\text{Fe}+^{40}\text{Ca}$ (1981Le02), 0.064 7 for $^{54}\text{Fe}+^{16}\text{O}$ (1979Po08), 0.060 5 for $^{54}\text{Fe}+^{18}\text{O}$ (1979Po08), 0.064 4 for $^{54}\text{Fe}+^{12}\text{C}$ and $^{54}\text{Fe}+^{13}\text{C}$ (1979Po16), 0.061 12 for $^{54}\text{Fe}+^{12}\text{C}$ (1967Af03); 0.045 (1976Le12), 0.0595 (1971DaZM), 0.051 2 (1965Si02). g : $g=1.05$ 6 (2000Sp08), $g=1.05$ 17 (1992Sp02), $g=1.08$ 19 (1977Fa07), $g=1.68$ 38 (1977Br23), $g=+0.95$ 11 (2009Ea02).
2538.1 3	4 ⁺	4.0 ps 8	ABCDEFGH I JKLMN OPQRSTUVWXYZ Z	XREF: Others: AA , AB , AH , AJ , AK XREF: C(2490). J^π : from L=4 in (e,e'), (α,α'). $T_{1/2}$: from $^{40}\text{Ca}(^{16}\text{O},2p\gamma)$, RDM. other: ≥ 2.1 ps, DSAM in (p,p' γ).
2561.3 4	0 ⁺	≥ 1.4 ps	B DEF HIJ N P	XREF: Others: AG

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Adopted Levels, Gammas (continued)

⁵⁴ Fe Levels (continued)						
E(level) [†]	J ^π &	T _{1/2} [@]	XREF			Comments
						XREF: H(2550)N(2566). T _{1/2} : From (p,p'γ). J ^π : from L=0 in (⁶ Li,d), (p,t). J ^π : from L=2 in (e,e'). XREF: Others: AB , AH , AK μ=8.22 18 (1989Ra17) XREF: AB(2950). J ^π : from γ(θ), linear polarization and DCO triple angular correlation ratios in (α,2nγ) (1979St13). T _{1/2} : weighted average from 1.22 ns 2 (P,py),(1971He21), 1.19 ns 3 in ε decay (1.48 min) (1970Co32) and 1.24 ns 4 in ε decay (1.48 min) (1971Sa07); other:≥0.55 ps from DSAM (1972Mo21).
2900 2949.2 5	2 ⁺ 6 ⁺	1.22 ns 2	A A DEF I	OPQRSTU WX		
2959.0 5	2 ⁺	0.052 ps 7	ABCDE GHIJKLMN P	V Z		XREF: Others: AA , AB , AC XREF: C(2940)H(2940)J(2950)K(2950)AB(2950). J ^π : from L=2 in (⁶ Li,d), (p,t). T _{1/2} : weighted average of 0.052 ps 8 (p,p'γ) and 0.052 ps 7 (n,n'γ). Other: 1.6 ps +21-7, DSAM in (α,α'γ).
3166.0 5	2 ⁺	0.15 ps +4-3	ABCDE GHIJKLMN P	Y		XREF: Others: AA , AB XREF: C(3120)J(3150)AB(3160). T _{1/2} : weighted average of 0.16 ps +4-3 (p,p'γ) and 0.14 ps +4-3 (n,n'γ). J ^π : from L=2 in (p,t), (α,α'). XREF: Others: AH T _{1/2} : From (p,p'γ). J ^π : from L=4 in (p,t), (α,α').
3294.8 4	4 ⁺	≥2.1 ps	AB DE GHIJKL			XREF: Others: AH T _{1/2} : From (p,p'γ). J ^π : from L=4 in (p,t), (α,α').
3344.8 3	3 ⁺		AB DE I N	Z		XREF: Others: AH XREF: A(3340). J ^π : from pγ(θ) and γγ(θ) in (p,p'γ). T _{1/2} : ≥2.1 ps (p,p'γ); 0.3 ps +7-2, DSAM in (α,α'γ). J ^π : From γ's to 4 ⁺ , 6 ⁺ .
3437.4 82 3793.8 12 3833.2 4	4 ⁺ to 6 ⁺ 4 ⁺	0.062 ps 12	E E BCDEFGHIJKL	P		XREF: C(3800)H(3820)J(3830)K(3810)L(3830). T _{1/2} : weighted average of 0.063 ps 14 from (p,p'γ) and 0.061 ps +15-11 from (n,n'γ). J ^π : from L=4 in (p,t), (α,α').
3841.0 11 4030.9 5	5 ⁺	≥0.7 ps	E B DE HIJ	M		XREF: Others: AH J ^π : from L(⁶ Li,d)=(5,6), 736γ M1+E2 to 4 ⁺ . T _{1/2} : From (p,p'γ). XREF: Others: AH J ^π : from L=4 in (α,α'). XREF: F(4060). J ^π : From (p,p'γ), but L=(5) in (p,p'). J ^π : from L=4 in (e,e').
4047.8 4	4 ⁺	0.30 ps +23-10	B DE G I KL			
4071.6 8	3 ⁺	0.058 ps 17	B D F I			
4099.7 11 4103.4 12 4267.8 4	4 ⁺ 4 ⁺	0.082 ps +23-17	A E E B DEFGHIJKLM			XREF: F(4280)M(4279). J ^π : from L=4 in (α,α'), (p,t); but L(⁶ Li,d)=(4+0). XREF: C(4250)I(4286.4). J ^π : from L(³ He,n)=0 and strong pair-line spectrum with no corresponding γ in (p,p'γ) (1980PaZM). XREF: F(4590)M(4553). J ^π : from L=2 in (α,α'), (³ He,n).
4290.8 7	0 ⁺	0.055 ps +17-14	BCD HI	Y		
4578.5 9	2 ⁺	≤0.007 ps	ABCD FG I K M			

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Adopted Levels, Gammas (continued) ^{54}Fe Levels (continued)

E(level) [†]	J ^π &	T _{1/2} [@]	XREF				Comments
4655.3 8			B DE	I			XREF: Others: AH J ^π : J≤6, from γ's to 4 ⁺ . J ^π : J≤4, from γ to 2 ⁺ .
4696? 3				D I			
4700.1 9			B D	I			
4781.9 6	3 ⁻	0.033 ps 11	AB D	G IJKLMN	P	V	XREF: K(4760). J ^π : from L=3 in (α,α'), (e,e'). E(level): from (pol d,d') and (e,e'). J ^π : from L=3 in (pol d,d') and (e,e').
4850	3 ⁻		A			N	XREF: H(4920). J ^π : from L(6Li,d)=4; but L is odd in (α,α').
4948.7 8	4 ⁽⁺⁾	0.029 ps 10	B D	GHI	K		XREF: Others: AH J ^π : from 3672γ to 2 ⁺ , 5080γ to 0 ⁺ . XREF: H(5120). J ^π : from L(6Li,d)=2.
5044.8 9	5 ⁻ ,6 ^{+C}		B E				XREF: J(5200). J ^π : from L(3He,n)=0.
5080 4	(1,2 ⁺)		AB D F				J ^π : J≤4, from γ to 2 ⁺ . XREF: Others: AH
5145 6	2 ⁺		B D	GH			J ^π : J≤4, from γ to 2 ⁺ .
5233 10	0 ⁺		BC		J		XREF: C(5380). J ^π : from L(3He,n)=2.
5248 6			B D	H			
5278.8 11			B DE				
5313 10			B				
5325 10			B F				
5392 6	2 ⁺		BCD	G			XREF: C(5380). J ^π : from L(3He,n)=2.
5404 10			B				
5431.1 13				E			
5453 7	(1,2 ⁺)		B D				J ^π : from γ to 0 ⁺ .
5461.2 11				E			
5482.0	3 ⁺ ,4 ⁺		B D				XREF: Others: AH J ^π : from 4074γ to 2 ⁺ and 1435γ to 4 ⁺ , so 2 ⁺ , 3 ⁺ , 3 ⁻ , and 4 ⁺ are likely, 2944γ (M1+E2) to 4 ⁺ , J ^π =3 ⁺ , 4 ⁺ . J ^π : from L(6Li,d)=(2).
5506 6	(2 ⁺)		B D	H			
5523 10			B				
5539 6	3 ⁻		B D F				J ^π : L(α,α')=3.
5592 10			B				
5621 6	(3 ⁻)		B D	G J			XREF: J(5640). J ^π : from L(p,t)=(3). J ^π : from L(p,p')=4.
5657 5	4 ⁺		B				
5666 10			B				
5703 5	4 ⁺		B			V	XREF: V(5720). J ^π : from L(p,p')=4.
5787 10			B				
5809 7	2 ^{+C}		B D				
5828 7			B D				XREF: B(5837). J ^π : J≤4, from γ to 2 ⁺ .
5875 10			B				
5907 5	3 ^{-C}		B				
5919.3 12			B E				
5927.4 5	7 ⁺		B F H				XREF: Others: AH XREF: B(5934)F(5940). J ^π : From 1895γ to 5 ⁺ , 2979γ (M1+E2) to 6 ⁺ . J ^π : from L(p,p')=2.
5955 8	2 ⁺		B D				
6023 10			B				
6038 8	(1,2 ⁺)		B D				J ^π : from γ to 0 ⁺ . XREF: H(6050).
6057 5			B	H			J ^π : from L(6Li,d)=2. L(p,p')=5.6.
6100 10			B F				

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Adopted Levels, Gammas (continued) ^{54}Fe Levels (continued)

E(level) [†]	J ^{π&}	T _{1/2} [@]	XREF				Comments
6128.7 6	1		B D H		Y		Γ=0.027 eV 4; Γ _{γ0} =0.025 eV 4 (1976La02) J ^π : from 6129γ(θ) in (γ,γ').
6156 10			B				
6192 5	2 ⁺		B				J ^π : from L(p,p')=2.
6212 10			B				
6238 10			B				
6259 5			B				
6296.8 16	7 ⁺		B				XREF: Others: AH XREF: B(6285). J ^π : From γ to 6 ⁺ . XREF: M(6355). J ^π : from L(α,α')=L(p,p')=3.
6341 5	3 ⁻		B G JK M				XREF: Others: AH J ^π : 3432γ with E2 to 6 ⁺ . 146γ with E2 from 10 ⁺ . T _{1/2} : from DSAM in (⁶ Li,pnγ) (1979Gu07); <1.4 ns from RDM in (¹⁶ O,2pγ) (1978Da09).
6380.9 11	8 ⁺	114 fs +28-21	E		O QR TU		J ^π : from L(³ He,n)=0. XREF: J(6410). J ^π : from L(e,e')=L(d,d')=3.
6400 10	0 ⁺		C G				
6401 10	3 ⁻		AB F J L N				
6429 5	2 ⁺ ^C		B				
6442 10			B				
6484 5	4 ⁺ ^C		B				
6510 15				J			
6527.1 11	10 ⁺	364 ns 7	B E		O QR TU		XREF: Others: AH Q=+0.285 25; μ=+7.281 10 (1989Ra17) Q: From weighted average values from 1984Ha07 and 1983Ra03. J ^π : from 146γ (E2) to 8 ⁺ and 3577γ (E4) to 6 ⁺ . T _{1/2} : from ⁴⁰ Ca(¹⁶ O,2pγ). Other: 358 ns 31 from ⁵² Cr(α,2nγ). XREF: Others: AH
6551.0 11							
6563 5	(1 ⁻) ^C		B				
6594 10			B				
6607 5	4 ⁺ ^C		B				
6648 10			B				
6663 10			B				
6670 5	4 ⁺ ^C		B				
6710 10	3 ⁻		B	J			J ^π : from L(p,t)=3.
6724.1 24	9 ⁺	≈41 ps	E		O QR		XREF: Others: AH J ^π : From M1(+E2) 197γ to 10 ⁺ . T _{1/2} : from ⁴⁰ Ca(¹⁶ O,2pγ).
6749 5	3 ⁻ ^C		B				
6774 5	1 ⁻ ^C		B				
6804 10			B				
6821 5	5 ⁻ ,6 ⁺ ^C		B				
6836 10			B				
6864.3 6	8 ⁺						XREF: Others: AH J ^π : From 3915γ (E2) to 6 ⁺ .
6881 5	4 ⁺ ^C		B				
6910 20			C				
6951 5			AB F J				XREF: F(6990)J(6970). J ^π : L(p,p')=3, L(e,e')=2.
7011 10	3 ⁻ ^C		B F				XREF: F(6990).
7040 [‡] 10			AB				XREF: A(7030)B(7050). J ^π : L(p,p')=5,6, L(e,e')=2.

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Adopted Levels, Gammas (continued) ^{54}Fe Levels (continued)

E(level) [†]	J ^π &	XREF	Comments
7074.8 17			XREF: Others: AH
7110 20	(2 ⁺ ,3 ⁻) ^b	A	
7128 10	6 ⁺	B H	J ^π : from L(⁶ Li,d)=6.
7155 10		B	
7180 10	(1) ^b	A	
7200 [#] 30	4 ⁺	A C F	J ^π : from L(e,e')=4.
7260 [#] 20	3 ⁻	AB K	XREF: B(7270)K(7250). J ^π : from L(p,p')=3.
7310 20	(2 ⁺ ,3 ⁻) ^b	A	
7351.5 6	(9 ⁺)		XREF: Others: AH J ^π : From 971.6γ to 8 ⁺ .
7377 10	2 ⁺ ^c	AB	XREF: A(7360).
7442 10		aB	XREF: a(7470).
7486 10	3 ⁻ ^c	aB	XREF: a(7470).
7505 4	10 ⁺		XREF: Others: AH J ^π : From 780γ to 9 ⁺ .
7550 20	(2 ⁺) ^b	A	
7560 20	0 ⁺	C	J ^π : from L(³ He,n)=0.
7565.8 18			XREF: Others: AH
7580 25	2 ⁺	JK	E(level): from (p,t). J ^π : from L=2 in (α,α') and (p,t).
7603 10	3 ⁻ ^c	AB	
7644 10	3 ⁻ ^c	AB F	
7674 10	+	AB	J ^π : L(p,p')=4, L(e,e')=2.
7760 20	(2 ⁺) ^b	A	
7791 10		AB	J ^π : L(p,p')=3, L(e,e')=2.
7859 [‡] 10		AB	XREF: A(7850)B(7868). J ^π : L(p,p')=3, L(e,e')=2.
7905 10		B	
7938 10	+	AB	XREF: A(7930). J ^π : L(p,p')=0, L(e,e')=2.
7940 20	3 ⁻	C	J ^π : from L(³ He,n)=3.
8005 10	3 ⁻	AB H K	XREF: H(7970).
8021 4	(11) ⁺	F O	J ^π : from L(α,α')=L(p,p')=3, but L=4, (3) in (⁶ Li,d). XREF: Others: AH XREF: F(8050). J ^π : J=9 to 11 from γ with M1(+E2) to 10 ⁺ .
8114 [‡] 10	1 ⁺ ^a	AB	XREF: A(8110)B(8117).
8179 10	1 ⁻	AB F	J ^π : L(e,e')=1.
8225 10		AB	XREF: A(8210).
8298 10	(2 ⁺) ^b	AB	XREF: A(8270).
8318.8 17	8 ⁻	A	XREF: Others: AH XREF: A(7314). J ^π : from fit of squared inelastic form factor for 8 ⁻ to experimental data. Purely transverse and most probably magnetic transition, T=1.
8334 10	1 ⁺ ^a	AB	XREF: B(8330).
8374.3 11	(10 ⁺)		XREF: Others: AH J ^π : From 1994γ to 8 ⁺ .
8410 10		A C	E(level): from (³ He,n). Probably a doublet.
8440 10		AB H	J ^π : L(³ He,n)=0; excitation multipolarity E2 from (e,e').
8450 20	1 ⁺ ^a	B	J ^π : L(p,p')=3, L(e,e')=2.
8465 10	3 ⁻	AB	XREF: A(8480).

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Adopted Levels, Gammas (continued) ^{54}Fe Levels (continued)

E(level) [†]	J ^π &	XREF	Comments
8521 10	5 ⁻ ,6 ⁺ ^c	B	J ^π : L(p,p')=3.
8560 10	(1,2 ⁻) ^b	A	
8577.8 7	(10 ⁺)		XREF: Others: AH J ^π : From 559γ to 11 ⁺ , 1226γ to 9 ⁺ .
8610 [#] 10	(2 ⁻) ^b	A F	
8633 10	1 ^{-c}	Bc	XREF: c(8640). J from L(p,p')=1.
8666 10		ABc	XREF: A(8650)c(8640).
8680 10	(2) ^b	A	
8740 10		A	
8808.0 6	(11 ⁺)		XREF: Others: AH J ^π : From 2282γ to 10 ⁺ .
8850 10	1 ⁺ ^a	ABC	XREF: C(8860).
8886 [‡] 10	3 ^{-c}	AB	XREF: A(8900)B(8882).
8930 10	2 ^{-b}	A	
8949 [‡] 10	8 ⁻	A	J ^π : from fit of squared inelastic form factor for 8 ⁻ to experimental data.
8952 10	3 ⁻	B	J ^π : L(p,p')=3.
8981 [‡] 10	1 ⁺ ^a	AB	XREF: A(8980)B(8982).
9062 [‡] 10	1 ⁺ ^a	ABC	XREF: A(9060)B(9064)C(9640).
9110 10		AB	
9123.6 12			XREF: Others: AH
9140 [#] 10	1 ⁺ ^a	AB	
9150 10	3 ^{-c}	B	
9243 [‡] 10		AB	XREF: A(9240)B(9246).
9290 20	1 ⁺ ^a	B	J ^π : L(p,p')=0, M2,E3 in (e,e').
9300 20		AB	XREF: B(9302).
9353 10	3 ^{-c}	AB	
9402 10	3 ^{-c}	B	
9410 20	1 ⁺ ^a	AB F	XREF: A(9400).
9450 10	1 ^a	A	
9506 [‡] 10	3 ^{-c}	AB	XREF: A(9500)B(9513).
9530 [#] 10	1 ⁺ ^a	AB	
9568 [‡] 10		AB	XREF: A(9570)B(9565).
9610 30		C	
9640 10		A	
9671 [‡] 10	3 ^{-c}	AB	XREF: A(9680)B(9662).
9716 10		AB	XREF: A(9730).
9747 10	3 ^{-c}	B	
9789		B	
9810 10		A	
9845.3 7	(12 ⁺)		XREF: Others: AH J ^π : From 3319γ to 10 ⁺ , 1826γ to 11 ⁺ .
9860 10		A	
9910 [#] 10		AB F	XREF: F(9920).
9940 20	1 ⁺ ^a	B F	XREF: F(9920).
9974 10	8 ⁻	A	J ^π : from fit of squared inelastic form factor for 8 ⁻ to experimental data. Purely transverse and most probably magnetic transition, T=1.
9984 10		ABC	J ^π : L(³ He,n)=2. L(p,p')=3.
9995.4? 11			XREF: Others: AH
10027 [‡] 10	(3 ⁻) ^c	AB	XREF: A(10020)B(10033).

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Adopted Levels, Gammas (continued)

^{54}Fe Levels (continued)			
E(level) [†]	J ^π &	XREF	Comments
10045		B	
10050 [#] 10	1 ⁺ ^a	AB	XREF: B(10060).
10083 [‡] 10	(3 ⁻) ^c	AB	XREF: A(10090)B(11076).
10131.0 9	(12 ⁺)		XREF: Others: AH J ^π : From γ's to 11 ⁺ .
10137 10	2 ⁺ ^c	AB	XREF: A(10130)B(10144).
10180 [‡] 10	1 ⁺ ^a	AB	XREF: B(10160). J ^π : from a very forward-peaked angular distribution characteristic of a ΔL=0 (1983Dj05).
10213 [‡] 10		AB	XREF: A(10220)B(10205).
10250 20	0 ⁺	BC	XREF: B(10256). J ^π : from L(³ He,n)=0.
10290 10		AB	E(level): isobaric analog of 1460 level of ⁵⁴ Mn.
10342 10	4 ⁺ ^c	B	XREF: B(10300).
10380 20		A	
10450 20		AB	
10535 [‡] 10	1 ⁺ ^a	AB	XREF: B(10455).
10542.0 7	(11)		XREF: A(10530)B(10541). J ^π : transverse excitation into state of low multipolarity, T=2.
10586 10		AB	XREF: Others: AH
10630 20		AB	J ^π : From γ's to 10 ⁺ , (10 ⁺), 11 ⁺ .
10660 10	(2 ⁻) ^b	A	XREF: A(10590).
10677 10	8 ⁻	A	XREF: B(10608).
10700 10	0 ⁺	C	J ^π : from fit of squared inelastic form factor for 8 ⁻ to experimental data. Purely transverse and most probably magnetic transition, T=1.
10740 20		A	E(level): isobaric analog of 2110 level of ⁵⁴ Mn.
10780 20		A	J ^π : from L(³ He,n)=0.
10820 [#] 10		A C	
10870 20		A	XREF: C(10830).
10910 [#] 20		A C	
11010 [#] 10	1 ⁺ ^a	ABC	XREF: C(10950).
11050 10		A	XREF: B(11020)C(10950).
11093.4 7	(13 ⁺)	A	XREF: Others: AH XREF: A(11090).
11113.6 8	(12)		J ^π : From 1248γ to 12 ⁺ , 3074γ to 11 ⁺ . XREF: Others: AH
11120 [#] 10	1 ⁺ ^a	ABC	J ^π : From 571.5γ to (11), 2306γ to 11 ⁺ .
11230 10		A	XREF: B(11110).
11280 10		AB	
11320 [#] 20	1 ⁺ ^a	AB	XREF: B(11262).
11360 10		A	XREF: B(11310).
11440 [#] 20	2 ⁺	A C	
11447		B	XREF: C(11460).
11520 [#] 10	1 ⁺ ^a	AB	J ^π : from L(³ He,n)=2.
11620 30		BC	XREF: B(11540).
11710 [#] 20		A C	XREF: B(11604).
11750 [#] 10	1 ⁺ ^a	AB	XREF: C(11740).
			XREF: B(11760).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{54}Fe Levels (continued)

E(level) [†]	J ^{π&}	XREF	Comments
11790 10		A	
11850 30	2 ⁺	C	J ^π : from L($^3\text{He},n$)=2.
11920 20	1 ⁺ ^a	B	
11950 20	1 ⁺ ^a	B	
12040 20	0 ⁺	C	J ^π : from L($^3\text{He},n$)=0.
12043.0 9	(13)		XREF: Others: AH
			J ^π : From 929 γ to (12).
12100 50	2 ⁺	C	J ^π : from L($^3\text{He},n$)=2.
12314.1 8	(14 ⁺)		XREF: Others: AH
			J ^π : From 1220.7 γ to 13 ⁺ , 2183 γ to (12).
12953.3 12	(14 ⁺)		XREF: Others: AH
			J ^π : From 1860 γ to 13 ⁺ .
13000 20	1 ⁺ ^a	B	
13263 10	8 ⁻	A	J ^π : from fit of squared inelastic form factor for 8 ⁻ to experimental data.
			Purely transverse and most probably magnetic transition, T=2.
13358.0 14			XREF: Others: AH
13520 20	0 ⁺	C	J ^π : from L($^3\text{He},n$)=0.
13730 30	4 ⁺	C	J ^π : from L($^3\text{He},n$)=4.
13900 20	1 ⁺ ^a	B	
14050 50		C	
14388.3 14			XREF: Others: AH
14540 30		C	
14590 30		C	
14700 30		C	
14730 30		C	
14850 30	2 ⁺	C	J ^π : from L($^3\text{He},n$)=2.
14870 20	0 ⁺	C	J ^π : from L($^3\text{He},n$)=0.
			E(level): isobaric analog of 6150 level of ^{54}Mn .
15062.0? 24			XREF: Others: AH

[†] Energies for states connected by γ -rays from using least-squares fits, others from (p,p'), except as noted.

[‡] From unweighted average values of (p,p') and (e,e').

From (e,e').

@ From DSAM (p,p' γ), except as noted.

& Mainly based on $p\gamma(\theta)$ and $\gamma\gamma(\theta)$ in (p,p' γ) and measured L values.

^a $\Delta L=0$ spin-flip transitions, characteristic very forward peaked angular distribution, DWIA, see (p,p') [1983Dj05](#).

^b Multipolarity of excitation from (e,e') (some L tentative), B(M1) and B(M2) from high resolution electron scattering (e,e'). See [1985So05](#).

^c From L(p,p').

Adopted Levels, Gammas (continued)

$\gamma(^{54}\text{Fe})$										
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult.	δ^f	α^g	$I_{(\gamma+ce)}$	Comments
1408.19	2 ⁺	1408.1 2	100	0.0	0 ⁺	E2 ^e				B(E2)(W.u.)=11.1 3
2538.1	4 ⁺	1129.9 3	100	1408.19	2 ⁺	E2 ^e				B(E2)(W.u.)=6.3 13
2561.3	0 ⁺	1153.1 3	100	1408.19	2 ⁺	E2 ^b				B(E2)(W.u.)<16
		2561.3		0.0	0 ⁺	E0 ^b			0.17 3	E_γ : from (p,p' γ). B(E0)(2561 γ):B(E2)(1153 γ)=0.49 8 in (p,p' γ). $I_{(\gamma+ce)}$: from electron-pair measurement (1972Wa28). $\alpha(K)$ =0.00233; $\alpha(L)$ =0.00023 B(E2)(W.u.)=3.24 6 Additional information 2.
2949.2	6 ⁺	411.4 5	100	2538.1	4 ⁺	E2 ^e		0.00263		$\alpha(K)$ =0.00233; $\alpha(L)$ =0.00023 B(E2)(W.u.)=3.24 6 Additional information 2.
2959.0	2 ⁺	1550.7 5	82 5	1408.19	2 ⁺	M1+E2 ^b	0.10 4			B(M1)(W.u.)=0.051 8; B(E2)(W.u.)=0.4 4 δ : from (p,p' γ). Other: 0.10 2 (n,n' γ). B(E2)(W.u.)=2.2 4 δ : -0.087 from 1970Kr02.
		2959.4 8	100 5	0.0	0 ⁺	E2 ^b				B(E2)(W.u.)=2.2 4 δ : -0.087 from 1970Kr02.
3166.0	2 ⁺	1757.6 5	23 4	1408.19	2 ⁺	M1+E2 ^b	0.63 +57-25			B(M1)(W.u.)=0.0036 +21-22; B(E2)(W.u.)=1.0 +13-10 δ : others: $\delta \geq 2.4$; or $\delta \leq -10$ from (p,p' γ) also.
3294.8	4 ⁺	3166.0 10 756.6 3	100 4 100 5	0.0 2538.1	0 ⁺ 4 ⁺	E2 ^b M1+E2 ^c	0.15 ^c 5			B(E2)(W.u.)=0.80 +17-22 B(M1)(W.u.)<0.020; B(E2)(W.u.)<2.7 δ : other: +7.1 (³ He,2pn γ). B(E2)(W.u.)<0.15 B(M1)(W.u.)<0.0086; B(E2)(W.u.)<0.022 B(M1)(W.u.)<0.00068; B(E2)(W.u.)<0.11 δ : others: +1.3 +14- ∞ (³ He,2pn γ), -0.7 +2-23 (p,p' γ).
3344.8	3 ⁺	1887 ^d 1 806.5 3 1936.5 4	19 5 75 5 100 5	1408.19 2538.1 1408.19	2 ⁺ 4 ⁺ 2 ⁺	(E2) ^d M1+E2 ^c M1+E2 ^c	0.02 ^c 1 0.51 ^c 4			
3437.4	4 ⁺ to 6 ⁺	487.9 ^a 899.5 ^a	100 ^a 20 ^a	2949.2 2538.1	6 ⁺ 4 ⁺					
3793.8		844.6 ^a	100 ^a	2949.2	6 ⁺					
3833.2	4 ⁺	538.6 ^b	≤ 2.2	3294.8	4 ⁺					
		1294.9 4	10 3	2538.1	4 ⁺	E2 ^b				B(E2)(W.u.)=19 7
		2425.2 7	100 3	1408.19	2 ⁺	E2 ^b				B(E2)(W.u.)=8.1 17
3841.0		2432.7 ^a	100 ^a	1408.19	2 ⁺					
4030.9	5 ⁺	736.4 4	100 ^d 7	3294.8	4 ⁺	(M1+E2) ^d	+0.14 ^d +10-7			B(M1)(W.u.)<0.036; B(E2)(W.u.)<6.5 E_γ : from unweighted average of 736.0 4 (n,n' γ) and 736.8 4 (³⁶ Ar,2 α 2pn γ). Additional information 3.
		1494 ^d 1	20 ^d 4	2538.1	4 ⁺	M1+E2	-1.2 +12-3	5		B(M1)(W.u.)<0.00078; B(E2)(W.u.)<0.89 Mult., δ : From (³ He,2pn γ).
4047.8	4 ⁺	703.0 3	100 ^a	3344.8	3 ⁺	M1(+E2)	0.23 9			B(M1)(W.u.)=(0.15 +5-12); B(E2)(W.u.)=(3.E+1 3) Mult.: from D+Q in (p,p' γ) and γ to 3 ⁺ .

Adopted Levels, Gammas (continued)

$\gamma(^{54}\text{Fe})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^{\dagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult.	δ^f	Comments
4047.8	4 ⁺	1089.2 ^a	4 ^a	2959.0	2 ⁺			
		1509.4 8	11 ^a	2538.1	4 ⁺	M1,E2		Mult.: from recommended upper limits for γ -ray strengths, γ to 4 ⁺ .
		2639.4 4	23 ^a	1408.19	2 ⁺	[E2]		B(E2)(W.u.)=0.20 +7-16
4071.6	3 ⁺	1534 ^b	9 3	2538.1	4 ⁺	E2		B(E2)(W.u.)=8 4
								Mult.: from mult.=Q in (p,p' γ) and RUL, mult=M2 is ruled out.
		2662.7 5	100 3	1408.19	2 ⁺	M1+E2 ^b	1.88 +50-44	B(M1)(W.u.)=0.0041 21; B(E2)(W.u.)=4.3 14
4099.7	4 ⁺	804.9 ^a	100 ^a	3294.8	4 ⁺			
4103.4		1154.2 ^a	100 ^a	2949.2	6 ⁺			
4267.8	4 ⁺	1729.6 4	100 ^b 18	2538.1	4 ⁺	M1+E2 ^b	-0.53 24	B(M1)(W.u.)=0.032 +12-14; B(E2)(W.u.)=6 5
		2859.6 6	27 ^b 8	1408.19	2 ⁺	E2		B(E2)(W.u.)=0.63 +25-28
								Mult.: from mult.=Q in (p,p' γ) and RUL, mult=M2 is ruled out.
4290.8	0 ⁺	2881.9 10	100	1408.19	2 ⁺	E2 ^d		B(E2)(W.u.)=4.3 +11-14
								Mult.: from mult.=Q and RUL, mult=M2 is ruled out.
		(4290.8)		0.0	0 ⁺	E0		
4578.5	2 ⁺	3170 ^b	100 14	1408.19	2 ⁺	M1+E2 ^b	-0.10 9	B(M1)(W.u.)>0.067
		4579 2	43 14	0.0	0 ⁺	E2 ^b		B(E2)(W.u.)>0.99
4655.3		608 ^d 1	12 ^d 4	4047.8	4 ⁺			
		1361 ^d 1	100 ^d 20	3294.8	4 ⁺			
4696?		3288 3	100 ^c	1408.19	2 ⁺			
4700.1		1355 1	100 ^c	3344.8	3 ⁺			
		2162 2	88 ^c	2538.1	4 ⁺			
		3294 3	33 ^c	1408.19	2 ⁺			
4781.9	3 ⁻	1436 ^b	21 6	3344.8	3 ⁺	E1 ^b		B(E1)(W.u.)=0.00055 25
		1487.2 9	33 8	3294.8	4 ⁺	E1 ^b		B(E1)(W.u.)=0.0008 4
		2244.1 7	32 8	2538.1	4 ⁺	E1 ^b		B(E1)(W.u.)=0.00022 10
		3373.9 12	100 13	1408.19	2 ⁺	E1(+M2) ^b	-0.018 26	B(E1)(W.u.)=(0.00020 8); B(M2)(W.u.)=(0.03 +8-3)
4948.7	4 ⁽⁺⁾	2001 ^b	18 6	2949.2	6 ⁺			
		2409	100 9	2538.1	4 ⁺	M1+E2 ^b	-0.36 +20-30	B(M1)(W.u.)=0.026 11; B(E2)(W.u.)=1.3 +14-13
		3537 5	64 15	1408.19	2 ⁺			
5044.8	5 ⁻ ,6 ⁺	1015.0 ^d 5	20 ^d 5	4030.9	5 ⁺	(M1+E2) ^d	+2.7 ^d	$\alpha(K)$ =0.00017
		2097 ^d 1	100 ^d 14	2949.2	6 ⁺	(D+Q) ^d	$\approx -1.0^d$	
5080	(1,2 ⁺)	3672 5	100 ^c	1408.19	2 ⁺			
		5080 7	43 ^c	0.0	0 ⁺			
5145	2 ⁺	3737 6	100 ^c	1408.19	2 ⁺			
5248		3840 6	100 ^c	1408.19	2 ⁺			
5278.8		1248.0 ^a		4030.9	5 ⁺			
		3867 6	^c	1408.19	2 ⁺			
5392	2 ⁺	3984 6	100 ^c	1408.19	2 ⁺			

Adopted Levels, Gammas (continued)

$\gamma(^{54}\text{Fe})$ (continued)									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult.	δ^f	α^g	Comments
5431.1		386.3 ^a	100 ^a	5044.8	5 ⁻ , 6 ⁺				
5453	(1, 2 ⁺)	5453 7	100 ^c	0.0	0 ⁺				
5461.2		2166.4 ^a	100 ^a	3294.8	4 ⁺				
5482.0	3 ⁺ , 4 ⁺	1435 ^d 1	12 ^d 4	4047.8	4 ⁺				
		2944 ^d 1	100 ^d 15	2538.1	4 ⁺	(M1+E2) ^d	$\approx -0.3^d$		Additional information 4.
		4074 ^h 5	100 ^c	1408.19	2 ⁺				Additional information 5.
5506	(2 ⁺)	4098 6	100 ^c	1408.19	2 ⁺				
5539	3 ⁻	4131 6	100	1408.19	2 ⁺				
5621	(3 ⁻)	4213 6	100 ^c	1408.19	2 ⁺				
5809	2 ⁺	4401 7	100 ^c	1408.19	2 ⁺				
5828		4420 7	100 ^c	1408.19	2 ⁺				
5919.3		2970 ^a	100 ^a	2949.2	6 ⁺				
5927.4	7 ⁺	881.9 ^d 3	20 ^d 3	5044.8	5 ⁻ , 6 ⁺	M1(+E2) ^d	$+0.07^d$ +11-8		Additional information 6.
		1895 ^d 1	4.5 ^d 20	4030.9	5 ⁺				
		2979 ^d 1	100 ^d 9	2949.2	6 ⁺	M1+E2 ^d	$\approx -1.0^d$		Additional information 7.
5955	2 ⁺	5955 8	100 ^c	0.0	0 ⁺				
6038	(1, 2 ⁺)	6038 8	100 ^c	0.0	0 ⁺				
6128.7	1	1837.4 [#]	2.7 [#] 5	4290.8	0 ⁺	[D]			
		2961.8 [#]	2.7 [#] 4	3166.0	2 ⁺	[D]			
		4720.7 [#]	2.5 [#] 7	1408.19	2 ⁺	[D]			
		6129.0 [#]	100 [#] 1	0.0	0 ⁺	[D]			
6296.8	7 ⁺	3348 ^d 2	100 ^d	2949.2	6 ⁺				Additional information 8.
6380.9	8 ⁺	3432.0 ^{&} 18	100 ^{&}	2949.2	6 ⁺	E2 ^e			B(E2)(W.u.)=0.86 +16-22
6527.1	10 ⁺	146.2 [@] 2	100.0 [@] 3	6380.9	8 ⁺	E2 ^e		0.1173	$\alpha(K)=0.1032$; $\alpha(L)=0.01063$
		3577.6 [@]	2.0 [@] 2	2949.2	6 ⁺	E4			B(E2)(W.u.)=1.69 4
									B(E4)(W.u.)=0.79 8
									Mult.: from $^{40}\text{Ca}(^{16}\text{O}, 2p\gamma)$, based on a pulsed-beam search revealed a weak 10 ⁺ to 6 ⁺ E4 cross-over transition, see 1978NoZY.
6551.0		1069 ^d 1	40 ^d 20	5482.0	3 ⁺ , 4 ⁺				
		3602 ^d 2	100 ^d 40	2949.2	6 ⁺				
6724.1	9 ⁺	197 ^d 2	100 ^d	6527.1	10 ⁺	M1(+E2) ^d	-0.07^d 6		B(M1)(W.u.) $\approx(0.070)$; B(E2)(W.u.) $\approx(19)$
6864.3	8 ⁺	936.9 ^d 5	100 ^d 11	5927.4	7 ⁺	M1(+E2) ^d	-0.09^d 12		Additional information 9.
		1819 ^d 1	22 ^d 6	5044.8	5 ⁻ , 6 ⁺				
		3915 ^d 2	83 ^d 8	2949.2	6 ⁺	(E2) ^d			Additional information 10.
7074.8		778 ^d 1	44 ^d 22	6296.8	7 ⁺				
		1148 ^{dh} 1	33 ^d 11	5927.4	7 ⁺				

Adopted Levels, Gammas (continued)

$\gamma(^{54}\text{Fe})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult.	δ^f	Comments
7074.8		4126 ^d 3	100 ^d 22	2949.2	6 ⁺			
7351.5	(9 ⁺)	487.2 ^d 2	100 ^d 12	6864.3	8 ⁺	M1(+E2) ^d	-0.01 ^d 7	Additional information 11.
		971.6 ^d 6	24 ^d 7	6380.9	8 ⁺			
		1423.8 ^d 6	67 ^d 10	5927.4	7 ⁺	(E2) ^d		Additional information 12.
7505	10 ⁺	780.0 ^d 2	100 ^d 6	6724.1	9 ⁺	M1(+E2) ^d	+0.06 ^d 6	
		978 ^d 1	15 ^d 2	6527.1	10 ⁺			
7565.8		4617 ^d 3	100 ^d	2949.2	6 ⁺			
8021	(11) ⁺	1492.4 ^d 4	100 ^d	6527.1	10 ⁺	M1(+E2) ^d	-0.02 ^d +14-12	Additional information 13.
8318.8	8 ⁻	753 ^d 1	100 ^d 40	7565.8				
		1769 ^{dh} 2	40 ^d 20	6551.0				
		2022 ^d 1	40 ^d 20	6296.8	7 ⁺			
8374.3	(10 ⁺)	1994 ^d 1	100 ^d	6380.9	8 ⁺	(E2) ^d		Additional information 14.
8577.8	(10 ⁺)	559 ^d 1	19 ^d 5	8021	(11) ⁺			
		1226.2 ^d 5	100 ^d 14	7351.5	(9 ⁺)			Additional information 15.
8808.0	(11 ⁺)	788.8 ^d 6	8.6 ^d 14	8021	(11) ⁺			
		1304.5 ^d 4	100 ^d 13	7505	10 ⁺	M1(+E2) ^d	+0.03 ^d +11-7	Additional information 16.
		2282 ^d 2	71 ^d 14	6527.1	10 ⁺			
9123.6		1772 ^d 1	100 ^d	7351.5	(9 ⁺)			
9845.3	(12 ⁺)	1037.2 ^d 4	23 ^d 3	8808.0	(11 ⁺)			Additional information 17.
		1826.4 ^d 7	100 ^d 6	8021	(11) ⁺	M1 ^d		Additional information 18.
		2342 ^d 2	2.2 ^d 6	7505	10 ⁺			
		3319 ^d 2	56 ^d 6	6527.1	10 ⁺			
9995.4?		2492 ^{dh} 2	100 ^d 33	7505	10 ⁺			
		3270 ^{dh} 3	100 ^d 33	6724.1	9 ⁺			
10131.0	(12 ⁺)	1323 ^d 1	100 ^d 14	8808.0	(11 ⁺)			
		2112 ^d 1	45 ^d 9	8021	(11) ⁺			
10542.0	(11)	1734 ^d 1	67 ^d 17	8808.0	(11 ⁺)			
		1964 ^d 1	25 ^d 8	8577.8	(10 ⁺)			
		2523 ^d 2	33 ^d 8	8021	(11) ⁺			
		3037 ^d 2	33 ^d 8	7505	10 ⁺			
		4016 ^d 1	100 ^d 17	6527.1	10 ⁺			
11093.4	(13 ⁺)	1248.1 ^d 3	100 ^d 3	9845.3	(12 ⁺)	M1 ^d		Additional information 19.
		3074 ^d 2	8.8 ^d 9	8021	(11) ⁺			
11113.6	(12)	571.5 ^d 4	100 ^d 7	10542.0	(11)	D+Q ^d		
		1118 ^{dh} 1	11 ^d 4	9995.4?				

Adopted Levels, Gammas (continued)

$\gamma(^{54}\text{Fe})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult.	Comments
11113.6	(12)	2306 ^d 2	54 ^d 11	8808.0 (11 ⁺)		D ^d	Additional information 20.
		3095 ^d 3	32 ^d 7	8021 (11) ⁺			
12043.0	(13)	929.4 ^d 4	100 ^d	11113.6 (12)		D+Q ^d	Additional information 21.
12314.1	(14 ⁺)	1220.7 ^d 4	100 ^d 8	11093.4 (13 ⁺)		M1 ^d	
		2183 ^{dh} 2	2 ^d 1	10131.0 (12 ⁺)			
12953.3	(14 ⁺)	1860 ^d 1	100 ^d	11093.4 (13 ⁺)		D+Q ^d	
13358.0		1315 ^d 1	100 ^d	12043.0 (13)			
14388.3		1435 ^d 1	8 ^d 4	12953.3 (14 ⁺)			
		2074 ^d 2	100 ^d 20	12314.1 (14 ⁺)			
15062.0?		1704 ^{dh} 2	100 ^d	13358.0			

[†] From (n,n' γ), except as noted.

[‡] Photon branching ratio, from (p,p' γ), except as noted.

From (γ,γ').

@ From (¹⁶O,2p γ).

& From (α ,2n γ).

^a From (³He,2pn γ).

^b From (p,p' γ).

^c From (n,n' γ).

^d From (³⁶Ar,2 α 2p γ).

^e From γ -ray linear polarization and angular correlations. in (α ,2n γ).

^f Based on p $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in (p,p' γ), except as noted.

^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.

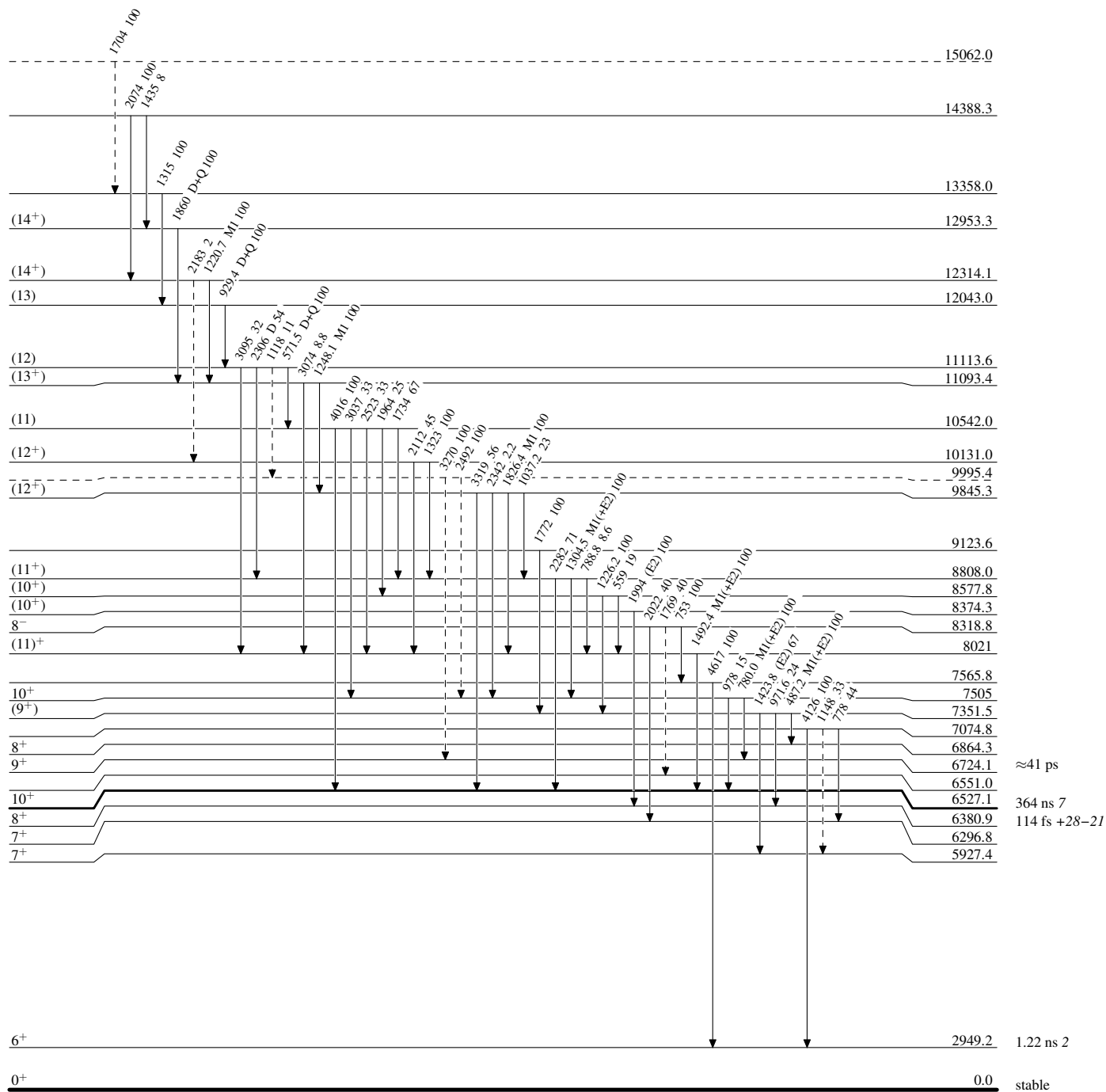
^h Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

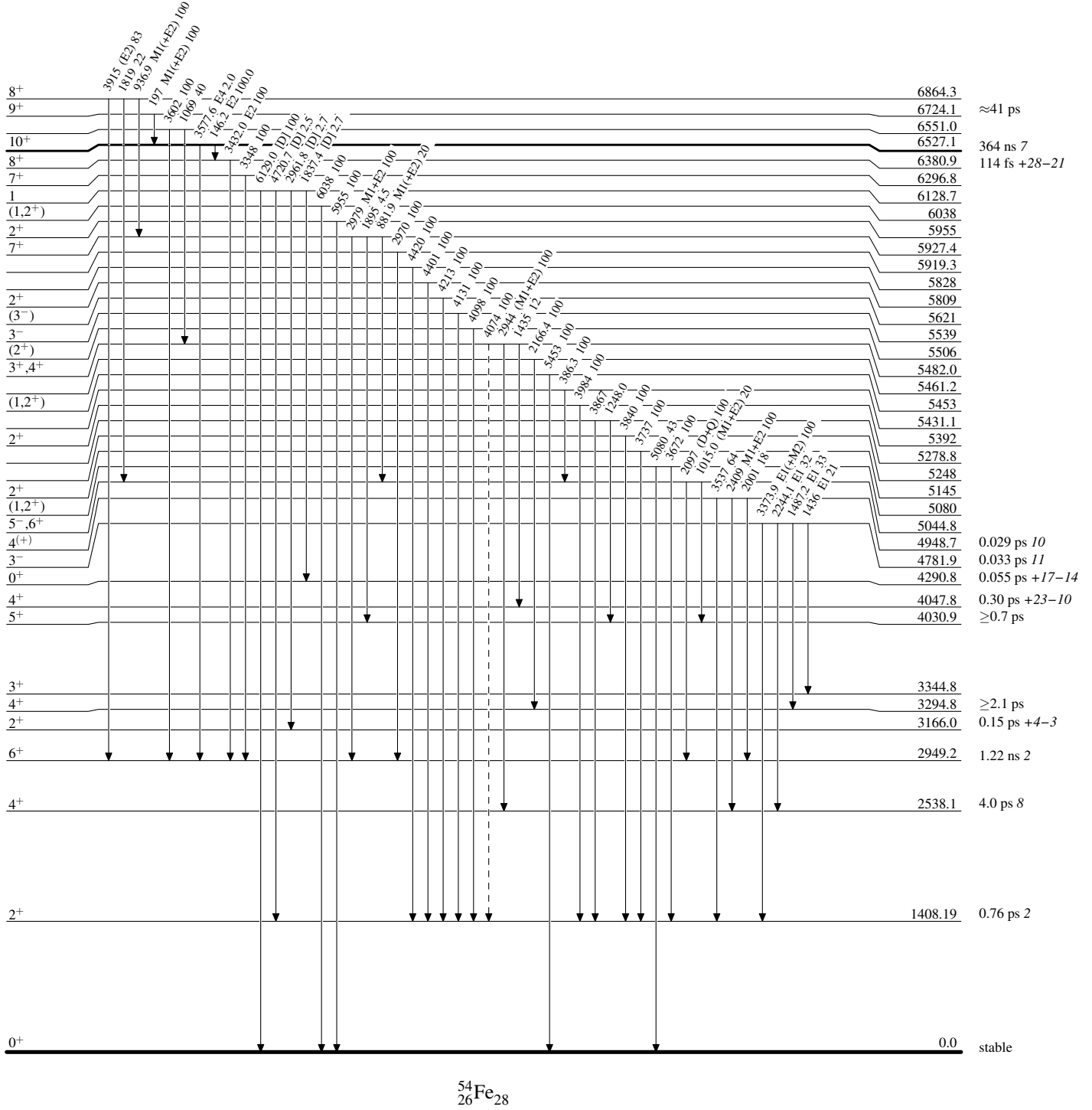
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

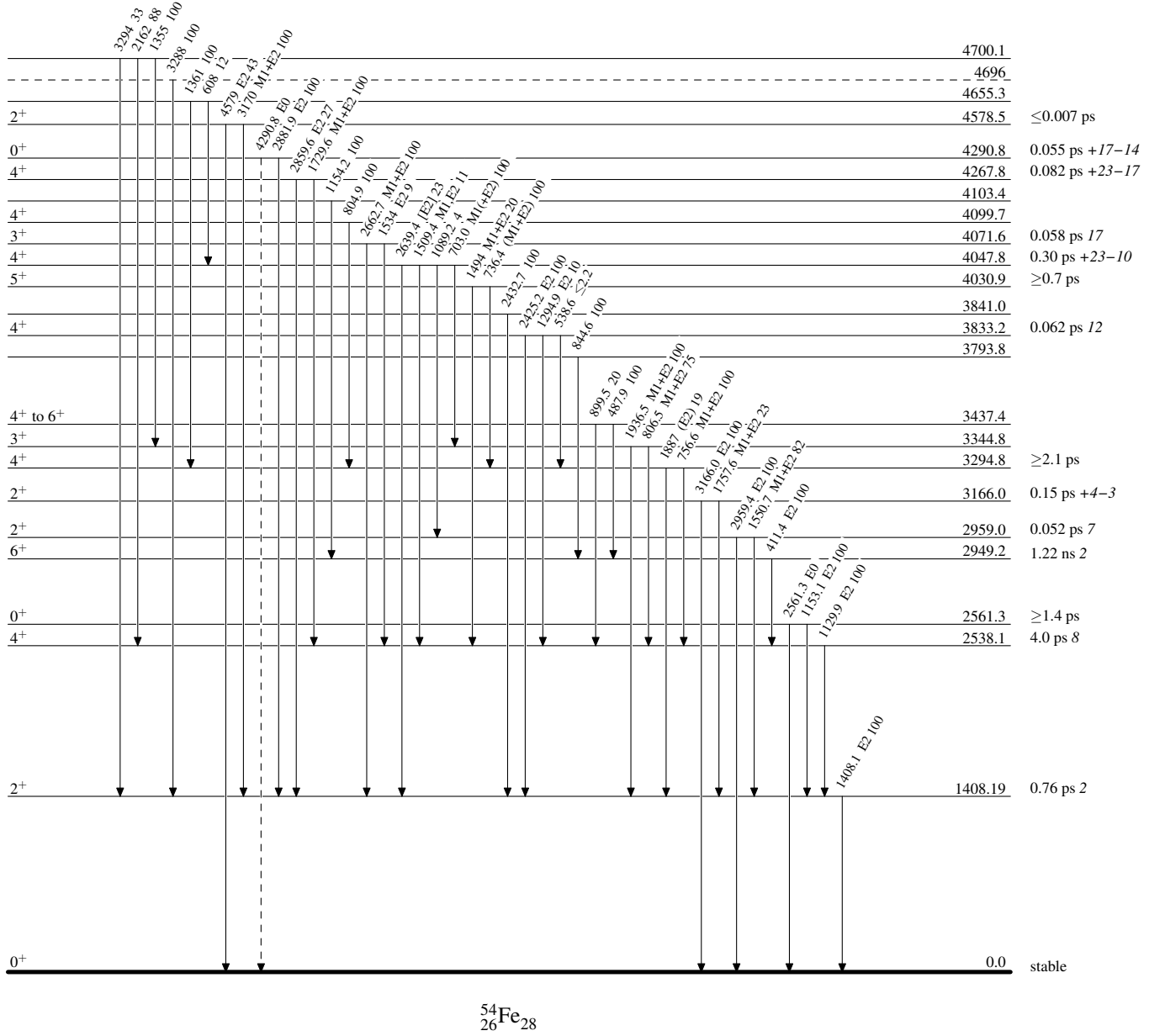
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain) $^{54}_{26}\text{Fe}_{28}$