Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 140,1 (2017)	30-Sep-2015

Q(β^-)=−14323.0 *28*; S(n)=15635.0 *6*; S(p)=8328.17 *2*; Q(α)=−7039.76 *3* 2012Wa38
S(2n)=28930.52 *20*, S(2p)=14709.51 *20* (2012Wa38).
First identification of ^{40}Cl nuclide by A. J. Dempster (Phys. Rev., 20 (1922), p. 631).
Additional details of data for resonances in different reactions can be found in the following datasets:
^{36}Ar(α,γ):resonances: 24 resonances from Eα(lab)=5486 to 13330 (excitation energy in ^{40}Ca=11978-19038).
^{39}K(p,γ): excitation energies and γ-decays for about 160 resonances.
^{39}K(p,p),(p,α):resonances: 267 resonances from E(p)(lab)=1102-6660 (excitation energy in ^{40}Ca=9403-14680).
^{40}Ca(p,pα),(p,2p):resonances: two resonances with excitation energies (in ^{40}Ca) at 11700 and 12300.

Other reactions (giant resonances, properties of compound nucleus, reaction mechanism, etc.):
^{12}C(^{28}Si,X) or ^{28}Si(^{12}C,X): 2002Ro35, 1995Na09, 1986Ha33, 1983Ra26, 1979Os01, 1979Cl02, 1979Ba49, 1973Ho37: reaction mechanisms.
Additional information 1.
^{24}Mg(^{16}O,X): 1991Fo08, 1985Sa11, 1981Nu02, 1980Sa31, 1980Sa12, 1980Pa08, 1979Le02, 1979Cl02, 1973Ho37.
^{27}Al(^{16}O,t): 1982Aw01, 1981Aw02: reaction mechanism.
^{39}K(p,p),(p,α):resonances: 1987WaZI, 1990Bu02, 1970De30: see dataset.
^{40}Ca(^{40}Ca,X): 1997Sc40: giant quadrupole resonance.
^{40}Ca(p,π^-): 1983Sh31: E=190 MeV. Measured σ.
^{40}Ca(p,pα),(p,2p):resonances: 2001Sc25: see dataset.
Photonuclear reactions: ^{40}Ca(γ,n),(γ,p),(γ,2n),(γ,pn), etc: 1974Br15, 1972Br58, 1971Sh23, 1971Is06, 1968Go29, 1966An03, 1964Ba24.
^{40}Ca(γ,π): 2002Kr02: deduced Δ' resonance. Others: 1988St12, 1982Do12.
^{40}Ca(e,X): 1976Zi02.
^{40}Ca(μ^-,ν): 2003Po09: photon asymmetry measured in radiative muon capture in ^{40}Ca.
^{40}Ca(π^+,K$^+$): 1991Pi07.
^{40}Ca(K,π^-): 1981Be17, 1989Ta16: hypernuclear production.
^{40}Ca(p-bar,X): 2002Ha01, 2001Tr23, 2001Tr19: measured anti-protonic x-rays.
^{40}Ca(p-bar,p-bar): 1984Ga32.
^{40}Ca(p,np): 1984Ah04 (also 1983AhZY): deduced neutron hole states.
^{40}Ca(pol p,pol n): 1986Wa28: deduced spin-flip probability.
^{40}Ca(^{20}Ne,^{16}Oα): 1986Sh30.
Hyperfine structure, isotope shifts, nuclear radius measurements: 2000Mu17, 2000Ga58, 1995Ku41, 1993Si20, 1992Ve02, 1992Ma20, 1991As06, 1990Go10, 1984Va08, 1983Lo13, 1982Ay02, 1982An15, 1980Be13, 1979Kl01, 1978Br31, 1976Ne08.
Mesic atoms: 1983Ku10, 1981Wo02, 1980Po01, 1979Ba07, 1971Ku08, 1970Ma26, 1970Ku03, 1966Co02.
Mesic atoms, in most studies, deduced isotope shifts, root-mean square radius.
1983Ku10, 1980Po01, 1979Ba07, 1970Ku03: measured pionic x rays.
1981Wo02, 1970Ma26, 1966Co02: measured muonic x rays.
1971Ku08: measured kaonic x rays.

Giant (dipole, quadrupole and octupole) resonances: see inelastic scattering datasets: ^{40}Ca(e,e′); ($\pi^+,\pi^{+\prime}$),($\pi^-,\pi^{-\prime}$); (p,p′),(pol p,p′); (d,d′),(pol d,d′); (^{3}He,^{3}He′); (α,α'); (HI,HI′).

In XREF column, level population indicated by letter Z or z refers to the following level energies in different reactions:
^{41}Ti εp decay (80.4 ms): 0, 3353.62, 3737, 3904.
^{43}Cr β3p decay (21.2 ms): 0.
^{44}V $\varepsilon\alpha$ decay (111 ms): 0.
^{14}N(^{28}Si,d): 6930, 8098.
^{36}Ar(^{7}Li,t): 3900, 5265, 5615, 6290, 6525, 7010.
^{36}Ar(^{16}O,^{12}C): 3353, 3900, 5250, 6900, 9900, 12400.

Adopted Levels, Gammas (continued)

^{40}Ca(p,pα),(p,2p):resonances: 11700, 12300.
^{40}Ca(t,t),(pol t,t): 0.
Inelastic scattering: 0, 3740, 3900, 4490, 5900, 6290, 6400, 6940, 7300. Giant resonances at 7.8, 10.7, 14.0, 17.6 and 26 MeV.
^{40}Ca(n,n′),(pol n,n′): 0, 3353, 3737, 3904, 4491.
^{40}Ca(π+,π+′),(π-,π-′): 0, 3353, 3736, 3908, 4492, 6256, 6583, 6700, 11700, 13400, 17500.
^{42}Ca(^{16}O,^{18}O): 0.

^{40}Ca Levels

Cross Reference (XREF) Flags

A	^{40}K β^- decay (1.248×10^9 y)	N	^{40}Ca(e,e′)	Others:	
B	^{40}Sc ε decay (182.3 ms)	O	^{40}Ca(n,n′γ)	AA	^{43}Cr β^+3p decay (21.2 ms)
C	^{4}He(^{36}Ar,α):resonances	P	^{40}Ca(p,p′γ)	AB	^{44}V $\varepsilon\alpha$ decay (111 ms)
D	^{32}S(^{12}C,α)	Q	^{40}Ca(p,p′),(pol p,p′)	AC	^{14}N(^{28}Si,d)
E	^{36}Ar(α,γ):resonances	R	^{40}Ca(d,d′),(pol d,d′)	AD	^{36}Ar(^{7}Li,t)
F	^{36}Ar(^{6}Li,d)	S	^{40}Ca(^{3}He,^{3}He′)	AE	^{36}Ar(^{16}O,^{12}C)
G	^{38}Ar(^{3}He,n)	T	^{40}Ca(α,$\alpha'\gamma$)	AF	^{40}Ca(p,pα),(p,2p):resonances
H	^{39}K(p,γ)	U	^{40}Ca(α,α′)	AG	^{40}Ca(t,t),(pol t,t)
I	^{39}K(p,p),(p,α):resonances	V	^{41}Ca(d,t)	AH	^{40}Ca(n,n′),(pol n,n′)
J	^{39}K(d,n)	W	^{41}Ca(^{3}He,α)	AI	^{40}Ca(π^+,$\pi^{+\prime}$),(π^-,$\pi^{-\prime}$)
K	^{39}K(^{3}He,d)	X	^{42}Ca(p,t)	AJ	^{42}Ca(^{16}O,^{18}O)
L	^{39}K(^{3}He,dγ)	Y	(HI,xnγ)	AK	Inelastic scattering
M	^{40}Ca(γ,γ′)	Z	^{41}Ti εp decay (80.4 ms)		

E(level)†	J$^\pi$‡	T$_{1/2}$#@	XREF	Comments
0.0	0$^+$	stable	AB DEFGH JK MNOPQRSTUVWXYZ	XREF: Others: AA, AB, AG, AH, AI, AJ, AK Double β decay ($\varepsilon\varepsilon$) is possible, but only limits have been set on half-life from measurements. T$_{1/2}$: experimental limits from $2\varepsilon\varepsilon$ decay (2001Be79,1999Be64): $>3.0\times10^{21}$ y for 0-neutrino mode; $>5.9\times10^{21}$ y for 2-neutrino mode. Evaluated rms charge radius=3.4776 fm *19* (2013An02). Additional information 2.
3352.62& *9*	0$^+$	2.17 ns *8*	D FGH JKL NOPQRSTUVWXYZ	XREF: Others: AE, AH, AI XREF: T(?). J$^\pi$: L(α,α′)=L(^{3}He,n)=L(p,t)=0 from 0$^+$; E0 excitation in (e,e′). T$_{1/2}$: weighted average of 2.21 ns *10* in (n,n′) and 2.15 ns *8* in (p,p′γ). Additional information 3.
3736.69 *5*	3$^-$	41 ps *4*	B D F H JKL NOPQRSTUVWXYZ	XREF: Others: AH, AI, AK μ=+1.6 *3* (2014StZZ,1979Ni04,1976Ja16) T=0 (1972Sc19) J$^\pi$: L(α,α′)=L(^{3}He,n)=L(p,t)=3 from 0$^+$; E3 excitation in (e,e′). μ: from tilted-foil hyperfine field IPAC in (α,α′)(1979Ni04) and recoil into gas in (α,α′) (1976Ja16). Other: 1.56 *30* (IMPAC, relative to g-factor for 4491 level in (α,α′), 1987Ma25). T$_{1/2}$: from (p,p′γ). Additional information 4.
3904.38& *3*	2$^+$	35 fs *7*	D FGH JKLMNOPQR TU XYZ	XREF: Others: AD, AE, AH, AI, AK J$^\pi$: L(α,α′)=L(^{3}He,n)=L(p,t)=2 from 0$^+$; E2 excitation in (e,e′) and (γ,γ′).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
				$T_{1/2}$: weighted average of 40 fs *7* in (p,γ), 29 fs *+10−6* in (γ,γ′), 36 fs *14* in (n,n′γ), and 33 fs *7* in (p,p′γ). Additional information 5.
4491.43 *4*	5⁻	289 ps *8*	B D F H JKL NOPQRSTUVWXY	XREF: Others: AH, AI, AK μ=+2.6 *5* (2014StZZ,1974He13) T=0 (1972Sc19) Jπ: L(α,α′)=L(p,t)=5 from 0⁺; E5 excitation in (e,e′). $T_{1/2}$: weighted average of 295 ps *5* in (α,α′γ), 272 ps *8* in (p,p′γ), and 0.38 ns *8* in (HI,xnγ). μ: IPAD method in (p,p′γ) (1974He13). Additional information 6.
5211.56[d] *17*	0⁺	1.02 ps *21*	D fgH KL OPQ XY	Jπ: L(p,t)=L(^{6}Li,d)=0 from 0⁺. $T_{1/2}$: from (p,p′γ).
5248.79 *5*	2⁺	83 fs *+11−9*	d fgH KLMNOPQ S U XY	XREF: Others: AD Jπ: L(p,t)=L(^{6}Li,d)=L(p,p′)=2 from 0⁺; E2 excitation in (e,e′). $T_{1/2}$: weighted average of 0.15 ps *7* in (p,γ) and 94 fs *17* in (p,p′γ) and 79 fs *+11−9* in (γ,γ′).
5278.80[&] *6*	4⁺	0.21 ps *4*	d FgH KL OPQ U Y	XREF: Others: AD, AE Jπ: L(^{6}Li,d)=L(p,p′)=4 from 0⁺; γ(θ) in (p,′γ). $T_{1/2}$: weighted average of 0.19 ps *4* in (n,n′γ), 0.225 ps *35* in (p,p′γ), and 0.16 ps *+13−4* in (p,γ).
5613.52 *3*	4⁻	0.69 ps *11*	B d H JKL OPQ sT VW Y	XREF: Others: AD Jπ: spin from γ(θ) in (HI,xnγ) and γγ(θ) in (p,γ); parity from L(d,n)=L(^{3}He,d)=3 from 3/2⁺ and L(d,t)=L(^{3}He,α)=2 from 7/2⁻. $T_{1/2}$: from (p,p′γ). Other: 69 fs *55* in (p,γ). Additional information 7.
5629.41[d] *6*	2⁺	40 fs *15*	d F H MNOPQ stU XY	XREF: Others: AD XREF: N(5610). Jπ: L(p,t)=2 from 0⁺; E2 excitation in (e,e′). $T_{1/2}$: weighted average of 42 fs *15* from (p,p′γ) and 38 fs *+20−10* from (γ,γ′).
5902.63 *7*	1⁻	15.8 fs *22*	D F H JKLMNOPQ U WX	XREF: Others: AK XREF: D(5900)N(5940). Jπ: L(p,t)=L(^{6}Li,d)=1 from 0⁺. $T_{1/2}$: weighted average of 42 fs *14* from (p,p′γ) and 15.2 fs *+23−18* (γ,γ′). 2004To07 in (HI,xnγ) propose this as 1⁻ member of $K^π$=0⁻ band, not observed by 2004To07. Additional information 8.
6025.47 *5*	2⁻	171 fs *21*	f H JKL OPQ uVWx	Jπ: L(^{3}He,d)=3 and L(d,n)=1+3 from 3/2⁺; analyzing power in (pol p,p′). $T_{1/2}$: from (p,p′γ). Additional information 9.
6029.71[b] *6*	3⁺	0.40 ps *8*	f H OP u xY	Jπ: 780.8γ and 2124.4γ E2(+M1) to 2⁺; band assignment in (HI,xnγ). $T_{1/2}$: from (p,p′γ).
6160	(3⁻)		N TU	XREF: T(6100). Jπ: L(α,α′)=(3).
6285.15 *4*	3⁻	0.33 ps *4*	D F H JKL NOPQ STU WX	XREF: Others: AD, AI, AK Jπ: L(α,α′)=L(p,t)=L(^{6}Li,d)=3 from 0⁺. $T_{1/2}$: weighted average of 0.27 ps *8* in (p,γ) and 0.35 ps *4* in (p,p′γ).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
				2004To07 in (HI,xnγ) propose this as (3^-) member of $K^\pi=0^-$ band, not observed by 2004To07. Additional information 10.
6422.4 *10*	2^+	12 fs *+5−3*	M Q	XREF: Others: AK Jπ: from (pol p,p′). $T_{1/2}$: from (γ,γ′).
6507.87 *13*	4^+	128 fs *21*	d F H OPQ U XY	XREF: Others: AD Jπ: L(p,t)=L(^{6}Li,d)=L(pol p,p′)=4 from 0^+. $T_{1/2}$: from (p,p′γ).
6542.80[d] *9*	4^+	121 fs *21*	d F H OPQ Y	XREF: Others: AD XREF: O(?). Jπ: L(^{6}Li,d)=4 from 0^+; 913.3γ stretched E2 to 2^+; band assignment in (HI,xnγ). $T_{1/2}$: from (p,p′γ).
6582.47 *10*	3^-	0.173 fs *28*	B d F H JKL NOPQ STUVWX	XREF: Others: AI XREF: O(?)T(6560). Jπ: L(α,α′)=L(p,t)=L(^{6}Li,d)=L(pol p,p′)=3. $T_{1/2}$: from (p,p′γ). 2004To07 in (HI,xnγ) propose this as possible (3^-) member of $K^\pi=0^-$ band, not observed by 2004To07. Additional information 11.
6750.41 *7*	2^-	96 fs *28*	F H JKL OPQ UVWX	XREF: Others: AI Jπ: from analyzing power in (pol p,p′) with L=3; L(^{3}He,d)=1 and L(d,n)=1+3 from $7/2^+$. $T_{1/2}$: from (p,p′γ). Additional information 12.
6908.70 *8*	2^+	2.41 fs *+29−23*	d F H MNOPQ X	XREF: Others: AD Jπ: L(p,t)=L(^{6}Li,d)=L(p,p′)=2 from 0^+. $T_{1/2}$: from (γ,γ′). Others: <35 fs from (p,γ), <10 fs from (p,p′γ).
6930.2[&] *3*	6^+	0.34 ps *+9−17*	d F l O v Y	XREF: Others: AC, AD, AE, AK Jπ: L(^{6}Li,d)=6; γ(θ) and band assignment in (HI,xnγ). $T_{1/2}$: from (HI,xnγ) by DSAM.
6931.29 *6*	3^-	1.4 ps *6*	d H l nOPQ stuvW	XREF: Others: AD, AK Jπ: L(^{3}He,α)=2 from $7/2^-$; 2439.8γ to 5^-, 1301.8γ, 1682.4γ and 3026.8γ to 2^+. $T_{1/2}$: from (p,γ). Other: 104 fs *28* from (p,p′γ).
6938.0 *18*	(1^- to 5^-)	0.42 fs *17*	d n P stuv	XREF: Others: AD, AK Jπ: γ to 3^-. $T_{1/2}$: from (p,p′γ).
6950.48 *7*	1^-	1.01 fs *5*	d GH JKLMNOPQ tuvWX	XREF: Others: AD, AK Jπ: L(p,t)=L(^{3}He,n)=1 from 0^+. $T_{1/2}$: from (γ,γ′). Other: <10 fs from (p,p′γ). Additional information 13.
7100	(2^+)		N	XREF: Others: AD E(level),Jπ: from (e,e′).
7113.1 *10*	1^-	55 fs *28*	H jK P x	XREF: Others: AD Jπ: 1899.8γ and 7112.9γ to 0^+, 1485γ and 3206.8γ to 2^+; L(^{3}He,d)=1 from $3/2^+$; L(d,n)=1(+3) from $3/2^+$.

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
7113.73 *5*	4^-	50 fs *21*	H jKL PQ UVWx	$T_{1/2}$: from (p,p′γ). XREF: Others: AD XREF: K(7117)U(7120). Jπ: L(p,p′)=5 from 0^+; L(d,t)=L(^{3}He,α)=0+2 from $7/2^-$. $T_{1/2}$: weighted average of 35 fs *21* in (p,p′γ) and 76 fs *28* in (p,γ).
7239.07 *8*	$(3^-,4,5^-)$	0.10 ps *5*	d H PQ	Jπ: 3501.4γ to 3^- and 2746γ to 5^-. $T_{1/2}$: from (p,p′γ).
7277.82 *8*	$(2,3)^+$	49 fs *35*	d f H PQ	XREF: Others: AK Jπ: 3541.0γ to 3^-; L(p,p′)=2 from 0^+ for 7278+7301. $T_{1/2}$: from (p,p′γ).
7300.67 *11*	0^+	118 fs *35*	d f H PQ U X	XREF: Others: AK Jπ: L(α,α′)=L(p,t)=L(^{6}Li,d)=0. $T_{1/2}$: from (p,p′γ).
7397.2[b] *10*	(5^+)	0.47 ps *14*	PQ Y	Jπ: γ to 4^+ and band assignment in (HI,xnγ). 2004To07 in (HI,xnγ) proposed this as (5^-) member of $K^\pi=0^-$ band. $T_{1/2}$: from (p,p′γ).
7421.9 *15*		0.20 ps *14*	PQ X	XREF: X(7433). $T_{1/2}$: from (p,p′γ).
7446.23 *6*	$3^+,4^+$	0.14 ps *5*	H PQ X	Jπ: L(p,p′)=4 from 0^+; γ to 2^+. $T_{1/2}$: from (p,p′γ).
7466.35 *7*	2^+	8 fs *4*	F H PQ TU X	XREF: T(7500)U(?). Jπ: L(p,t)=L(p,p′)=2 from 0^+; 4113.5γ and 7465.6γ to 0^+. $T_{1/2}$: from (p,γ). Other: <10 fs in (p,p′γ).
7481?			H	
7532.26 *5*	2^-	0.16 ps *4*	H JKL PQ W	Jπ: L(^{3}He,d)=1 from $3/2^+$; L(^{3}He,α)=2; L(p,p′)=3; not 3^- from (p,γ). $T_{1/2}$: weighted average of 0.22 ps *7* in (p,γ) and 0.149 ps *35* in (p,p′γ).
7561.17 *7*	4^+	0.17 ps *4*	F H PQR U X	XREF: U(?). Jπ: L(^{6}Li,d)=4. Note that L(p,t)=(2) is inconsistent and tentative. $T_{1/2}$: from (p,p′γ). Other: 0.18 ps *+10–5* in (p,γ). Additional information 14.
7623.11 *8*	$(2^-,3,4^+)$	0.111 ps *28*	H PQ X	XREF: X(7625). Jπ: 1993.6γ and 2374.2γ to 2^+ and 2009.5γ to 4^-. However, L(p,t)=0 for a level at 7625 could indicate there may be a separate level, if this assignment is correct. $T_{1/2}$: from (p,p′γ).
7658.23 *5*	4^-	<10 fs	B H jKL PQ vWX	T=1 Jπ: log *ft*=3.3 from 4^-; analog of g.s. in ^{40}K (see 1966Er05, 1966An01). $T_{1/2}$: from (p,p′γ).
7676.6 *5*	(6^+)	0.20 ps *5*	H j PQ uv Y	Jπ: 2399.2γ (E2) to 4^+. $T_{1/2}$: from (p,p′γ).
7694.08 *4*	3^-	<6 fs	H JKL PQ uvW	T=1 Jπ: L(d,n)=1 and L(^{3}He,d)=3 from $3/2^+$; 2080.6γ to 4^-; analog of the 29.8, 3^- level in ^{40}K, see 1966Er05 in (^{3}He,d). $T_{1/2}$: from (p,γ). Other: <10 fs in (p,p′γ).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
7701.8 *4*	0^+		F H Q u X	Jπ: L(^{6}Li,d)=L(p,t)=0.
7769.4 *10*	(3,4,5$^-$)	166 fs *35*	H PQ X	XREF: X(7757). Jπ: 2155.8γ to 4$^-$ and 4032.5γ to 3$^-$; J=(3,4,5) from γ feeding in (p,γ) (1990Ki07). $T_{1/2}$: from (p,p′γ).
7814.7 *6*	0^+		G PQ X	E(level): from (p,p′). Jπ: L(^{3}He,n)=0.
7870	3^-		F	Jπ: L(^{6}Li,d)=3.
7872.18 *9*	2^+	2.44 fs *+24–20*	H Mn PQ U X	XREF: Others: AK Jπ: L(p,t)=L(α,α′)=2 from 0^+. $T_{1/2}$: from (γ,γ′). Other: <14 fs from (p,p′γ).
7928.42 *10*	4^+	49 fs *35*	H n PQ s U X	XREF: Others: AK Jπ: L(α,α′)=L(p,p′)=4 from 0^+. Note that L(p,t)=(3) is inconsistent and tentative. $T_{1/2}$: from (p,p′γ).
7972.5	(≤3)$^-$		d J s x	Jπ: L(d,n)=1.
7974.4[d] *8*	(6^+)		H Y	E(level): band assignment in (HI,xnγ).
7976.55 *3*	2^+	21 fs *21*	d PQ s x	Jπ: 4624γ and 7977γ to 0^+ and 2699γ to 4^+. $T_{1/2}$: from (p,p′γ).
8018.8 *10*	0^+		d PQ X	E(level): from (p,p′γ). Jπ: L(p,t)=0 from 0^+.
8051.8 *6*			Q	E(level): from (p,p′).
8091.61 *17*	2^+	2.94 fs *+20–18*	d FGH M PQ U X	XREF: F(8050)G(8050). Jπ: L(α,α′)=L(^{6}Li,d)=L(^{3}He,n)=L(p,p′)=2 from 0^+; E2 excitation in (γ,γ′); but L(p,t)=4 from 0^+ for a level at 8085 is inconsistent and it could imply that there may be a separate level if the assignment is correct. $T_{1/2}$: from (γ,γ′). Other: <28 fs in (p,p′γ).
8100.1[a] *7*	8^+	12.5 ps *17*	d Y	XREF: Others: AC Jπ: 1168.8γ ΔJ=2, E2 to 6^+. $T_{1/2}$: from (HI,xnγ) by recoil-distance method.
8113.2 *5*	1^-	30 fs *+20–9*	d F j M PQ X	XREF: F(8150). Jπ: spin=1 from dipole excitation in (γ,γ′); L(p,p′)=3 and L(^{6}Li,d)=1 from 0^+. $T_{1/2}$: from (γ,γ′). Other: <14 fs in (p,p′γ).
8134.77 *10*	(3^-)	<28 fs	d H j PQ	Jπ: 2505.3γ and 4229.4γ to 2^+ and 2521.2γ to 4^-. Possible 3643.1γ to 5^- would disfavor 2^- and 3^+. L(d,n)=1+3 from $3/2^+$ for 8113 and 8135 doublet. $T_{1/2}$: from (p,p′γ).
8187.5 *8*	(3,4,5$^-$)	<17 fs	H j PQ x	Jπ: 4451.6γ to 3^-; J=(3,4,5) based on γ feeding in (p,γ) (1990Ki07). $T_{1/2}$: from (p,p′γ).
8195.9 *6*			Q x	E(level): from (p,p′).
8271 *1*	(≤3)$^-$		J L PQ U	XREF: U(?). E(level): from (p,p′). Jπ: L(d,n)=1 from $3/2^+$; 1315γ and 2364γ to 1^-. But L(^{6}Li,d)=4 from 0^+ is suggested for a 8270 group.
8276 *1*	0^+		FG PQ X	Jπ: L(p,t)=L(^{3}He,n)=L(^{6}Li,d)=0 from 0^+.
8323.16 *8*	(1^-,2^+)	58 fs *21*	d H PQ	Jπ: 8322.2γ to 0^+, 2038.0γ and 4586.2γ to 3^-. $T_{1/2}$: weighted average of 83 fs *28* in (p,γ) and 42 fs *21* in (p,p′γ).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
8338.0 *3*	(2+,3,4)		d H Q X	Jπ: 1795.2γ and 1830.1γ to 4+; J=(2,3,4) based on γ feeding in (p,γ) (1990Ki07).
8358.9 *6*	(0,1,2)−	104 fs *21*	d J L PQ	XREF: J(8371). Jπ: L(d,n)=1 from 3/2+; 1405γ to 1− is unlikely to be Mult=Q, ΔJ=2 based on RUL. $T_{1/2}$: from (p,p′γ).
8364 *5*	(3− to 7−)		P	Jπ: 3872γ to 5−.
8373.94 *15*	4+		F H Q U WX	XREF: F(8380). Jπ: L(α,α′)=L(p,t)=L(^{6}Li,d)=4 from 0+.
8424.81 *11*	2−	<17 fs	H JKL N PQ vW	T=1 (1990Ki07) XREF: K(8435). Jπ: L(^{3}He,α)=2 from 7/2−, L(p,p′)=3 from 0+, L(d,n)=1+3 from 3/2+; M2 excitation in (e,e′); analog of the 800, 2− level in ^{40}K, see 1966Er05 in (^{3}He,d). $T_{1/2}$: from (p,p′γ).
8439.0 *5*	0+		FgH PQ s X	XREF: F(8420). Jπ: L(p,t)=L(^{6}Li,d)=0 from 0+.
8484.02 *13*	(1−,2−,3−)	24 fs *14*	gH k PQ s vWX	Jπ: 2581.3γ to 1−, 4747.0γ to 3−; L(^{3}He,α)=(2) from 7/2−. But L(p,t)=0 from 0+ for a level at 8483 is inconsistent and it is unlikely the same level based on RUL for the 4747.0γ, unless L(p,t)=0 is questionable. $T_{1/2}$: from (p,p′γ).
8540 *4*	1,2+	14 fs *14*	f P vw	Jπ: 5188γ and 8540γ to 0+; M2 is ruled out by RUL for these transitions. $T_{1/2}$: from (p,p′γ).
8551.1 *7*	5−	<17 fs	f JK N PQ v X	T=1 XREF: N(8500). Jπ: L(p,t)=L(p,p′)=5 from 0+, L(d,n)=L(^{3}He,d)=3 from 3/2+; analog of the 891, 5− level in ^{40}K, see 1966Er05 in (^{3}He,d). $T_{1/2}$: from (p,p′γ).
8578.80 *9*	2+	3.6 fs +*13*−*8*	d f H M PQ u x	Jπ: L(p,p′)=2 from 0+; E2 excitation in (γ,γ′). $T_{1/2}$: from (γ,γ′). Other: <21 fs from (p,p′γ).
8587 *2*	(2+,3)		d f P u x	Jπ: 2562γ to 2−, 3904γ to 2+, 3308γ to 4+.
8633 *6*			PQ	E(level): from ^{40}Ca(p,p′γ).
8665.3 *8*	1−		J PQ	XREF: P(8671). E(level): from (p,p′). Jπ: L(d,n)=1; 8665γ to 0+.
8678.29 *10*	4+	42 fs *35*	H P X	Jπ: L(p,t)=4. $T_{1/2}$: from (p,γ).
8701 *1*	(6−)		Y	Jπ: suggested in (HI,xnγ); 3088γ to 4− and 4209γ to 5−.
8717 *8*			P	
8748.22 *9*	2+	5.8 fs +*11*−*8*	f H j M PQ T	XREF: P(8756)T(8700). Jπ: L(p,p′)=2 from 0+; E2 excitation in (γ,γ′). $T_{1/2}$: from (γ,γ′).
8764.18 *6*	3−		d H j P X	XREF: P(8769)X(8752). Jπ: L(p,t)=3.
8810 *7*	2+		d f PQ U	XREF: P(8819). Jπ: L(α,α′)=2 from 0+ for a 8780 group.
8850.6 *9*	6−,7−,8−		J PQ X	XREF: P(8860). E(level): from (p,p′). Jπ: L(p,p′)=7 from 0+. Jπ=(0)− is proposed for a

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
				8860 group in (d,n).
8909.0 *9*			Q X	E(level): from (p,p′).
8934.81 *7*	2^+		F H j P	XREF: P(8922). Jπ: L(^{6}Li,d)=2 from 0^+; 3722.1γ, 5581.8γ and 8933.7γ to 0^+, 2352.2γ and 5197.8γ to 3^-, 2905.0γ to 3^+.
8935.8[b] *9*	(7^+)		Y	Jπ: band assignment in (HI,xnγ).
8938.4 *9*	0^+		J PQ X	XREF: P(8949). E(level): from (p,p′). Jπ: L(p,t)=0. But L(d,n)=1 from $3/2^+$ is suggested for a level at 8931.
8978 *6*	$5^+,6^+,7^+$		H Q V x	XREF: H(?)V(?). E(level): from (p,p′). Jπ: L(p,p′)=6 from 0^+.
8982.5 *5*	2^+	4.5 fs *+39−14*	j M r UV x	XREF: U(8970)V(?). Jπ: E2 excitation in (γ,γ′). $T_{1/2}$: from (γ,γ′).
8994.50 *11*	$(1^-,2^+)$		H j PQr x	XREF: P(9011). Jπ: 5641.5γ and 8993.4γ to 0^+, 2411.0γ, 2709.3γ to 3^-.
9031.9 *3*	4^-		H Q VWX	Jπ: L(d,t)=L(^{3}He,α)=0 from $7/2^-$, L(p,p′)=5 from 0^+. 2004To07 in (HI,xnγ) propose (7^-) for this level, but γ′s to 3^- and 4^- states are inconsistent with this assignment.
9033?[c] *1*	(7^-)		Y	E(level): it is possible that this level is the same as the 9031.9 seen in other reactions and the 4542γ reported by 2004To07 in (HI,xnγ) could correspond to 4540.2γ in (p,γ). But the most intense 3418γ from 9031.9 level is not reported by 2004To07. Jπ: band assignment in (HI,xnγ).
9050.1 *10*			Q	E(level): from (p,p′).
9080.3 *11*			Q w	E(level): from (p,p′).
9091.70 *6*	3^-		H k Q w	T=(0) (1990Ki07) Jπ: 1977.9γ to 4^- and 3812.7γ to 4^+, 5187.0γ to 2^+ and 3066.1γ to 2^-, 3188.9γ to 1^-.
9135.66 *5*	$2^-,3^-$		f H Jk Q Wx	T=0 (1990Ki07) Jπ: L(d,n)=1 from $3/2^+$, L(p,p′)=3 from 0^+.
9162.1 *11*			f k Q x	Additional information 15. E(level): from (p,p′).
9185.3 *12*			k Q	E(level): from (p,p′).
9209.77 *3*	$(2,3)^-$		H j Q w	T=0 (1990Ki07) Jπ: 2096.0γ to 4^-, 2259.2γ and 3307.0γ to 1^-; L(d,n)=1 from $3/2^+$. Additional information 16.
9226.69 *5*	$(1^-,2,3^-)$		H j q w	Jπ: 2276.1γ to 1^- and 2941.4γ to 3^-. Possible 9225.6γ to 0^+ would disfacvor 3^-. Additional information 17.
9227.43 *7*	$(1,2^+)$		H j q w	Jπ: 5874.4γ to 0^+ and 3201.8γ to 2^-.
9246.0 *12*	$(7)^-$		F Q X	XREF: X(9250). E(level): from (p,p′). Jπ: L(p,p′)=7. But L(^{6}Li,d)=6 for a 9240 group. Additional information 18.
9274.5 *12*			Q X	XREF: X(9263). E(level): from (p,p′).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
9304 *5*	0^+		X	T=1 (1972Sc19) Jπ: L(p,t)=0.
9305.2[&] *8*	(8^+)		Y	Jπ: band assignment in (HI,xnγ).
9362.54 *6*	3^-		B F H k U x	T=0 (1990Ki07) XREF: U(9340). Jπ: log *ft*=5.4 from 4^-; 937.7γ to 2^-, 4113.5γ to 2^+. Γ_α/Γ_p=0.0119 *5* from ^{40}Sc ε decay.
9377.7 *2*	$2^-,3^-,4^-$		H k Q x	E(level): from (p,γ). Jπ: L(p,p′)=3 from 0^+.
9388.20 *19*	2^+		H k	Jπ: 2087.4γ, 4176.3γ and 9387.0γ to 0^+, and 2845.3γ, 2880.3γ and 4109.2γ to 4^+.
9395.6 *3*			H jk	E(level): from (p,γ).
9404.85 *19*	2^-	0.14 keV	HIJk	T=1 XREF: J(9408). Jπ: 9403.7γ to 0^+, 2822.2γ, 3119.6γ and 5667.7γ to 3^-, 2291.1γ to 4^-; L(p,p)=1 from $3/2^+$; γγ(θ) in (p,γ) give J=2. $T_{1/2}$: from (p,p),(p,α): resonances.
9406.3 *6*	0^+		GH k X	T=1 XREF: G(9380). E(level): from (p,γ). Jπ: L(^{3}He,n)=L(p,t)=0 from 0^+.
9412.3 *2*			H Jk q	XREF: J(9408). E(level): from (p,γ).
9418.8 *2*	3^-		B H Jk q	T=1 XREF: J(9408). Jπ: log *ft*=5.6 from 4^-; 3516.0γ to 1^-.
9429.11 *5*	$(3,4)^-$		B H Jk w	T=0 (1990Ki07) XREF: J(9431). Jπ: log *ft*=5.5 from 4^-; L(^{3}He,α)=(0) from $7/2^-$.
9432.46 *18*	1^-	0.23 keV	HIJk w	T=1 (1990Ki07) XREF: J(9431). Jπ: L(p,p)=1 from $3/2^+$; 9431.3γ to 0^+. $T_{1/2}$: from (p,p),(p,α):resonances.
9453.95 *5*	3^-	0.09 keV	B HIJk Q W	T=0 XREF: Q(?). Jπ: log *ft*=5.2 from 4^-; L(d,n)=1 from $3/2^+$. $T_{1/2}$: from (p,p),(p,α):resonances.
9499.9 *15*	2^+		F H U	E(level): from (p,γ). Jπ: L(^{6}Li,d)=2 from 0^+.
9536.24 *16*			H	E(level): from (p,γ).
9537.8 *5*	1^-	0.4 keV	HIJ Q	XREF: Q(?). E(level): from (p,γ). Other: 9535.2 *14* in (p,p):resonances. Jπ,$T_{1/2}$: from (p,p),(p,α):resonances. L(p,p)=L(d,n)=1 from $3/2^+$.
9564 *5*	(2^+)		G WX	T=(1) XREF: G(9600). Jπ: L(^{3}He,n)=2 for a 9600 group.
9603.0 *4*	3^-	0.4 keV	B HIj T wx	T=1 Jπ: log *ft*=5.6 from 4^-; L(p,p)=1 from $3/2^+$; γγ(θ) in (p,γ) gives J=3. $T_{1/2}$: from (2J+1)×Γ=3.4 keV for the 9603+9605 levels in (p,p),(p,α):resonances, and Γ=0.19 keV *5* from (γ,γ′) for the 9605 level.

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
9604.6 *4*	1^-	0.19 keV *5*	HIj M wx	T=1 $T_{1/2}$: from (γ,γ'). Other: 1.3 keV from (p,p),(p,α):resonances.
9632.7? *11*			H	E(level): from (p,γ).
9640.89 *7*	2^-		H wX	T=1 XREF: X(9620). Jπ: spin from $\gamma\gamma(\theta)$ and parity from a resonance formation fit in (p,γ).
9655.5 *9*			H q WX	XREF: W(9647)X(9665). E(level): from (p,γ).
9662.2 *2*	$\leq 3^-$		Hij q WX	XREF: W(9647)X(9665). E(level): from (p,γ). Jπ: L(p,p)=(d,n)=1 from $3/2^+$ for 9662+9669.
9668.71 *8*	3^-		F HijK WX	T=1 XREF: F(9700)K(9700)W(9673)X(9665). Jπ: L(^{6}Li,d)=3 from 0^+.
9779.47 *7*	3		H	T=1 Jπ: from $\gamma\gamma(\theta)$ in (p,γ).
9785.3 *2*	$(1,2^+)$		H	Jπ: 2484.5γ, 6432.1γ and 9784.0γ to 0^+.
9802.1 *7*	$\leq 3^-$		HI	E(level): from (p,γ). Jπ: L(p,p)=1 from $3/2^+$.
9807.2? *11*			H	
9811.0 *2*	$(3^-,4^-,5^-)$		B H	E(level): from (p,γ). Jπ: log *ft*=6.1 from 4^-.
9829.43 *16*			B H	E(level): from (p,γ).
9834.97 *19*			B H	
9853.5[d] *8*	(8^+)		Y	XREF: Others: AE Jπ: band assignment in (HI,xnγ).
9854.43 *17*	$\leq 3^-$		HI	E(level): from (p,γ). Jπ: L(p,p)=1 from $3/2^+$.
9859.6 *3*	$4^-,5^-,6^-$		H Q	Jπ: L(p,p′)=5 from 0^+.
9865.15 *11*	1	0.100 keV *24*	ef H M	T=1 Jπ: from $\gamma\gamma(\theta)$ in (p,γ). $T_{1/2}$: from (γ,γ').
9869.3 *4*	$1^+,2^+$	0.90 keV *21*	ef H MN Q U	XREF: Q(9877)U(9870). Jπ: γ′s to 0^+ and 2^+; M1 or E2 excitation in (e,e′). L(^{6}Li,d)=2 for a 9870 group and a doublet at 9868 suggested by 1980St17 in (e,e′) could indicate there is a separate level with $J^\pi=2^+$. $T_{1/2}$: from (γ,γ').
9898.5 *3*			H	
9921.3 *2*	$(3^-,4^-,5^-)$		B f H	E(level): from (p,γ). Jπ: log *ft*=6.3 from 4^-.
9939.7 *2*			f H	
9954.00 *9*	4^+		B f H	T=0 Jπ: spin=4 from $\gamma\gamma(\theta)$ in (p,γ); observed α decay from this level in ^{40}Sc ε decay implies π=natural.
9977.09 *17*	(3,4,5)		B f H	E(level): from (p,γ). Jπ: log *ft*=7.0 from 4^-.
9993.6 *15*			H	
10040.54 *9*	$(2^-,3^-)$		H j v	T=1 Jπ: γ′s to 1^- and 4^-.
10045.6 *5*	$(3^-$ to $7^-)$		H j v	

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
10049.38 *7*	4^-		B H jK q vw	T=1 XREF: K(?). Jπ: log *ft*=6.3 from 4^-; γ's to 2^- and 5^-; L(p,p′)=5 from 0^+, L(^{3}He,α)=0 from $7/2^-$.
10057.9 *3*			f H j q vw	
10065 *2*	$(1^-,2^+)$		f I q v	T=0
10080.6 *2*			f H Uv	E(level): from (p,γ).
10130.59 *19*	$(3^-,4^+)$		B f HI v	T=0 E(level): from (p,γ).
10154 *8*	$(3^-,4^+,5^-)$		B f	T=0 E(level): from ^{40}Sc ε decay. Jπ: log *ft*=7.3 from 4^-; observed α decay from this level in ^{40}Sc ε decay implies π=natural.
10193 *7*	$(3^-,4^+,5^-)$		b	T=0 Jπ: log *ft*=7.5 from 4^-; observed α decay from this level in ^{40}Sc ε decay implies π=natural.
10199.1 *4*	1^-		HI	T=0 E(level): from (p,γ).
10205.0 *8*			H	
10210.5 *2*	$3^-,4^-$		B H W	E(level): from (p,γ). Jπ: log *ft*=5.7 from 4^-; L(^{3}He,α)=0 from $7/2^-$.
10232.7 *7*			H	
10262.53 *10*	3^-		HI	T=0+1. Jπ: γ's to 1^-, 3^-, 3^+; L(p,p)=1 from $3/2^+$ for 10263+10268; π=natural from (p,α):resonances.
10267.6 *5*	1^-	0.9 keV	HI	T=0 Jπ,$T_{1/2}$: from (p,p),(p,α):resonances for a 10265 group.
10274.7 *3*	$3^+,4^+,5^+$		H Q	XREF: Q(10287). Jπ: L(p,p′)=4 from 0^+.
10277.8 *2*	(1^-)	1.6 keV	HI Q	T=0 XREF: I(10275)Q(10290). E(level): from (p,γ).
10284.9 *3*	1^-	1.1 keV	Hi Q	XREF: Q(10290). E(level): from (p,γ).
10318.8 *4*	1^+	26 eV *7*	E H MN Q	T=1 XREF: Q(10328). Jπ: M1 excitation in (e,e′). $T_{1/2}$: from (γ,γ′).
10333.7 *5*	$(3)^-$	0.11 keV	B HI Q	T=0 XREF: Q(10344). Jπ: $(1,3)^-$ from (p,p),(p,α):resonances; log *ft*=7.1 from 4^-.
10340 *20*	4^+		Q U	XREF: Q(10344). Jπ: L(α,α′)=4.
10358.5 *15*			F H	XREF: F(10340). Jπ: L(^{6}Li,d)=8 for a level at 10340 could indicate there may be a different level.
10361.4 *15*			B H	T=0
10362.8 *5*	1^-	0.60 keV	I	E(level): could be the same level as the 10361.4 level in (p,γ).
10364.8 *5*	$(1,3)^-$		I	
10376.6 *5*	1^-	0.6 keV	HI	
10383.79 *16*	$(1^-,2^+)$		HI K	T=0 XREF: K(?).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
10415.06 *6*	3		H	T=1 Jπ: 2853.8γ to 4^+, 3301.2γ to 4^-, 2948.6γ to 2^+, 3664.5γ to 2^-.
10420.4 *5*	1^-	0.5 keV	HI	T=0 E(level): from (p,γ).
10430.47 *19*	(2^+)		HI	T=0 E(level): from (p,γ).
10441.3 *6*			H	E(level): from (p,γ).
10443.8 *2*	2^-	4.0 keV	HI	E(level): from (p,γ). 10443.5 *5* in (p,p),(p,α):resonances.
10447.0 *5*	3^-	0.44 keV	B f I	T=0 E(level): $ from (p,p),(p,α):resonances. Jπ: $(1,3)^-$ in (p,p),(p,α):resonances with L(p)=1 from $3/2^+$; log *ft*=6.2 from 4^-.
10469.9 *15*	$(3,5)^-$		B f H	E(level): from (p,γ). Jπ: log *ft*=5.7 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
10474 *2*	(8^-)		Y	Jπ: proposed in (HI,xnγ).
10478.6 *15*			H	
10503.0 *15*	$(3,4,5)^-$		B H	E(level): from (p,γ). Jπ: log *ft*=5.5 from 4^-.
10514.7 *15*	$(3^-,4^+,5^-)$		B H	XREF: B(10519). Jπ: log *ft*=6.7 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
10516.5 *5*	1^-	1.2 keV	I	T=0 E(level): could be the same level as the 10514.7 level in (p,γ).
10517.4 *5*	$1^{(+)}$	0.30 keV	I	
10529.8 *5*	(1^+)	0.40 keV	HI	E(level): from (p,p),(p,α):resonances. 10527.8 *15* from (p,γ). Additional information 19.
10541.7 *5*	2^+	0.19 keV	HI	T=0 E(level): from (p,p),(p,α):resonances. 10540.0 *15* from (p,γ).
10552.1 *15*			H	
10582 *5*	(3,4,5)		B	Jπ: log *ft*=6.3 from 4^-.
10596.4 *5*	3^-	0.16 keV	B F I U	T=0 XREF: F(10590). E(level): from (p,p),(p,α):resonances.
10598.6 *5*	(1^+)	0.20 keV	I	
10607.6 *5*	$0^{(+)}$	0.20 keV	g I	
10618.8 *5*	2^-	3.5 keV	I	
10621.6 *5*	0^+	0.04 keV	g I	T=0
10633.8 *5*	$(1,3)^-$	1.1 keV	HI	E(level): from (p,p),(p,α):resonances. 10632.7 *2* in (p,γ).
10639.07 *7*	$(3^-,4,5^-)$		H	T=1 Jπ: 3707.6γ and 4056.3γ to 3^-, 6147.7γ to 5^-.
10646.3 *4*	NATURAL		gHI	T=0 E(level): from (p,γ).
10653.12 *16*			H	
10656.1 *5*	(1^-)	0.60 keV	I	T=0
10657.6 *5*	2^+	0.35 keV	I	T=0
10666.6 *5*	2^-	2.0 keV	I	
10670.3 *3*			H	
10673.58 *17*	2^-		H N	Jπ: M2 excitation in (e,e′).
10675.6 *5*	1^-	1.6 keV	HI	T=0

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
				E(level): from (p,p),(p,α):resonances. 10673.69 *15* in (p,γ).
10690.9 *3*			H	XREF: Others: AK
10693.1 *5*	1^+	1.1 keV	I	XREF: Others: AK
10699.50 *10*	3		B H N	XREF: Others: AK XREF: N(10680). Jπ: 2325.5γ to 4^+, 5085.6γ to 4^-, 2607.8γ to 2^+, 3167.1γ to 2^-.
10701.1 *5*	0^+	0.60 keV	I	
10720.7 *3*	$(3,5)^-$		B H	XREF: Others: AK E(level): from (p,γ). Jπ: log *ft*=5.7 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
10722.3 *5*	1^+	1.1 keV	I	
10737.7 *3*	1^-		F H	T=0+1 XREF: F(10700). Jπ: 10736.2γ to 0^+, 3043.4 and 4452.3γ to 3^-; L(^{6}Li,d)=1 from 0^+.
10740.3 *5*	1^-	2.2 keV	I	
10747.8 *4*	(4^+)		HI	T=0 Jπ: $(1^-,2,3,4^+)$ from 5118.0γ and 6842.8γ to 2^+, 7010.5γ to 3^-; $J^\pi=(4^+,5^-)$ from (p,p),(p,α):resonances for a level at 10751.
10749.0 *5*	0^+	0.31 keV	I	
10753.74 *18*	(3,4,5)		B H	Jπ: log *ft*=6.5 from 4^-.
10770.2 *3*	(1^+)	0.05 keV	HI	XREF: I(10772.3). E(level): from (p,γ).
10776.2 *3*	(1^-)		H N	Jπ: possible E1 excitation in (e,e′) for 10776.
10778.3 *5*	2^+	0.18 keV	I	T=0
10780.7 *5*	3^-	1.0 keV	B HI	T=0 E(level): from (p,p),(p,α):resonances. 10780.9 *3* in (p,γ).
10783.2 *5*	(0^-)	0.70 keV	I	
10787.6 *3*			F H u	XREF: F(?).
10799.9 *10*			H u	
10802.8 *5*	$0^{(+)}$	0.70 keV	I	T=0
10813.6 *5*	$(3^-,4^+,5^-)$		B f H u	T=0 Jπ: log *ft*=6.3 from 4^-; L(^{6}Li,d)=5 for 10800 group; α decay of this level in ^{40}Sc ε decay implies π=natural.
10816.4 *5*	2^-	6.0 keV	I	
10816.6 *5*	3^+	0.50 keV	I	
10829.9 *6*			f H	
10833.2 *5*	3^-	0.026 keV	f I	T=0
10848.4 *4*	$(3,4,5)^-$		B f H	Jπ: log *ft*=5.8 from 4^-.
10849.3 *5*	2^-	11 keV	I	
10852.2 *5*	1^-	2.5 keV	I	T=0
10861.4 *5*	2^+	0.045 keV	I	T=0
10869.0 *5*	1^-	26 keV	HI	E(level): from (p,p),(p,γ):resonances. 10868.8 *4* in (p,γ).
10869.7 *5*	0^+	0.40 keV	I	
10873.9 *5*	1^-	4.0 keV	I	
10895[c] *1*	(9^-)		Y	Jπ: band assignment in (HI,xnγ).
10899.3 *5*	1^+	0.41 keV	I	
10910.0 *4*	$(3,4,5^-)$		B f H	E(level): from (p,γ).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF				Comments
							Jπ: log *ft*=6.8 from 4⁻; 7172.6γ to 3⁻; L(^{6}Li,d)=3 for 10900 group.
10914.8 *5*	1⁻	5.0 keV		I			T=0
10915.7 *5*	3⁺	0.70 keV		I			
10921.1 *4*	(2⁺,3,4⁻)		f	H			Jπ: 4895.3γ to 2⁻ and 5641.9γ to 4⁺.
10932.7 *5*	1⁻	2.0 keV		I			T=0
10933.2 *5*	2⁻	0.10 keV		I			
10934.3 *5*				H			
10946.9 *5*	2⁺	0.23 keV		I			T=0
10950.8 *5*	1⁻	7.0 keV		HI			T=0 E(level): from (p,p),(p,α):resonances. 10951.5 *4* in (p,γ).
10953.6 *5*	0(+)	0.22 keV		I			T=0
10956.0 *4*	3⁻		B	H			E(level): from (p,γ). Jπ: 5676.8γ to 4⁺, 5342.1γ to 4⁻, 5053.0γ to 1⁻.
10976.2 *5*	(3,4,5)		B	H	n		Jπ: log *ft*=6.0 from 4⁻.
10988.0 *4*	(3⁻,4⁺)		B	H	n		E(level): from (p,γ). Jπ: log *ft*=7.2 from 4⁻; α decay of this level in ^{40}Sc ε decay implies π=natural; 4079.1γ, 5358.2γ to 2⁺.
10988.7 *5*	2⁻	9.0 keV		I			
10989.4 *5*	(1⁺)	0.4 keV		I			
10994.7 *4*	(2⁺,3,4⁺)			H			Jπ: 5715.5γ to 4⁺, 5745.3γ to 2⁺.
10995 *3*	(1⁻)	6.7 keV		I			
10998.9 *5*	(1,3)⁻	0.20 keV		I			T=0
11002.3 *5*				H	n		
11003.0[a] *9*	(10⁺)					Y	Jπ: band assignment in (HI,xnγ).
11007.2 *5*	1⁻	5.0 keV		I			
11011.0 *4*	3⁻			H	n		T=0+1 Jπ: 6519.0γ to 5⁻, 11009.4γ to 0⁺.
11024.0 *5*	(1⁻,3⁻)	0.11 keV		HI			T=0
11036.3 *5*	(1⁺)	0.10 keV		I			
11037 *7*	(3,4,5)		B				Jπ: log *ft*=6.4 from 4⁻.
11042.0 *5*	(1⁻ to 4⁺)			H			Jπ: 7136.9γ to 2⁺ and 7304.6γ to 3⁻.
11044.5 *5*	2⁺	0.50 keV		I			T=0
11070.6 *4*	(3,4⁺)			H			Jπ: 5456.1γ to 4⁻, 5790.7γ to 4⁺, 5820.7γ to 2⁺.
11073.5 *5*	2⁺	0.66 keV		I			
11078.4 *5*	1⁻	1.2 keV	f	HI			T=0 E(level): from(p,p),(p,α):resonances.
11083.6 *5*	(1⁺)	0.35 keV		I			T=0
11089.3 *5*	0(+)	0.10 keV	F	I			XREF: F(11100).
11091 *3*	(3⁻,4⁺)		B	I			T=0 E(level): from 1970De30 in (p,p),(p,α):resonance. 11088 *12* in ^{40}Sc ε decay. Jπ: log *ft*=7.1 from 4⁻; 4+(1⁻,3⁻) for a 11901 level from 1970De30 in (p,p),(p,α):resonance.
11107.0 *5*	1⁻	3.9 keV		I			
11112 *3*	0⁻	5.2 keV		I			
11117.0 *5*			b	H			
11119.0 *5*	2⁺	0.046 keV	b	I		U	XREF: U(11100).
11127.1 *5*				H			
11129.1 *5*	4⁺	0.11 keV		I			T=0
11142 *6*	(3,4,5)⁻		B				Jπ: log *ft*=5.8 from 4⁻.
11145.2 *5*	1(−)	0.20 keV		I			
11145.8 *5*	1⁺	0.20 keV		I			

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
11157.2 *5*	2^-	48 keV	I	
11161.5 *5*	$4^{(+)}$	0.040 keV	I V	T=0
11162.9 *5*	2^+	3.5 keV	I	
11165.2 *4*			H	
11167.4 *5*	4^+	0.083 keV	I	T=0
11187.6 *5*	3^-	1.4 keV	I k	
11202.9 *5*	$(3)^-$		B I k v	T=0 E(level): from (p,p),(p,α):resonances. Jπ: log *ft*=5.5 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural; $(1,2^-,3)$ from (p,p),(p,α):resonances.
11210	(0^+)		F k	Jπ: L(^{6}Li,d)=0.
11212.6 *5*	3^-	2.8 keV	I k	
11217 *3*	3^-	25 keV	B k v	Jπ: log *ft*=5.2 from 4^-.
11217.8 *5*	4^+	1.4 keV	I k	
11231.4 *5*	2^-	3.0 keV	I v	
11236 *3*	1^-	3.9 keV	I v	
11246.8 *5*	3^-	0.092 keV	I v	T=0
11255.9 *5*	1^+	0.30 keV	I	
11260.8 *5*	(0^-)	6.0 keV	I	
11264.4 *5*	2^+	0.34 keV	I	T=0
11284.3 *5*	(2^-)	0.60 keV	I	
11289.8 *5*	1^+	1.0 keV	I	
11300.3 *5*	1^+	0.40 keV	I	
11302.5 *5*	(1^-)	1.2 keV	I	
11311 *4*	$(3^-,4^+,5^-)$		B F v	Jπ: log *ft*=6.2 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
11320.0 *5*	(0^-)	1.8 keV	I	
11322.0 *5*	2^+	0.52 keV	I	T=0
11329.3 *5*	2^+		I	
11330.7 *5*	1^-	4.0 keV	f I	T=0
11338.7 *5*	(1^+)	0.20 keV	I	
11342.6 *5*	2^-	40 keV	I	
11346.4 *5*	$4^{(+)}$	0.020 keV	I	T=0
11351.5 *5*	1^+	0.80 keV	I	
11362.4 *5*	1^+	1.2 keV	I	
11366.0 *5*	2^+	0.19 keV	I	T=0
11367.0 *5*	2^-	4.4 keV	I	
11368.3 *5*	$4^{(+)}$	0.021 keV	I	
11370	(5^-)		F	Jπ: L(^{6}Li,d)=5.
11371.4 *5*	2^+	1.4 keV	I	T=0
11382.1 *5*	2^+	2.6 keV	I	T=0
11393.0 *5*	$1^{(-)}$	0.10 keV	I	
11404.2 *5*	1^-	3.5 keV	I	T=0
11407.0 *5*	1^+	0.22 keV	I	
11414.8 *5*	4^+	0.10 keV	B I	T=0
11420.3 *5*	3^-	0.30 keV	I	
11432.7 *5*	1^-	0.30 keV	I	T=0
11436.8 *5*	2^+	0.22 keV	I	T=0 Additional information 20.
11447.2 *5*	1^-	5.3 keV	I	T=0
11451.4 *5*	1^+	0.60 keV	I	
11455.4 *5*	3^-	0.060 keV	b I U	T=0 XREF: U(11470).
11460.4 *5*	2^+	1.17 keV	I	T=0

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
11465.1 *5*	$2^{(+)}$	0.13 keV	I	T=0
11468 *3*	$(3^-,4^+,5^-)$		B F	T=0 Jπ: log *ft*=6.2 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
11468.7 *5*	2^-	0.40 keV	I	
11479.8 *5*	1^+	0.30 keV	I	
11486.7 *5*	0^+	0.11 keV	I	
11489.6 *5*	1^+	0.40 keV	I	
11514.6 *5*	2^+	0.62 keV	I	
11515.2 *5*	$1^{(-)}$	4.23 keV	I	
11519.0 *5*	2^+	0.70 keV	I	
11537.9 *5*	2^-	8.0 keV	I	
11542.2 *5*	2^+	0.62 keV	I	
11543.7 *5*	(1^+)	0.90 keV	I	
11546.7 *5*	2^-	18 keV	I	
11549 *6*	$(3,5)^-$		B	Jπ: log *ft*=5.9 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
11554.5 *5*	1^-	31 keV	I	
11559.1 *5*	(2^+)	0.40 keV	I	
11563.5 *5*	(2^-)	0.40 keV	I	
11577.9 *5*	2^-	1.0 keV	I	
11578.0 *5*	2^+	0.23 keV	I	
11585.6 *5*	2^-	0.15 keV	I	
11597.2 *5*	(2^+)	0.30 keV	I	
11602.3 *5*	2^+	0.30 keV	I	
11603.4 *5*	2^+	0.28 keV	I	
11605.3 *5*	1^-	13 keV	I	
11611.1 *5*	1^-	0.86 keV	I	
11614.0 *5*	(2^-)	0.50 keV	I	
11616 *10*	(3,4,5)		B v	Jπ: log *ft*=6.3 from 4^-.
11628.5 *5*	(3^+)	0.70 keV	I	
11629.1 *5*	2^+	0.085 keV	I	
11638.1 *5*	1^-	0.09 keV	I	
11645.0 *5*	(2^-)	0.60 keV	I	
11646.9 *5*	2^+	0.60 keV	I	
11650.8 *5*	$2^{(+)}$	0.18 keV	I	
11652.2 *5*	3^-		I	
11653.5 *5*	2^+	1.59 keV	I	
11661.7 *5*	1^-	1.56 keV	I	
11663 *7*	$(3^-,4^+,5^-)$		B v	T=0 Jπ: log *ft*=6.2 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
11672.8 *5*	(2^-)	0.20 keV	I	
11677.1 *5*	2^+	0.96 keV	I U	XREF: U(11690).
11685.8[&] *9*	(10^+)		Y	Jπ: from band assignment in (HI,xnγ).
11687.5 *5*	(1^+)	0.50 keV	I	
11689.2 *5*	(2^-)	0.60 keV	I	
11690	7^-		F	Jπ: L(^{6}Li,d)=7.
11692.8 *5*	$4^{(+)}$	0.021 keV	I	
11696.3 *5*	$0^{(-)}$	0.60 keV	I	
11703.6 *5*	0^+	4.65 keV	I	
11704.6 *5*	2^-	3.0 keV	I	
11707.8 *5*	1^-	0.30 keV	I	
11708.7[b] *12*	(9^+)		Y	Jπ: from band assignment in (HI,xnγ).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
11713.6 *5*	1^+	0.20 keV	I	
11715.7 *5*	2^-	1.5 keV	I	
11721.2 *5*	1^+	1.5 keV	I	
11724.1 *5*	$3^{(-)}$	0.060 keV	I	
11726 *5*	$(3,5)^-$		B v	XREF: Others: AI T=0 Jπ: log *ft*=5.7 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
11731.0 *5*	$1^{(-)}$	3.6 keV	I	
11731.1 *5*	1^+	0.40 keV	I	
11738.8 *5*	2^+	3.0 keV	I	
11742.8 *5*	4^+	1.07 keV	I	
11744.6 *5*	$1^{(-)}$	0.55 keV	I	
11749.5 *5*	2^-	2.57 keV	I	
11753.4 *5*	3^-		I	
11754.0 *5*	1^+	0.35 keV	I	
11757.3 *5*	2^-	0.60 keV	I	
11760 *10*	1^+		N	Jπ: M1 excitation in (e,e′).
11768.0 *5*	2^-	15 keV	I	
11782.6 *5*	$3^{(-)}$	0.041 keV	I	
11788.5 *5*	2^+	2.5 keV	I	
11792.4 *5*	1^+	0.46 keV	I	
11799.2 *5*	$4^{(+)}$	0.18 keV	B I v	XREF: Others: AI
11804.1 *5*	0^+	0.26 keV	I	
11809.0 *5*	(1^+)	1.1 keV	I	
11810.9 *5*	2^+	1.8 keV	I	
11811.6 *5*	3^-	0.26 keV	I	
11820.6 *5*	3^-	3.5 keV	I	
11830.8 *5*	2^+	0.30 keV	I	
11839.2 *5*	0^+	1.05 keV	I	
11841 *6*	$(3^-,4^+,5^-)$		B F	T=0 XREF: F(11800). Jπ: log *ft*=5.9 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
11844.1 *5*	1^+	0.78 keV	I	
11855.8 *5*	2^+	0.39 keV	I	
11857.3 *5*	(1^+)	1.3 keV	I	
11863.3 *5*	(3^-)	0.41 keV	I	
11864.7 *5*	(0^+)	1.6 keV	I	
11868.8 *5*	(4^+)	0.032 keV	I	
11870.0 *5*	3^-	0.040 keV	I	
11872.2 *5*	2^+	0.87 keV	I	
11878.0 *5*	1^-	0.32 keV	I	
11884.5 *5*	1^+	0.80 keV	I	
11888.3 *5*	4^+	0.13 keV	I	
11890.9 *5*	1^-	20 keV	I	
11894.0 *5*	(2^-)	1.0 keV	I	
11901.4 *5*	1^+	0.70 keV	I	
11915.9 *5*	3^-	1.0 keV	I	
11924.6 *5*	2^+	2.2 keV	I	
11930.0 *5*	$4^{(+)}$	0.030 keV	I	
11933.3 *5*	1^-	16.1 keV	I	
11935.0 *5*	1^+	0.9 keV	I	
11937.3 *5*	2^-	0.60 keV	I	
11940.4 *5*	1^+	0.40 keV	I	

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
11942.8 *5*	3^-	0.48 keV	I	
11945.0 *5*	1^-	0.40 keV	I	
11948.4 *5*	0^+	0.31 keV	I	
11958.7 *5*	(2^+)	1.0 keV	I U	XREF: U(11940).
11962.9 *5*	0^+	0.30 keV	I	
11969.8 *5*	1^+	0.80 keV	I	
11971.0 *5*	2^+	0.26 keV	I	
11975.1 *5*	1^-	0.055 keV	E I	
11983.3 *5*	(2^-)	1.0 keV	I	
11987.1 *5*	3^-	0.38 keV	E I	
11988 *1*	0^+	81 eV *10*	E G X	T=2 Jπ: L(^{3}He,n)=0; IAR state. %α=93 *9* to ^{36}Ar g.s.; %α<3% to first 2^+ in ^{36}Ar; %p<5% ro ^{39}K g.s.
11994.0 *5*	0^-	3.0 keV	E I	
12000 *5*	$(3,5)^-$		B	T=0 Jπ: log *ft*=5.4 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
12001.3 *5*	(2^+)	1.02 keV	E I	
12007.4 *5*	1^+	0.55 keV	I	
12010.4 *5*	2^-	6.0 keV	I	
12012.2 *5*	4^+	0.010 keV	I	
12023.6 *5*	1^+	0.90 keV	I	
12026.9 *5*	4^+	0.22 keV	I	
12033.8 *5*	3^-	0.31 keV	I	
12038 *3*	$(3,4,5)^-$		B H Q	Jπ: log *ft*=5.8 from 4^-.
12047.7 *5*	2^+	2.65 keV	f HI N	
12056.4 *5*	1^-	2.0 keV	f I	
12058.9 *5*	2^+	1.11 keV	I	
12067.3 *5*	2^+	1.15 keV	I	
12067.8 *5*	4^+	1.11 keV	I	
12068 *3*	$(3,5)^-$		B H	T=0 Jπ: log *ft*=5.6 from 4^-; α decay of this level in ^{40}Sc ε decay implies π=natural.
12076.8 *5*	2^-	3.07 keV	HI	
12082.0 *5*	$4^{(+)}$	0.021 keV	I	
12086.1 *5*	$4^{(+)}$	0.011 keV	I	
12088.8 *5*	2^-	10 keV	I	
12089.7 *5*	2^+	24 keV	f I	
12093.1 *5*	$4^{(+)}$	0.060 keV	I	
12095.1 *5*	2^+	9.4 keV	Ef HI	
12106.0 *5*	$4^{(+)}$	0.090 keV	I	
12110.7 *5*	2^+	2.0 keV	f HI	
12115.1 *5*	3^-	0.78 keV	I	
12125.9 *5*	(3^+)		I	
12132.7 *5*	(4^+)	0.13 keV	I	
12134.9 *5*	(4^+)	0.10 keV	I	
12141.2 *5*	2^+	1.24 keV	I	
12152.3 *5*	4^+	0.36 keV	I	
12157.8 *5*	$4^{(+)}$	0.12 keV	I	
12159.4 *5*	$4^{(+)}$	0.083 keV	I	
12177.7 *5*	$1^{(-)}$	0.22 keV	I	
12180.2 *5*	2^+	1.50 keV	F I	XREF: F(12170).
12184.5 *5*	2^-	2.0 keV	I	

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
12192.7 *5*	2^+	1.24 keV	I	
12196.3 *5*	$1^{(-)}$	0.95 keV	I	
12201.2 *5*	3^-	2.1 keV	E HI N	E(level): from (p,p),(p,α):resonances. Jπ: from (p,p),(p,α):resonances and E3 excitation in (e,e′).
12209.3 *5*	0^-	1.0 keV	I	
12211.9 *5*	4^+	0.021 keV	I	
12217.7 *5*	1^+	1.5 keV	I	
12224.3 *5*	1^-	1.46 keV	I	
12226.4 *5*	2^+	0.43 keV	I	
12237.7 *5*	1^+	2.0 keV	I	
12244.0 *5*	4^+	0.030 keV	I	
12245.2 *5*	1^-	2.0 keV	I	
12256 *4*		5.5 keV	I	
12270 *4*	(2^+)	5.8 keV	I	
12280 *4*		4.2 keV	I	
12292 *4*		4.0 keV	I	
12299 *4*	(2^+)	4.0 keV	I	XREF: Others: AF
12305 *4*	(1^-)	6.7 keV	I	
12331 *4*	2^+	7.3 keV	HI	
12334.9[d] *10*	(10^+)		Y	XREF: Others: AE Jπ: from band assignment in (HI,xnγ).
12340	5^-		F	Jπ: L(^{6}Li,d)=5.
12350 *10*	2^-		N	Jπ: M2 excitation in (e,e′).
12357 *4*	$(3^-,1^-)$	5.5 keV	I	
12368 *4*		6.7 keV	I	
12376 *4*		5.9 keV	I	
12381 *4*		4.0 keV	I	
12399 *4*	$(2^+,1^-)$	6.7 keV	I	
12406 *4*		3.5 keV	I	
12411 *4*		4.0 keV	I	
12419 *4*		5.4 keV	HI	
12420	(1^-)	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=1.
12425 *4*		6.4 keV	I	
12450	(4^+)		F U	Jπ: L(^{6}Li,d)=4, but L(α,α′)=3 for a 12450 group is inconsistent and could indicate there may be a separate level.
12488	2^-		N	Jπ: M2 excitation in (e,e′).
12490 *10*	1^+		N	Jπ: M1 excitation in (e,e′).
12503	2^-		N	Jπ: M2 excitation in (e,e′).
12530	1^-	<0.03 MeV	C F	XREF: F(12520). Jπ: L(^{36}Ar,α)=1.
12580	1^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=1.
12591.9 *10*	(10^+)		Y	XREF: Others: AE Jπ: proposed in (HI,xnγ).
12604			H	
12622	(2)		N	Jπ: from (e,e′).
12650	7^-		F H	Jπ: L(^{6}Li,d)=7.
12668	1^-	<0.05 MeV	C H	Jπ: L(^{36}Ar,α)=1.
12688			H	
12720	3^-		F	Jπ: L(^{6}Li,d)=3.
12750 *10*	2^-		N	Jπ: M2 excitation in (e,e′).
12830 *10*	$1^+,(2^-)$		N	Jπ: most likely M1 excitation in (e,e′).
12875			H	
12900	4^+		F	Jπ: L(^{6}Li,d)=4.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
12923[c] *2*	(11⁻)		Y	Jπ: from band assignment in (HI,xnγ).
12965	2⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=2.
12980			E H	
12996			H	
13050 *10*	1⁺		N	Jπ: M1 excitation in (e,e′).
13050	4⁺		F	Jπ: L(^{6}Li,d)=4.
13086			H	
13113			H	
13115.1[a] *10*	(12⁺)		Y	Jπ: from band assignment in (HI,xnγ).
13125	2⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=2.
13150 *10*	2⁻		N	Jπ: M2 excitation in (e,e′).
13170	3⁻	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
13194			H	
13195	(10⁻)		Y	Jπ: proposed in (HI,xnγ).
13200	4⁺		F	Jπ: L(^{6}Li,d)=4.
13203			H	
13250			E	
13289			H	
13300	4⁺		F	Jπ: L(^{6}Li,d)=4.
13301	2⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=2.
13345	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
13400	0⁺		f U	XREF: Others: AI Jπ: L(α,α′)=0.
13410	3⁻	<0.04 MeV	C f	Jπ: L(^{36}Ar,α)=3.
13445	2⁻		N q	XREF: Others: AI Jπ: M2 excitation in (e,e′).
13470	4⁺		F q	XREF: Others: AI Jπ: L(^{6}Li,d)=4.
13480	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
13480 *10*	1⁺		E N	XREF: Others: AI Jπ: M1 excitation in (e,e′).
13520	3⁻	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
13535.5[b] *13*	(11⁺)		Y	Jπ: from band assignment in (HI,xnγ).
13570	3⁻	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=3.
13.6×10^{3} *4*			N	
13610	1⁺,2⁺,3⁺		Q	Jπ: L(p,p′)=2 from 0⁺.
13620	6⁺		C	Jπ: L(^{6}Li,d)=6.
13620	3⁻	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
13645	3⁻	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
13670 *10*	2⁻		N	Jπ: M2 excitation in (e,e′).
13710	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
13720	6⁺		EF	Jπ: L(^{6}Li,d)=6.
13760	3⁻	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
13822			H	
13830	7⁻		F	Jπ: L(^{6}Li,d)=7.
13830	(1⁺,2⁺,3⁺)		Q	Jπ: L(p,p′)=(2) from 0⁺.
13850	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
13890	(0⁺,1⁺)		Q	Jπ: L(p,p′)=(0) from 0⁺.
13900	2⁺		N	Jπ: E2 excitation in (e,e′).
13910	3⁻	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
13913			H	
13921 *15*	4		QR	T=(0) Jπ: σ(θ) in (p,p′).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
13952	4^+		E	Jπ: L(^{6}Li,d)=4.
13960	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
13993			H	
14000	4^+		F	Jπ: L(^{6}Li,d)=4.
14005	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
14020	$(2^-,3^-,4^-)$		Q	Jπ: L(p,p′)=(3) from 0^+.
14047	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
14070 *50*	(0^+)		U	Jπ: L(α,α′)=(0).
14096			E	
14100	$1^+,2^+,3^+$		Q	Jπ: L(p,p′)=2 from 0^+.
14150	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14177	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14190	4^+		F	Jπ: L(^{6}Li,d)=4.
14200	$0^+,1^+$		S	XREF: Others: AK Jπ: L(^{3}He,^{3}He′)=0.
14210	$(2^-,3^-,4^-)$		Q	Jπ: L(p,p′)=(3) from 0^+.
14225	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
14232.4& *10*	(12^+)		Y	Jπ: from band assignment in (HI,xnγ).
14262	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
14283 *15*	(6)		Q	T=1 Jπ: σ(θ) in (p,p′).
14292	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
14312	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
14320	$(2^-,3^-,4^-)$		Q	Jπ: L(p,p′)=(3) from 0^+.
14335	3^-	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=3.
14370	6^+		F I	XREF: F(14380). Jπ: L(^{6}Li,d)=6.
14390	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14410	$2^-,3^-,4^-$		E Q	XREF: E(14420). Jπ: L(p,p′)=3 from 0^+.
14419			E	
14435	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14460	$(2)^+$		I qr	Jπ: L(p,p′)=2 for 14500 group; L(d,d′)=0+2 for 14500 group;
14490	3^-	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
14530	(6^+)		EF I qr	XREF: E(14509)F(14500). Jπ: L(^{6}Li,d)=6.
14540	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14600	$(1,2^+,3^-,4^+)$		I N r	Jπ: from (e,e′).
14605	3^-	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
14640	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14660	$1^+,2^+,3^+$		f Qr	Jπ: L(p,p′)=2 from 0^+.
14680			f I r	Jπ: 1^+ for a 15000 group in (d,d′).
14690	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14725	3^-	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=3.
14750	4^+		F	Jπ: L(^{6}Li,d)=4.
14760	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14780	$1^+,2^+,3^+$		Q	Jπ: L(p,p′)=2 from 0^+.
14790	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14835	3^-	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
14869	(9^-)		EF	XREF: F(14850). Jπ: L(^{6}Li,d)=(9).

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
14888	3⁻	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
14942	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
15002	3⁻	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
15080			F Qr	
15101	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
15140			F r	
15150	3⁻	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=3.
15152.4[a] *12*	(13⁺)		Y	Jπ: from band assignment in (HI,xnγ).
15220	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
15250			F	
15260	3⁻	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=3.
15267.1[d] *14*	(12⁺)		Y	Jπ: from band assignment in (HI,xnγ).
15285	4⁺	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=4.
15306[c] *2*	(13⁻)		Y	Jπ: from band assignment in (HI,xnγ).
15330			F	
15345	4⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=4.
15384	4⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=4.
15435	4⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=4.
15490	4⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=4.
15525	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
15550	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
15580	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
15600			F	
15620	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
15670	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
15700			F	
15707	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
15748.1 *14*	(12⁺)		Y	Jπ: from band assignment in (HI,xnγ).
15790	4⁺	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=4.
15840	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
15875	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
15900	3⁻		U	Jπ: L(α,α′)=3.
15915	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
15950	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
15960	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
16000	5⁻	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=5.
16000 *50*	3⁻	0.63 MeV *10*	U	Jπ: L(α,α′)=3 from 0⁺.
16020	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
16065	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
16110	5⁻	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=5.
16120	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
16160	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
16210	4⁺	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=4.
16255	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
16290	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
16360	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
16395	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
16450	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
16510	4⁺	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=4.
16529.4[&] *12*	(14⁺)		Y	Jπ: from band assignment in (HI,xnγ).
16545	5⁻	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=5.

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#@]	XREF	Comments
16579.7[b] *16*	(13+)		Y	Jπ: from band assignment in (HI,xnγ).
16585	5−	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=5.
16610	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
16640	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
16665	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
16700	(2−,3−,4−)	0.90 MeV *2*	S	Jπ: L(^{3}He,^{3}He′)=(3).
16735	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
16810	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
16910	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
16945	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
17010	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17065	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
17113	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
17170	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
17210	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17280	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17320	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
17360	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17410	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17450	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17513	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
17590	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
17669			E	XREF: Others: AI, AK XREF: AI(17500). E(level): possibly GQR.
17670	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
17698.6 *14*	(14+)		Y	Jπ: from band assignment in (HI,xnγ).
17700	2+		U	Jπ: L(α,α′)=2.
17730	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17790	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
17855	6+	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=6.
17859			E	
17915	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
17950	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
18000 *50*	2+	2.25 MeV *20*	U	Jπ: L(α,α′)=2 from 0+.
18010	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
18054.6 *14*	(14+)		Y	Jπ: proposed in (HI,xnγ).
18077	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
18139	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
18146			E	
18174	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
18200	2+		N RS	XREF: N(18400). Jπ: L(d,d′)=0+2; L(^{3}He,^{3}He′)=2(+0).
18215?[c] *2*	(15−)		Y	Jπ: from band assignment in (HI,xnγ).
18260 *5*	1		H	Jπ: 18256γ D to 0+.
18260	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
18326			E	
18328	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
18406	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
18452			E	
18485	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.

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Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#@	XREF	Comments
18497.2[d] *17*	(14+)		Y	Jπ: from band assignment in (HI,xnγ).
18547	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
18605	6+	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=6.
18659	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
18680 *5*	1		H	Jπ: 18675γ D to 0+.
18705	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
18719.2 *17*	(14+)		Y	Jπ: from band assignment in (HI,xnγ).
18731			E	
18765	6+	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=6.
18865	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
18930	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
19020	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
19037			E	
19070 *5*	1		H	Jπ: 19065γ D to 0+.
19080	6+	<0.05 MeV	C	Jπ: L(^{36}Ar,α)=6.
19150	6+	<0.07 MeV	C	Jπ: L(^{36}Ar,α)=6.
19.18×10^3 *37*	0+	4.9 MeV *6*	U	Jπ: L(α,α′)=0.
19195.6[a] *16*	(15+)		Y	Jπ: from band assignment in (HI,xnγ).
19230	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
19280	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
19385	6+	<0.03 MeV	C	Jπ: L(^{36}Ar,α)=6.
19450 *5*	1		H	Jπ: 19445γ D to 0+.
19467	6+	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=6.
19525	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
19597	6+	<0.02 MeV	C	Jπ: L(^{36}Ar,α)=6.
19667	6+	<0.04 MeV	C	Jπ: L(^{36}Ar,α)=6.
19780	6+	<0.06 MeV	C	Jπ: L(^{36}Ar,α)=6.
19850 *5*	1		H	Jπ: 19845γ D to 0+.
20130 *5*			H	
20430 *5*	1		H	Jπ: 19845γ D to 0+.
20578.6[&] *15*	(16+)		Y	Jπ: from band assignment in (HI,xnγ).
20650 *5*	1		H	Jπ: 20644γ D to 0+.
20940 *5*	1		H	Jπ: 20934γ D to 0+.
21000 *50*			U	Jπ: L(α,α′)=0+2.
21490			H	
21690			H	
22060			H	
22060.4[d] *20*	(16+)		Y	Jπ: from band assignment in (HI,xnγ).
23360	1−		M U	XREF: Others: AK Jπ: L(α,α′)=1; GDR.
31×10^3 *2*	2−,3−,4−		Q	Jπ: L(p,p′)=3 from 0+.
35.3×10^3 *5*			N	
42.0×10^3			N	
58.4×10^3 *11*			N	

† From (p,γ), ^{40}Sc ε decay, (γ,γ′) or (HI,xnγ) based on γ-ray energies. In other cases, a large number of excitation energies are from (p,p),(p,α):resonances. When levels are known from transfer particle-reactions, weighted averages of available values are taken. The following reactions have imprecise excitation energies above ≈8 MeV, hence level correspondence between various reactions (as given in XREF column) is considered (by the evaluator) as tentative: resonances in (α,γ); (^{6}Li,d); (^{3}He,n); (d,d′), (^{3}He,^{3}He′); (α,α′); (HI,HI′) and (d,t).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{40}Ca Levels (continued)

‡ When no arguments are given (above 9600), the assignments are based on J^{π}'s determined in ^{39}K(p,γ) or ^{39}K(p,p),(p,α):resonances. For high-spin structures (J>6), assignments are based on $\gamma(\theta)$ data and expected band associations. In particle-transfer reactions, target (^{39}K) $J^{\pi}=3/2^{+}$ for (d,n) and (^{3}He,d) reactions; target (^{41}Ca) $J^{\pi}=7/2^{-}$ for (^{3}He,α) and (d,t) reactions. In arguments based on γ decays, RUL (for E2 and M2 transitions) is also used when level lifetimes are known. For some of the high-energy levels populated only in (e,e′), J^{π} assignments are from measurements of $\sigma(\theta)$ and deduced transition strengths in that reaction.

Lifetimes are available from DSAM in (p,p′γ), (p,γ) and (HI,xnγ), and measured widths in (γ,γ′). Widths are from (γ,γ′), (p,γ) and (p,p),(p,α):resonances and for some levels, values are for Γ_p or deduced from (p,p) resonance strengths by assuming $\Gamma_p/\Gamma=1$ if spin values is firmly assigned. Consult individual data sets for corresponding resonance strengths.

@ Additional information 21.

& Band(A): 4p-4h, 0^{+} band. Q(transition)=0.74 *14* from life-time data; corresponds to $\beta_2\approx0.27$.

a Band(B): γ sequence based on 8^{+}.

b Band(C): 3^{+} band.

c Band(D): $K^{\pi}=0^{-}$ band (2004To07) (?). This band is proposed (2004To07) as a partner of 4p-4h band based on the 3353,0^{+} state; the 1^{-}, 3^{-} and 5^{-} members of this band are proposed at 5902, 1^{-}; 6280, 3^{-} or 6580, 3^{-}; and 7399, (5^{-}), respectively. However, the 7399 level is assigned (5^{+}) in another in-beam γ-ray study. Assignment of (7^{-}) by 2004To07 for 9033 level is inconsistent with L(p,p′)=5 for a 9029 *5* group and γ′s to 3^{-} and 4^{-} states seen in (p,γ). The 7^{-} assignment is only possible if the 9033 level in 2004To07 is different from a 9032 seen in other reactions.

d Band(E): SD band (2001Id01,2003Ch22). Q(transition)=1.30 *15* over the whole band; 1.81 *+46−33* for high-spin states; 1.18 *14* for low-spin states (2003Ch22). Q(transition)=1.80 *+39−29* (2001Id01). Q(transition) from 2001Id01 corresponds to $\beta_2=0.59$ *+11−7*. Configuration=8p−8h defined by $\pi3^4\nu3^4$, where superscripts are the number of protons and neutrons occupying the N=3 ($f_{7/2}$) intruder orbital.

Adopted Levels, Gammas (continued)

γ(^{40}Ca)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#	δ#	Comments
3352.62	0^+	3352.6		0.0	0^+	E0		Decay is mainly by e^+e^- pair emission. Monopole strength: ρ^2(E0)=0.0256 *7* (2005Ki02, deduced from $T_{1/2}$). Other: 0.025 *8* in (e,e′) deduced from measured matrix element.
3736.69	3^-	3736.5 *3*	100	0.0	0^+	E3		B(E3)(W.u.)=31 *+4−3* E_γ: weighted average of 3735.6 *8* from ^{40}Sc ε decay, 3736.8 *3* from ^{39}K(p,γ), 3737 *2* from ^{40}Ca(n,n′γ), 3736.7 *3* from ^{40}Ca(p,p′γ), and 3736.1 *3* from (HI,xnγ). Mult.: from γ(θ) in (p,p′γ), M3 ruled out by RUL.
3904.38	2^+	551.8	<0.10	3352.62	0^+	[E2]		B(E2)(W.u.)<49 E_γ: from (p,γ). I_γ: from (p,γ). Others: <1.5 in (p,p′γ).
		3903.9 *1*	100	0.0	0^+	E2		B(E2)(W.u.)=2.2 *+6−4* E_γ: weighted average of 3904.5 *3* from ^{39}K(p,γ), 3903.8 *1* from ^{40}Ca(γ,γ′), 3904.2 *4* from ^{40}Ca(n,n′γ), 3904.4 *4* from ^{40}Ca(p,p′γ), and 3904.0 *3* from (HI,xnγ). Mult.: Q from γ(θ) in (p,p′γ) and (HI,xnγ), M2 ruled out by RUL.
4491.43	5^-	754.8 *2*	100	3736.69	3^-	E2		B(E2)(W.u.)=0.98 *3* E_γ: weighted average of 755.6 *8* from ^{40}Sc ε decay, 754.8 *3* from ^{39}K(p,γ), 755 *2* from ^{40}Ca(n,n′γ), 754.7 *2* from ^{40}Ca(p,p′γ), and 754.8 *2* from (HI,xnγ). Mult.: from γγ(θ) and γ(pol) in in (p,γ). δ(O/Q)=−0.01 *2* from (p,γ), +0.05 *5* in (p,p′γ).
5211.56	0^+	1307.7 *3*	100	3904.38	2^+	[E2]		B(E2)(W.u.)=17 *+4−3* E_γ: from (p,p′γ).
5248.79	2^+	1344.4 *3*	19.4 *12*	3904.38	2^+	M1+E2	+13 *+6−3*	B(M1)(W.u.)=8×10^{-5} *+11−6*; B(E2)(W.u.)=25 *+8−6* E_γ,Mult.,δ: from (p,p′γ). I_γ: weighted average of 18.9 *11* from ^{39}K(p,γ), 27 *7* from ^{40}Ca(n,n′γ), and 25 *5* from ^{40}Ca(p,p′γ).
		1896.1	6.3 *8*	3352.62	0^+	(E2)		B(E2)(W.u.)=1.5 *+6−4* E_γ: from (p,γ), 1897 *2* from (n,n′γ). I_γ: weighted average of 6.4 *8* from ^{39}K(p,γ), 7 *4* from ^{40}Ca(n,n′γ), and 5.2 *26* from ^{40}Ca(p,p′γ). Mult.: from (p,p′γ).
		5248.9 *3*	100.0 *15*	0.0	0^+	E2		B(E2)(W.u.)=0.143 *+35−24* E_γ: weighted average of 5248.9 *6* from ^{39}K(p,γ), 5247.9 *6* from ^{40}Ca(p,p′γ), 5249.2 *3* from ^{40}Ca(γ,γ′), and 5249 *2* from ^{40}Ca(n,n′γ). I_γ: from (p,γ). δ: from (p,p′γ).
5278.80	4^+	787.4	3.1 *15*	4491.43	5^-	[E1]		B(E1)(W.u.)=6×10^{-5} *+7−5* E_γ,I_γ: from (p,γ).
		1374.0 *3*	100.0 *15*	3904.38	2^+	E2		B(E2)(W.u.)=67 *+17−12* E_γ: unweighted average of 1374.5 *4* from ^{39}K(p,γ), 1374.0 *2* from ^{40}Ca(n,n′γ), 1373.1 *1* from ^{40}Ca(p,p′γ), and 1374.30 *20* from (HI,xnγ).

$^{40}_{20}Ca_{20}$-26

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
								I_γ: from (p,γ). Mult.: from γγ(θ) and γ(pol) in (p,γ). δ(O/Q)=+0.02 *4* from (p,p′γ), −0.02 *5* from (p,γ).
5613.52	4⁻	1122.7 *2*	41.4 *28*	4491.43	5⁻	M1+E2	−0.7 *2*	B(M1)(W.u.)=0.0046 *+23−16*; B(E2)(W.u.)=6 *+4−3* E_γ: weighted average of 1126 *3* from ^{40}Sc ε decay, 1121.5 *6* from ^{39}K(p,γ), 1122 *2* from ^{40}Ca(n,n′γ), and 1122.8 *2* from ^{40}Ca(p,p′γ). I_γ: weighted average of 48 *8* from ^{40}Sc ε decay, 41.8 *28* from ^{39}K(p,γ), and 39 *4* from ^{40}Ca(p,p′γ). Mult.,δ: from γ(pol) in (p,γ).
		1877.0 *2*	100 *3*	3736.69	3⁻	M1+E2	−0.27 *5*	B(M1)(W.u.)=0.0033 *+8−6*; B(E2)(W.u.)=0.21 *+15−9* E_γ: weighted average of 1877.8 *7* from ^{40}Sc ε decay, 1877.0 *3* from ^{39}K(p,γ), 1877 *2* from ^{40}Ca(n,n′γ), and 1876.9 *2* from ^{40}Ca(p,p′γ). I_γ: from (p,γ). Mult.,δ: from γ(pol) in (p,γ).
5629.41	2⁺	2277.0 *10*	14.0 *10*	3352.62	0⁺	[E2]		B(E2)(W.u.)=3.3 *+23−11* E_γ: weighted average of 2275 *2* from ^{40}Ca(n,n′γ) and 2277.5 *10* from ^{40}Ca(p,p′γ). I_γ: weighted average of 14.0 *10* from ^{39}K(p,γ), and 14 *6* from ^{40}Ca(p,p′γ). Other: 48 *12* from ^{40}Ca(n,n′γ),
		5628.5 *2*	100.0 *10*	0.0	0⁺	E2		B(E2)(W.u.)=0.26 *+15−7* E_γ: weighted average of 5628.5 *2* from ^{40}Ca(γ,γ′), 5629 *2* from ^{40}Ca(n,n′γ), and 5628.3 *5* from ^{40}Ca(p,p′γ). I_γ: from (p,γ). Mult.: from γ(θ) in (p,p′γ) and RUL.
5902.63	1⁻	5902.0 *2*	100	0.0	0⁺	E1		B(E1)(W.u.)=6.7×10^{-5} *+34−17* E_γ: weighted average of 5902.0 *2* from ^{40}Ca(γ,γ′), 5903 *2* from ^{40}Ca(n,n′γ), and 5902.6 *15* from ^{40}Ca(p,p′γ). Mult.: D from γγ(θ) in (p,p′γ), polarity from level-parity change determined from other experimental evidence.
6025.47	2⁻	2121.0 *6*	23 *3*	3904.38	2⁺	[E1]		B(E1)(W.u.)=6.1×10^{-5} *+19−15* E_γ: from (p,p′γ). I_γ: from (p,γ).
		2289.0 *3*	100 *3*	3736.69	3⁻	M1+E2	−2.8 *5*	B(M1)(W.u.)=0.0010 *+7−4*; B(E2)(W.u.)=4.7 *+11−9* E_γ: from (p,p′γ). I_γ: from (p,γ). Mult.,δ: D+Q from γγ(θ) in (p,p′γ), polarity from no level-parity change determined from other experimental evidence.
6029.71	3⁺	750.9	<1.2	5278.80	4⁺			E_γ,I_γ: from (p,γ). Other: Iγ<3.4 in (p,p′γ).
		780.7 *4*	20 *4*	5248.79	2⁺	E2(+M1)	>2	B(M1)(W.u.)<0.0037; B(E2)(W.u.)>77 E_γ: from (p,p′γ).

$^{40}_{20}Ca_{20}$-27

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
								I_γ: weighted average of 25 *4* from ^{39}K(p,γ), 18 *6* from ^{40}Ca(n,n′γ), and 15 *5* from ^{40}Ca(p,p′γ).
								Mult.,δ: Q(+D) from γγ(θ) in (p,p′γ); M2(+E1) is ruled out by RUL.
6029.71	3+	2124.4 *3*	100 *4*	3904.38	2+	E2(+M1)	>4	B(M1)(W.u.)<0.00027; B(E2)(W.u.)>3.0
								E_γ: from (p,p′γ).
								I_γ: from (p,γ).
								Mult.,δ: Q(+D) from γγ(θ) in (p,p′γ); M2(+E1) is ruled out by RUL.
		2293.0	<8	3736.69	3−			E_γ,I_γ: from (p,γ). Other: Iγ<23 in (p,p′γ).
6285.15	3−	671.6	1.3 *3*	5613.52	4−			E_γ,I_γ: from (p,γ) only.
		1793.4 *2*	100.0 *11*	4491.43	5−	E2		B(E2)(W.u.)=8.2 *+14−13*
								E_γ: weighted average of 1793.9 *6* from ^{39}K(p,γ), 1793 *2* from ^{40}Ca(n,n′γ), and 1793.3 *2* from ^{40}Ca(p,p′γ).
								I_γ: from (p,γ).
								Mult.: Q(+O) from γγ(θ) in (p,p′γ), M2 ruled out by RUL.
								δ(O/Q)=−0.03 *17* from (p,p′γ), +0.03 *2* from (p,γ).
		2380.0 *5*	27.4 *7*	3904.38	2+	E1		B(E1)(W.u.)=2.6×10^{-5} *+5−4*
								E_γ: from (p,p′γ).
								I_γ: from (p,γ). Others: 80 *33* from (n,n′γ), 30 *7* from (p,p′γ), and 33 *7* from (α,α′γ).
								Mult.: D from γγ(θ) in (p,p′γ), polarity from level-parity change determined from other experimental evidence.
		2548.4	4.4 *6*	3736.69	3−			E_γ,I_γ: from (p,γ). Other: Iγ<13 in (p,p′γ).
		6284.6	5.8 *7*	0.0	0+	[E3]		B(E3)(W.u.)=4.2 *+13−10*
								E_γ,I_γ: from (p,γ).
6422.4	2+	6420.6 *9*	100	0.0	0+	[E2]		B(E2)(W.u.)=0.49 *+22−12*
								E_γ: from (γ,γ′).
6507.87	4+	1229.0[&]	4 *3*	5278.80	4+			E_γ,I_γ: from (p,p′γ). Other: Iγ<3.5 in (p,γ).
		1259.0	17 *4*	5248.79	2+	[E2]		B(E2)(W.u.)=24 *+13−9*
								E_γ: from (p,γ).
								I_γ: weighted average of 18 *4* from ^{39}K(p,γ) and 15 *4* from ^{40}Ca(p,p′γ).
		2603.2 *3*	100 *4*	3904.38	2+	E2		B(E2)(W.u.)=3.7 *+11−8*
								E_γ: from (p,p′γ).
								I_γ: from (p,γ).
								Mult.: O(+Q) from γγ(θ) in (p,p′γ), M2 ruled out by RUL.
								δ(O/Q)=−0.09 *9* from (p,p′γ).
6542.80	4+	913.3	32 *3*	5629.41	2+	E2		B(E2)(W.u.)=1.7×10^{2} *+7−5*
								E_γ,I_γ: from (p,γ). Other: Iγ=17 *4* in (p,p′γ).
								Mult.: from γγ(θ) in (p,p′γ) and RUL.
								B(E2)(W.u.)>100 consistent with 6543, 4+ state as a member of SD band.
		1264.0	14 *3*	5278.80	4+			E_γ,I_γ: from (p,γ). Other: Iγ=10 *4* in (p,p′γ).
		1294.0	24 *3*	5248.79	2+	(E2)		B(E2)(W.u.)=22 *+10−7*

$^{40}_{20}Ca_{20}$-28

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#	δ#	Comments
								E_γ,I_γ: from (p,γ). Other: Iγ=12 *4* in (p,p′γ).
								Mult.: (Q) from (HI,xnγ), M2 ruled out by RUL.
6542.80	4+	2638.1 *3*	100 *3*	3904.38	2+	E2(+M3)	−0.07 *7*	B(E2)(W.u.)=2.6 *+8−6*
								E_γ: from (p,p′γ).
								I_γ: from (p,γ).
								Mult.: Q(+O) from γγ(θ) in (p,p′γ), M2 ruled out by RUL.
								δ(O/Q)=−0.07 *7* from (p,p′γ).
6582.47	3−	969.0	26 *5*	5613.52	4−			E_γ,I_γ: from (p,γ). Other: Iγ=7.5 *30* in (p,p′γ).
		2091.0	<1.1	4491.43	5−	[E2]		B(E2)(W.u.)=0.39 *+36−24*
								E_γ: from (p,γ).
								I_γ: from (p,γ). Other: 7.5 *30* from (p,p′γ).
		2678.1	24.7 *21*	3904.38	2+	[E1]		B(E1)(W.u.)=2.8×10^{-5} *+11−7*
								E_γ: from (p,γ).
								I_γ: weighted average of 24.2 *18* from ^{39}K(p,γ), and 34 *8* from ^{40}Ca(p,p′γ).
		2845.1 *3*	100.0 *20*	3736.69	3−	M1+E2	+3.1 *+26−11*	B(M1)(W.u.)=0.00034 *+60−26*; B(E2)(W.u.)=1.3 *+5−4*
								E_γ: from (p,p′γ).
								I_γ: from (p,γ).
								Mult.,δ: D+Q from γγ(θ) in (p,p′γ), M2 ruled out by RUL.
6750.41	2−	2848.4& *10*	<10	3904.38	2+			E_γ: from (p,p′γ). Other: 2845.9 from (p,γ).
								I_γ: from (p,γ). Others: 22 *10* in (n,n′γ), 18 in (p,p′γ).
		3014.0 *3*	100	3736.69	3−	M1+E2	−0.84 *16*	B(M1)(W.u.)=0.0047 *+36−17*; B(E2)(W.u.)=1.1 *+10−5*
								E_γ: from (p,p′γ).
								Mult.,δ: from γγ(θ) in (p,p′γ) and RUL.
6908.70	2+	6907.6 *1*	100	0.0	0+	[E2]		B(E2)(W.u.)=2.1 *+5−4*
								E_γ: from (γ,γ′).
6930.2	6+	1651.8 *4*	100	5278.80	4+	E2		B(E2)(W.u.)=17 *+17−4*
								E_γ: weighted average of 1651.9 *7* from (HI,xnγ) and 1651.7 *4* from (^{3}He,dγ). Other: 1651 *2* from (n,n′γ).
								Mult.: from γ(θ) and γ(DCO) in (HI,xnγ) and RUL.
6931.29	3−	1301.8	7.0 *4*	5629.41	2+	[E1]		B(E1)(W.u.)=1.1×10^{-5} *+10−4*
								E_γ,I_γ: from (p,γ).
		1317.7	2.4 *4*	5613.52	4−			E_γ,I_γ: from (p,γ).
		1682.4	7.4 *4*	5248.79	2+	[E1]		B(E1)(W.u.)=5.3×10^{-6} *+47−19*
								E_γ,I_γ: from (p,γ).
		2439.8	1.7 *4*	4491.43	5−	[E2]		B(E2)(W.u.)=0.008 *+10−4*
								E_γ,I_γ: from (p,γ).
		3026.8	2.4 *6*	3904.38	2+	[E1]		B(E1)(W.u.)=3.0×10^{-7} *+37−15*
								E_γ,I_γ: from (p,γ).
		3194.5	100.0 *9*	3736.69	3−			E_γ,I_γ: from (p,γ). Other: Eγ=3190.0 *15* in (p,p′γ), 3193 *2* in (n,n′γ).

$^{40}_{20}Ca_{20}$-29

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	Comments
6938.0	(1$^-$ to 5$^-$)	3201.0 *15*	100	3736.69	3$^-$		E_γ: from (p,p′γ).
6950.48	1$^-$	6949.7 *8*	100	0.0	0$^+$	[E1]	B(E1)(W.u.)=0.0019 *+4−3* E_γ: weighted average of 6949.3 *7* from ^{40}Ca(γ,γ′), 6949 *2* from ^{40}Ca(n,n′γ), and 6952.2 *15* from ^{40}Ca(p,p′γ).
7113.1	1$^-$	1485	5	5629.41	2$^+$	[E1]	B(E1)(W.u.)=0.00010 *+11−4* E_γ,I_γ: (p,p′γ) only.
		1899.8 *7*	22	5211.56	0$^+$	[E1]	B(E1)(W.u.)=0.00022 *+23−8* E_γ,I_γ: (p,p′γ) only.
		3206.8 *6*	28	3904.38	2$^+$	[E1]	B(E1)(W.u.)=5.8×10^{-5} *+60−20* E_γ,I_γ: from (p,p′γ). Other: Eγ=3208.5 in (p,γ).
		7112.9 *10*	100	0.0	0$^+$	[E1]	B(E1)(W.u.)=1.9×10^{-5} *+20−7* E_γ,I_γ: from (p,p′γ). Other: Eγ=7113.3 in (p,γ).
7113.73	4$^-$	1088.2	1.7 *5*	6025.47	2$^-$	[E2]	B(E2)(W.u.)=7 *+8−4* E_γ,I_γ: from (p,γ).
		1500.2	10.3 *11*	5613.52	4$^-$		E_γ,I_γ: from (p,γ).
		1834.9	2.6 *5*	5278.80	4$^+$	[E1]	B(E1)(W.u.)=2.1×10^{-5} *+22−9* E_γ,I_γ: from (p,γ).
		2623.2 *3*	40.7 *20*	4491.43	5$^-$		E_γ: from (p,p′γ). Other: 2622.2 in (p,γ). I_γ: from (p,γ).
		3378.5 *3*	100.0 *14*	3736.69	3$^-$		E_γ: from (p,p′γ). Other: 3376.9 in (p,γ). I_γ: from (p,γ).
7239.07	(3$^-$,4,5$^-$)	1624.5 *7*	50	5613.52	4$^-$		E_γ,I_γ: from (p,p′γ) only.
		2746	100	4491.43	5$^-$		E_γ,I_γ: from (p,p′γ) only.
		3501.4 *5*	100	3736.69	3$^-$		E_γ,I_γ: from (p,p′γ). Other: Eγ=3502.2 in (p,γ).
7277.82	(2,3)$^+$	3541.0	100	3736.69	3$^-$	[E1]	B(E1)(W.u.)=0.00027 *+67−11* E_γ: from (p,γ).
7300.67	0$^+$	1671.3	5.3 *16*	5629.41	2$^+$	[E2]	B(E2)(W.u.)=1.8 *+18−10* E_γ,I_γ: from (p,γ).
		2050.3 *5*	100.0 *16*	5248.79	2$^+$	[E2]	B(E2)(W.u.)=16 *+8−4* E_γ: from (p,p′γ). Other: 2051.9 in (p,γ).
7397.2	(5$^+$)	1369		6029.71	3$^+$	(E2)	E_γ: from (HI,xnγ) only. Mult.: (Q) from (HI,xnγ), M2 ruled by RUL.
		2119.2 *6*		5278.80	4$^+$	(D)	E_γ: from (p,p′γ). Mult.: from (HI,xnγ).
7421.9		3684.9 *12*	100	3736.69	3$^-$		E_γ: from (p,p′γ).
7446.23	3$^+$,4$^+$	1816.8	30.0 *17*	5629.41	2$^+$		E_γ,I_γ: from (p,γ).
		1831.5 *10*	48.5 *19*	5613.52	4$^-$	[E1]	B(E1)(W.u.)=0.00014 *+10−5* E_γ: from (p,p′γ). Other: 1832.7 in (p,γ). I_γ: from (p,γ).
		2167.4	56 *3*	5278.80	4$^+$		E_γ,I_γ: from (p,γ). Other: Eγ=2169.1 *15* in (p,p′γ).

$^{40}_{20}Ca_{20}$-30

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	Comments
7446.23	3$^+$,4$^+$	2198.0 *10*	100 *3*	5248.79	2$^+$		E_γ: from (p,p′γ). Other: 2197.4 in (p,γ). I_γ: from (p,γ).
7466.35	2$^+$	2217.5	24 *3*	5248.79	2$^+$		E_γ,I_γ: from (p,γ).
		3561.8	36.0 *25*	3904.38	2$^+$		E_γ,I_γ: from (p,γ).
		4113.5	21.0 *18*	3352.62	0$^+$	[E2]	B(E2)(W.u.)=0.9 *+12−4* E_γ,I_γ: from (p,γ).
		7465.6	100 *4*	0.0	0$^+$	[E2]	B(E2)(W.u.)=0.21 *+24−8* E_γ,I_γ: from (p,γ). Other: Eγ=7467.8 *10* in (p,p′γ).
7481?		7480		0.0	0$^+$		
7532.26	2$^-$	1247.1	23.1 *21*	6285.15	3$^-$		E_γ,I_γ: from (p,γ).
		1506.8	11.3 *10*	6025.47	2$^-$		E_γ,I_γ: from (p,γ).
		1629.6	8.0 *24*	5902.63	1$^-$		E_γ,I_γ: from (p,γ).
		1917.6 *10*	57 *3*	5613.52	4$^-$	[E2]	B(E2)(W.u.)=4.1 *+19−12* E_γ: from (p,p′γ). Other: 1918.7 in (p,γ). I_γ: from (p,γ).
		3627.7	36 *3*	3904.38	2$^+$	[E1]	B(E1)(W.u.)=1.2×10^{-5} *+6−4* E_γ,I_γ: from (p,γ).
		3795.4 *10*	100 *4*	3736.69	3$^-$		E_γ,I_γ: from (p,γ).
7561.17	4$^+$	1531.4	44 *5*	6029.71	3$^+$		E_γ,I_γ: from (p,γ).
		2312.1 *10*	100 *13*	5248.79	2$^+$	[E2]	B(E2)(W.u.)=3.9 *+17−11* E_γ: unweighted average of 2313.0 *6* from ^{39}K(p,γ) and 2311.1 *3* from ^{40}Ca(p,p′γ). I_γ: from (p,γ).
		3824.3	14 *3*	3736.69	3$^-$	[E1]	B(E1)(W.u.)=5.4×10^{-6} *+41−23* E_γ,I_γ: from (p,γ).
7623.11	(2$^-$,3,4$^+$)	1993.6	100 *3*	5629.41	2$^+$		E_γ,I_γ: from (p,γ).
		2009.5 *7*	90 *3*	5613.52	4$^-$		E_γ: from (p,p′γ). I_γ: from (p,γ).
		2374.2	31.5 *20*	5248.79	2$^+$		E_γ,I_γ: from (p,γ).
		3886.2	57.4 *20*	3736.69	3$^-$		E_γ,I_γ: from (p,γ).
7658.23	4$^-$	1373.1	33 *5*	6285.15	3$^-$		E_γ,I_γ: from (p,γ).
		2045.6 *7*	100 *6*	5613.52	4$^-$		E_γ: weighted average of 2045.8 *7* from ^{40}Sc ε decay and 2045.0 *10* from ^{40}Ca(p,p′γ). Other: 2045.6 in (p,γ). I_γ: from ^{40}Sc ε decay.
		3167.9 *7*	52 *8*	4491.43	5$^-$		E_γ: from ^{40}Sc ε decay. Other: 3166.7 in (p,γ). I_γ: weighted average of 47 *8* from ^{40}Sc ε decay and 56 *8* from ^{39}K(p,γ).
		3920.0 *10*	59 *8*	3736.69	3$^-$		E_γ: from ^{40}Sc ε decay. Other: 3921.3 in (p,γ). I_γ: weighted average of 51 *8* from ^{40}Sc ε decay and 67 *8* from ^{39}K(p,γ).
7676.6	(6$^+$)	2399.2 *5*	100	5278.80	4$^+$	(E2)	B(E2)(W.u.)=4.4 *+15−9* E_γ: from (p,p′γ). Mult.: (Q) from γ(θ) in (HI,xnγ), M2 ruled out by RUL.

$^{40}_{20}Ca_{20}$-31

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	Comments
7694.08	3^-	2080.6	10.1 *13*	5613.52	4^-		E_γ,I_γ: from (p,γ).
		3957.5 *5*	100.0 *13*	3736.69	3^-		E_γ: from (p,p′γ). Other: 3957.3 in (p,γ). I_γ: from (p,γ).
7701.8	0^+	3797.2	100	3904.38	2^+		E_γ: from (p,γ).
7769.4	$(3,4,5^-)$	2155.8	52 *9*	5613.52	4^-		E_γ,I_γ: from (p,γ).
		4032.5	100 *9*	3736.69	3^-		E_γ,I_γ: from (p,γ).
7814.7	0^+	2565	43	5248.79	2^+		E_γ,I_γ: from (p,p′γ).
		3908	100	3904.38	2^+		E_γ,I_γ: from (p,p′γ).
7872.18	2^+	7871.1 *1*	100	0.0	0^+	[E2]	B(E2)(W.u.)=0.89 *+22−15* E_γ: from (γ,γ′). Others: 7871.4 in (p,γ), 7872.9 *10* in (p,p′γ). I_γ: 1982Mo05 in (γ,γ′) report Γ_0/Γ=0.84 *6* without indicating the observation of other γ branches other than the ground transition and no other γ branches were observed in other studies. So this value is not considered.
7928.42	4^+	2314.8	100 *18*	5613.52	4^-	[E1]	B(E1)(W.u.)=0.00046 *+151−25* E_γ,I_γ: from (p,γ). Other: Eγ=2313.7 *17* in (p,p′γ).
		3436.8	100 *18*	4491.43	5^-	[E1]	B(E1)(W.u.)=0.00014 *+46−8* E_γ,I_γ: from (p,γ).
		4191.5	<14	3736.69	3^-		E_γ,I_γ: from (p,γ). Other: Iγ=20 in (p,p′γ).
7974.4	(6^+)	1432		6542.80	4^+	(Q)	E_γ,Mult.: from (HI,xnγ).
		2695		5278.80	4^+	(Q)	E_γ,Mult.: from (HI,xnγ).
7976.55	2^+	2699	20	5278.80	4^+	[E2]	B(E2)(W.u.)>1.2
		4072.1 *6*	100	3904.38	2^+		
		4624	60	3352.62	0^+	[E2]	B(E2)(W.u.)>0.24
		7977	20	0.0	0^+	[E2]	B(E2)(W.u.)>0.0051
8018.8	0^+	2770	100	5248.79	2^+		
8091.61	2^+	8090.6 *2*	100	0.0	0^+	[E2]	B(E2)(W.u.)=0.72 *+9−7* E_γ: from (γ,γ′). Other: 8092.4 *20* in (p,p′γ).
8100.1	8^+	1168.8 *3*	100	6930.2	6^+	E2	B(E2)(W.u.)=2.6 *+4−3* E_γ: from (HI,xnγ). Mult.: from γγ(θ) and γ(DCO) in (HI,xnγ) and RUL.
8113.2	1^-	8111.0 *6*	100	0.0	0^+	[E1]	B(E1)(W.u.)=6.0×10^{-5} *+39−17* E_γ: from (γ,γ′).
8134.77	(3^-)	2505.3	82 *9*	5629.41	2^+		E_γ,I_γ: from (p,γ).
		2521.2	24 *9*	5613.52	4^-		E_γ,I_γ: from (p,γ).
		3643.1[&]	<15	4491.43	5^-		E_γ,I_γ: from (p,γ). Other: Iγ=100 in (p,p′γ).
		4229.4 *10*	100 *30*	3904.38	2^+		E_γ: from (p,p′γ). Other: 4230.1 in (p,γ). I_γ: from (p,γ).
8187.5	$(3,4,5^-)$	4451.6 *8*	100	3736.69	3^-		E_γ: from (p,p′γ). Other: 4450.7 in (p,γ).
8271	$(\leq3)^-$	1321	100	6950.48	1^-		E_γ,I_γ: from (p,p′γ).
		2368	67	5902.63	1^-		E_γ,I_γ: from (p,p′γ).
8276	0^+	2646	100	5629.41	2^+		

$^{40}_{20}Ca_{20}$-32

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	Comments
8323.16	(1⁻,2⁺)	1572.7	12.5 *10*	6750.41	2⁻		
		2038.0	2.2 *5*	6285.15	3⁻		
		2297.6	26.3 *17*	6025.47	2⁻		
		2420.5	1.9 *12*	5902.63	1⁻		
		3074.2	4.5 *9*	5248.79	2⁺		
		4586.2	100 *3*	3736.69	3⁻		
		8322.2	3.4 *12*	0.0	0⁺		Unobserved intensity=18 *3* in (p,γ).
8338.0	(2⁺,3,4)	1795.2	100 *10*	6542.80	4⁺		
		1830.1	42 *10*	6507.87	4⁺		Unobserved intensity=25 *13* in (p,γ).
8358.9	(0,1,2)⁻	1405	100	6950.48	1⁻		E_γ: from (p,p′γ).
8364	(3⁻ to 7⁻)	3872	100	4491.43	5⁻		
8373.94	4⁺	4469.3	100	3904.38	2⁺		
8424.81	2⁻	2399.3	19 *4*	6025.47	2⁻		
		2522.1	24 *4*	5902.63	1⁻		
		4687.8	100 *6*	3736.69	3⁻		E_γ: from (p,γ). Other: 4688.2 *15* in (p,p′γ).
8439.0	0⁺	2809.5	100	5629.41	2⁺		
8484.02	(1⁻,2⁻,3⁻)	2581.3	59 *11*	5902.63	1⁻		
		4747.0	100 *11*	3736.69	3⁻		Additional information 22.
8540	1,2⁺	5188	67	3352.62	0⁺		E_γ,I_γ: from (p,p′γ).
		8540 *4*	100	0.0	0⁺		E_γ,I_γ: from (p,p′γ).
8551.1	5⁻	4060.8 *15*		4491.43	5⁻		E_γ,I_γ: from (p,p′γ).
8578.80	2⁺	8577.7 *2*	100	0.0	0⁺	[E2]	B(E2)(W.u.)=0.54 *+7−6* E_γ: from (γ,γ′).
8587	(2⁺,3)	2562	25	6025.47	2⁻		E_γ,I_γ: from (p,p′γ).
		3308	25	5278.80	4⁺		E_γ,I_γ: from (p,p′γ).
		4682	17	3904.38	2⁺		E_γ,I_γ: from (p,p′γ).
		4850	100	3736.69	3⁻		E_γ,I_γ: from (p,p′γ).
8665.3	1⁻	8665	100	0.0	0⁺		
8678.29	4⁺	2393.1	20 *8*	6285.15	3⁻	[E1]	B(E1)(W.u.)=0.00017 *+145−12*
		4941.3	100 *23*	3736.69	3⁻	[E1]	B(E1)(W.u.)=0.00010 *+53−5* Unobserved intensity=34 *25* in (p,γ).
8701	(6⁻)	3088		5613.52	4⁻		
		4209		4491.43	5⁻		
8748.22	2⁺	8748.4 *2*	100	0.0	0⁺	[E2]	B(E2)(W.u.)=0.26 *+4−3* E_γ: from (γ,γ′). Other: 8747.2 in (p,γ).
8764.18	3⁻	2734.4	47 *18*	6029.71	3⁺		
		3134.6	56 *21*	5629.41	2⁺		
		3485.2	100 *30*	5278.80	4⁺		
		4859.5	65 *18*	3904.38	2⁺		Unobserved intensity ≈26 in (p,γ).
8934.81	2⁺	1402.5	12.2 *11*	7532.26	2⁻		
		1657.0	3.5 *5*	7277.82	(2,3)⁺		
		1821.0	1.7 *4*	7113.1	1⁻		

$^{40}_{20}Ca_{20}$-33

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [‡]	E_f	J_f^π	Mult.[#]	Comments
8934.81	2^+	1984.3	5.6 *8*	6950.48	1^-		
		2184.3	5.6 *8*	6750.41	2^-		
		2352.2	1.9 *3*	6582.47	3^-		
		2905.0	3.2 *11*	6029.71	3^+		
		2909.2	17.6 *19*	6025.47	2^-		
		3032.1	1.7 *5*	5902.63	1^-		
		3305.2	2.9 *5*	5629.41	2^+		
		3685.8	5.6 *24*	5248.79	2^+		
		3722.9	3.5 *8*	5211.56	0^+		
		5030.1	100 *5*	3904.38	2^+		
		5197.8	2.9 *13*	3736.69	3^-		
		5581.8	21.8 *21*	3352.62	0^+		
		8933.7	77 *5*	0.0	0^+		
8935.8	(7^+)	1538		7397.2	(5^+)	(Q)	
		2004		6930.2	6^+	(D)	
8982.5	2^+	8981.4 *5*	100	0.0	0^+	[E2]	B(E2)(W.u.)=0.38 *+6−5* E_γ: from (γ,γ').
8994.50	$(1^-,2^+)$	1880.7	0.44 *11*	7113.1	1^-		
		2085.7	0.62 *15*	6908.70	2^+		
		2244.0	0.60 *8*	6750.41	2^-		
		2411.9	0.44 *14*	6582.47	3^-		
		2709.3	0.64 *16*	6285.15	3^-		
		2968.9	1.5 *3*	6025.47	2^-		
		3364.9	8.7 *7*	5629.41	2^+		
		3782.6	8.2 *7*	5211.56	0^+		
		5089.8	8.3 *8*	3904.38	2^+		
		5257.4	2.4 *4*	3736.69	3^-		
		5641.5	2.1 *6*	3352.62	0^+		
		8993.4	100.0 *22*	0.0	0^+		
9031.9	4^-	1337.7	25 *8*	7694.08	3^-		
		2746.6	25 *8*	6285.15	3^-		
		3418.2	100 *13*	5613.52	4^-		
		3752.9	30 *13*	5278.80	4^+		
		4540.2	70 *13*	4491.43	5^-		
9033?	(7^-)	4542[&]		4491.43	5^-		E_γ: this γ may correspond to 4540.2γ from 9031.9 level.
9091.70	3^-	1397.5	3.7 *3*	7694.08	3^-		
		1468.6	1.31 *16*	7623.11	$(2^-,3,4^+)$		
		1625.3	0.71 *5*	7466.35	2^+		
		1813.8	2.17 *24*	7277.82	$(2,3)^+$		
		1852.6	1.26 *17*	7239.07	$(3^-,4,5^-)$		
		1977.9	0.95 *16*	7113.73	4^-		

$^{40}_{20}Ca_{20}$-34

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]
9091.70	3^-	2341.2	0.98 *24*	6750.41	2^-	9226.69	$(1^-,2,3^-)$	2941.4	27.8 *15*	6285.15	3^-	
		2509.1	1.79 *24*	6582.47	3^-			3323.9	<3.0	5902.63	1^-	
		2806.4	8.8 *5*	6285.15	3^-			3977.7	<14	5248.79	2^+	
		3061.9	4.3 *7*	6029.71	3^+			5321.9	<3.1	3904.38	2^+	
		3066.1	5.0 *9*	6025.47	2^-			5489.6	39 *3*	3736.69	3^-	
		3188.9	2.6 *4*	5902.63	1^-			9225.6	<97	0.0	0^+	
		3812.7	14.6 *7*	5278.80	4^+	9227.43	$(1,2^+)$	3201.8	35.0 *13*	6025.47	2^-	
		3842.7	7.7 *4*	5248.79	2^+			3324.7	<1.0	5902.63	1^-	
		5187.0	16.2 *7*	3904.38	2^+			3978.4	<4.7	5248.79	2^+	
		5354.6	100.0 *17*	3736.69	3^-			5322.7	<1.0	3904.38	2^+	
9135.66	$2^-,3^-$	710.8	1.72 *15*	8424.81	2^-			5874.4	100 *3*	3352.62	0^+	
		1263.5	0.55 *9*	7872.18	2^+			9226.3	<33	0.0	0^+	
		1441.5	8.9 *4*	7694.08	3^-	9305.2	(8^+)	1628		7676.6	(6^+)	(Q)
		1603.4	6.3 *4*	7532.26	2^-			2375		6930.2	6^+	(Q)
		1857.8	0.43 *7*	7277.82	$(2,3)^+$	9362.54	3^-	937.7	4.4 *7*	8424.81	2^-	
		2021.9	3.13 *21*	7113.73	4^-			1668.4	100.0 *25*	7694.08	3^-	
		2185.1	0.78 *14*	6950.48	1^-			1704.3	26.6 *20*	7658.23	4^-	
		2385.2	1.06 *15*	6750.41	2^-			1739.4	3.9	7623.11	$(2^-,3,4^+)$	
		2553.0	3.5 *3*	6582.47	3^-			2412.0	3.2	6950.48	1^-	
		2850.4	23.5 *7*	6285.15	3^-			2612.0	3.7	6750.41	2^-	
		3110.1	0.43 *17*	6025.47	2^-			2779.9	6.3 *7*	6582.47	3^-	
		3232.9	5.1 *4*	5902.63	1^-			3077.3	9.5 *25*	6285.15	3^-	
		3522.0	0.51 *17*	5613.52	4^-			3748.8	29.8 *22*	5613.52	4^-	
		3886.7	0.8 *3*	5248.79	2^+			4113.5	10.7 *20*	5248.79	2^+	
		5230.9	13.6 *7*	3904.38	2^+			5457.8	14.4 *20*	3904.38	2^+	
		5398.6	100.0 *15*	3736.69	3^-			5625.4	8.3 *15*	3736.69	3^-	
9209.77	$(2,3)^-$	725.7	1.53 *16*	8484.02	$(1^-,2^-,3^-)$	9388.20	2^+	1694.0	7	7694.08	3^-	
		785.0	5.4 *3*	8424.81	2^-			2087.4	2.5	7300.67	0^+	
		1515.6	7.3 *3*	7694.08	3^-			2845.3	28	6542.80	4^+	
		2096.0	2.60 *20*	7113.73	4^-			2880.3	9	6507.87	4^+	
		2259.2	4.5 *3*	6950.48	1^-			3102.9	3.2	6285.15	3^-	
		2459.3	3.2 *3*	6750.41	2^-			3362.6	6	6025.47	2^-	
		2627.1	3.6 *3*	6582.47	3^-			3758.6	19	5629.41	2^+	
		2924.5	6.5 *3*	6285.15	3^-			4109.2	15	5278.80	4^+	
		3184.2	2.6 *3*	6025.47	2^-			4139.2	8	5248.79	2^+	
		3307.0	17.4 *5*	5902.63	1^-			4176.3	28	5211.56	0^+	
		3580.2	3.4 *3*	5629.41	2^+			5483.4	8	3904.38	2^+	
		5305.0	4.7 *5*	3904.38	2^+			5651.1	17	3736.69	3^-	
		5472.7	100.0 *16*	3736.69	3^-			9387.0	100	0.0	0^+	
9226.69	$(1^-,2,3^-)$	1694.4	100 *5*	7532.26	2^-	9404.85	2^-	1872.5	43	7532.26	2^-	
		2276.1	15.9 *14*	6950.48	1^-			2127.0	2.2	7277.82	$(2,3)^+$	
		2476.2	24.1 *15*	6750.41	2^-			2291.1	20	7113.73	4^-	

$^{40}_{20}Ca_{20}$-35

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9404.85	2⁻	2454.3	4	6950.48	1⁻			
		2496.1	8	6908.70	2⁺			
		2822.2	10	6582.47	3⁻			
		3119.6	100	6285.15	3⁻	M1		Mult.: δ(Q/D)=0.0 *3* in (p,γ), polarity from no level-parity change determined from other experimental evidence.
		3502.1	20	5902.63	1⁻			
		5500.1	7	3904.38	2⁺			
		5667.7	49	3736.69	3⁻	M1+E2	−0.03 *2*	Mult.: D+Q in (p,γ), polarity from no level-parity change determined from other experimental evidence.
		9403.7	7	0.0	0⁺			
9418.8	3⁻	1724.6	10	7694.08	3⁻			
		1760.5	7	7658.23	4⁻			
		1795.6	4	7623.11	(2⁻,3,4⁺)			
		1886.5	5	7532.26	2⁻			
		2305.0	62	7113.73	4⁻			
		2668.3	6	6750.41	2⁻			
		3133.5	100	6285.15	3⁻			
		3393.2	5	6025.47	2⁻			
		3516.0	12	5902.63	1⁻			
		3805.1	5	5613.52	4⁻			
		4169.8	4	5248.79	2⁺			
		5681.7	18	3736.69	3⁻			
9429.11	(3,4)⁻	1734.9	21 *3*	7694.08	3⁻			
		1770.8	100 *6*	7658.23	4⁻			
		1806.0	3.3 *11*	7623.11	(2⁻,3,4⁺)			
		2315.3	3.6 *8*	7113.73	4⁻			
		2846.5	26 *5*	6582.47	3⁻			
		3143.8	9.4 *17*	6285.15	3⁻			
		4937.3	81 *6*	4491.43	5⁻			
		5692.0	33 *6*	3736.69	3⁻			
9432.46	1⁻	1900.2	2.5	7532.26	2⁻			
		2481.9	0.8	6950.48	1⁻			
		2681.9	1.0	6750.41	2⁻			
		3406.8	2.3	6025.47	2⁻			
		5527.7	1.1	3904.38	2⁺			
		9431.3	100	0.0	0⁺			
9453.95	3⁻	1029.1	4.9 *6*	8424.81	2⁻			
		1759.8	73.2 *23*	7694.08	3⁻			
		1795.7	23.4 *20*	7658.23	4⁻			
		1830.8	5.9 *10*	7623.11	(2⁻,3,4⁺)			
		1921.6	3.3 *7*	7532.26	2⁻			
		2007.7	2.3 *7*	7446.23	3⁺,4⁺			

$^{40}_{20}Ca_{20}$-36

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9453.95	3⁻	2340.2	34.7 *17*	7113.73	4⁻			
		2703.4	6.9 *7*	6750.41	2⁻			
		3168.7	100.0 *23*	6285.15	3⁻			
		3428.3	5.9 *10*	6025.47	2⁻			
		3824.3	8.3 *10*	5629.41	2⁺			
		3840.2	33.7 *20*	5613.52	4⁻			
		4174.9	5	5278.80	4⁺			
		5549.2	16.2 *20*	3904.38	2⁺			
		5716.8	11.2 *13*	3736.69	3⁻			
9603.0	3⁻	2489.2	61	7113.73	4⁻			
		3317.7	100	6285.15	3⁻	M1+E2	0.42 *6*	Mult.,δ: D+Q from (p,γ), polarity form no level-parity change determined from other experimental evidence.
		5865.8	24	3736.69	3⁻	M1+E2	+0.18 *3*	Mult.,δ: D+Q from (p,γ), polarity form no level-parity change determined from other experimental evidence.
9604.6	1⁻	2072.3	6	7532.26	2⁻			
		2654.0	1.3	6950.48	1⁻			
		2854.1	2.0	6750.41	2⁻			
		3579.0	5	6025.47	2⁻			
		5699.8	1.0	3904.38	2⁺			
		6251.4	1.4	3352.62	0⁺			
		9603.4	100	0.0	0⁺			
9640.89	2⁻	2174.5	16.7 *6*	7466.35	2⁺			
		2690.3	0.32 *6*	6950.48	1⁻			
		2732.1	1.06 *11*	6908.70	2⁺			
		3355.6	0.99 *23*	6285.15	3⁻			
		4011.2	9.94 *21*	5629.41	2⁺			
		5736.1	100.0 *11*	3904.38	2⁺			
		5903.7	82.5 *11*	3736.69	3⁻			
		9639.6	3.2	0.0	0⁺			
9668.71	3⁻	1974.5	1.5 *3*	7694.08	3⁻			
		2136.4	4.1 *4*	7532.26	2⁻			
		2222.4	1.53 *25*	7446.23	3⁺,4⁺			
		2554.9	60.6 *16*	7113.73	4⁻			
		2759.9	1.5 *3*	6908.70	2⁺			
		2918.2	4.6 *4*	6750.41	2⁻			
		3383.4	100.0 *14*	6285.15	3⁻			
		3643.1	6.8 *7*	6025.47	2⁻			
		5176.9	6.76 *23*	4491.43	5⁻			
		5763.9	8.1 *5*	3904.38	2⁺			
		5931.6	29.7 *14*	3736.69	3⁻			
9779.47	3	1031.3	17.1 *15*	8748.22	2⁺			
		1101.2	16.6 *20*	8678.29	4⁺			

$^{40}_{20}Ca_{20}$-37

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.#	δ#	Comments
9779.47	3	1200.7	25.1 *15*	8578.80	2^+			
		1644.7	13.6 *10*	8134.77	(3^-)			
		1851.0	26.6 *15*	7928.42	4^+			
		1907.3	28.6 *25*	7872.18	2^+			
		2218.2	95 *4*	7561.17	4^+			
		2313.1	15	7466.35	2^+			
		2870.7	21.1 *25*	6908.70	2^+			
		3196.8	7.5 *20*	6582.47	3^-			
		3236.6	6.5 *15*	6542.80	4^+			
		3271.5	3.5 *10*	6507.87	4^+			
		3749.6	6	6029.71	3^+			
		4149.8	10.1 *10*	5629.41	2^+			
		4165.7	100 *4*	5613.52	4^-	D+Q	+0.07 *4*	Mult.,δ: from (p,γ).
		4500.4	27.1 *20*	5278.80	4^+			
		4530.4	3.5 *10*	5248.79	2^+			
		5874.7	73 *5*	3904.38	2^+			
		6042.3	27 *3*	3736.69	3^-			
9785.3	$(1,2^+)$	2484.5	2.6	7300.67	0^+			
		2876.5	0.8	6908.70	2^+			
		5880.5	2.9	3904.38	2^+			
		6432.1	11	3352.62	0^+			
		9784.0	100	0.0	0^+			
9853.5	(8^+)	1880		7974.4	(6^+)	(Q)		
		2176		7676.6	(6^+)	(Q)		
		2921		6930.2	6^+	(Q)		
9865.15	1	1426.1	0.25 *7*	8439.0	0^+			
		1773.5	1.02 *11*	8091.61	2^+			
		1992.9	0.29 *4*	7872.18	2^+			
		2163.3	0.74 *25*	7701.8	0^+			
		2398.7	0.57 *9*	7466.35	2^+			
		2564.3	4.5 *3*	7300.67	0^+			
		2587.2	0.28 *10*	7277.82	$(2,3)^+$			
		2914.6	0.45 *6*	6950.48	1^-			
		2956.3	1.54 *14*	6908.70	2^+			
		3114.6	0.29 *3*	6750.41	2^-			
		3962.3	0.48 *7*	5902.63	1^-			
		4235.5	0.57 *10*	5629.41	2^+			
		4616.1	0.35 *4*	5248.79	2^+			
		4653.2	0.64 *10*	5211.56	0^+			
		5960.3	7.1 *3*	3904.38	2^+	D+Q	−0.18 *3*	Mult.,δ: from (p,γ).
		6512.0	21.0 *7*	3352.62	0^+			
		9863.8 *20*	100.0 *17*	0.0	0^+			

$^{40}_{20}Ca_{20}$-38

Adopted Levels, Gammas (continued)

$\gamma(^{40}Ca)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
9869.3	$1^+,2^+$	2167.4	1.1	7701.8	0^+			
		2568.5	3.0	7300.67	0^+			
		2960.5	1.2	6908.70	2^+			
		4620.2	1.1	5248.79	2^+			
		4657.3	0.8	5211.56	0^+			
		5964.4	7	3904.38	2^+			
		6516.1	17	3352.62	0^+			
		9868.0	100	0.0	0^+			
9954.00	4^+	1580.0	6.5 *5*	8373.94	4^+			
		3022.6	5.2 *5*	6931.29	3^-			
		3371.3	2.1 *5*	6582.47	3^-			
		3411.1	18.2 *10*	6542.80	4^+			
		3446.0	7.2 *4*	6507.87	4^+			
		4340.2	8.2 *7*	5613.52	4^-			
		4674.9	100 *3*	5278.80	4^+	M1+E2	+0.04 *3*	Mult.,δ: from γ(pol) in (p,γ).
		5462.2	4.6 *7*	4491.43	5^-			
		6216.8	11.2 *10*	3736.69	3^-			
10040.54	$(2^-,3^-)$	1276.3	10.4 *14*	8764.18	3^-			
		1556.5	3.5 *6*	8484.02	$(1^-,2^-,3^-)$			
		1717.3	100.0 *19*	8323.16	$(1^-,2^+)$			
		2417.4	4.4 *6*	7623.11	$(2^-,3,4^+)$			
		2508.2	1.8 *4*	7532.26	2^-			
		2762.6	16.1 *6*	7277.82	$(2,3)^+$			
		2926.7	8.5 *6*	7113.73	4^-			
		3089.9	12.8 *12*	6950.48	1^-			
		3457.8	2.7 *4*	6582.47	3^-			
		4014.9	3.9 *4*	6025.47	2^-			
		4137.7	26.3 *12*	5902.63	1^-			
		6303.3	3.9 *4*	3736.69	3^-			
10049.38	4^-	1017.5	26.3 *12*	9031.9	4^-			
		1861.6	1.17 *12*	8187.5	$(3,4,5^-)$			
		2279.9	5.4 *3*	7769.4	$(3,4,5^-)$			
		2810.2	1.7 *3*	7239.07	$(3^-,4,5^-)$			
		2935.5	32.0 *9*	7113.73	4^-			
		3466.7	16.7 *7*	6582.47	3^-			
		3764.0	2.88 *21*	6285.15	3^-			
		4023.7	2.97 *23*	6025.47	2^-			
		4435.6	2.17 *21*	5613.52	4^-			
		5557.5	37.3 *9*	4491.43	5^-			
		6312.2	100.0 *21*	3736.69	3^-			
10262.53	3^-	2639.3	3.9 *6*	7623.11	$(2^-,3,4^+)$			
		2796.1	43.3 *25*	7466.35	2^+			

$^{40}_{20}Ca_{20}$-39

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[#]	Comments
10262.53	3⁻	2816.2	13.1 *11*	7446.23	3⁺,4⁺			
		3148.7	3.9 *8*	7113.1	1⁻			
		3679.8	11.4 *8*	6582.47	3⁻			
		4232.6	45 *4*	6029.71	3⁺			
		4359.7	7.5 *11*	5902.63	1⁻			
		4632.8	8.1 *11*	5629.41	2⁺			
		5013.4	10.0 *11*	5248.79	2⁺			
		6357.6	100 *3*	3904.38	2⁺			
		6525.3	32 *3*	3736.69	3⁻			
10318.8	1⁺	2616.9	0.86 *9*	7701.8	0⁺			
		3368.2	0.50 *9*	6950.48	1⁻			
		4689.1	0.33 *9*	5629.41	2⁺			
		5106.8	0.93 *7*	5211.56	0⁺			
		6413.9	4.12 *24*	3904.38	2⁺	M1+E2	−0.16 *3*	Mult.,δ: D+Q from (p,γ), polarity from no level-parity change determined from other evidence.
		6965.5	14.4 *5*	3352.62	0⁺			
		10317.4	100.0 *9*	0.0	0⁺			
10415.06	3	2720.8	2.3 *12*	7694.08	3⁻			
		2791.8	96 *3*	7623.11	(2⁻,3,4⁺)			
		2853.8	6.5 *6*	7561.17	4⁺			
		2948.6	33.9 *12*	7466.35	2⁺			
		2968.7	100.0 *23*	7446.23	3⁺,4⁺			
		3137.1	5.1 *8*	7277.82	(2,3)⁺			
		3301.2	9.0 *10*	7113.73	4⁻			
		3483.6	23.0 *12*	6931.29	3⁻			
		3506.2	90.2 *23*	6908.70	2⁺			
		3664.5	14.4 *6*	6750.41	2⁻			
		3832.3	7.7 *8*	6582.47	3⁻			
		3907.0	5.9 *9*	6507.87	4⁺			
		4129.7	2.1 *5*	6285.15	3⁻			
		4389.3	33.9 *17*	6025.47	2⁻			
		4785.3	4.7 *9*	5629.41	2⁺			
		4801.2	39.7 *17*	5613.52	4⁻			
		5135.9	15.5 *12*	5278.80	4⁺			
		5165.9	9.7 *10*	5248.79	2⁺			
		6510.1	20.1 *17*	3904.38	2⁺			
		6677.8	40.8 *23*	3736.69	3⁻			
10474	(8⁻)	1773		8701	(6⁻)			
10639.07	(3⁻,4,5⁻)	2504.2	3.1 *5*	8134.77	(3⁻)			
		3525.2	9.5 *7*	7113.73	4⁻			
		3707.6	100 *3*	6931.29	3⁻			
		4056.3	3.8 *5*	6582.47	3⁻			

$^{40}_{20}Ca_{20}$-40

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]
10639.07	(3$^-$,4,5$^-$)	4096.1	6.89 *24*	6542.80	4$^+$	
		4131.0	9.5 *5*	6507.87	4$^+$	
		5025.2	32.3 *14*	5613.52	4$^-$	
		5359.9	10.5 *10*	5278.80	4$^+$	
		6147.1	8.6 *7*	4491.43	5$^-$	
		6901.7	53.4 *24*	3736.69	3$^-$	
10699.50	3	2325.5	2.0 *3*	8373.94	4$^+$	
		2607.8	1.40 *18*	8091.61	2$^+$	
		3167.1	2.0 *3*	7532.26	2$^-$	
		3233.0	1.8 *4*	7466.35	2$^+$	
		3253.1	1.8 *3*	7446.23	3$^+$,4$^+$	
		3790.6	5.1 *4*	6908.70	2$^+$	
		4156.5	3.9 *4*	6542.80	4$^+$	
		4414.1	2.7 *4*	6285.15	3$^-$	
		4669.5	7.4 *6*	6029.71	3$^+$	
		5069.7	10.7 *6*	5629.41	2$^+$	
		5085.6	3.9 *4*	5613.52	4$^-$	
		5420.3	17.9 *10*	5278.80	4$^+$	
		6794.5	100 *3*	3904.38	2$^+$	
		6962.2	16 *3*	3736.69	3$^-$	
10737.7	1$^-$	3043.4	17 *3*	7694.08	3$^-$	
		3828.8	8 *3*	6908.70	2$^+$	
		4452.3	14.2 *24*	6285.15	3$^-$	
		10736.2	100 *6*	0.0	0$^+$	
10747.8	(4$^+$)	5118.0	14.8 *11*	5629.41	2$^+$	
		6842.8	100.0 *12*	3904.38	2$^+$	
		7010.5	3.8 *7*	3736.69	3$^-$	
10770.2	(1$^+$)	3656.3	7.9 *17*	7113.1	1$^-$	
		3861.3	14.3 *17*	6908.70	2$^+$	
		5521.0	100 *5*	5248.79	2$^+$	
		10768.6	76 *5*	0.0	0$^+$	
10895	(9$^-$)	1862		9033?	(7$^-$)	(Q)
10910.0	(3,4,5$^-$)	7172.6	100	3736.69	3$^-$	
10921.1	(2$^+$,3,4$^-$)	4895.3	20	6025.47	2$^-$	
		5641.9	100	5278.80	4$^+$	
10956.0	3$^-$	2768.2	11	8187.5	(3,4,5$^-$)	
		3474.8	23	7481?		
		5053.0	23	5902.63	1$^-$	
		5342.1	18	5613.52	4$^-$	
		5676.8	100	5278.80	4$^+$	
		7218.6	57	3736.69	3$^-$	

$^{40}_{20}Ca_{20}$-41

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]
10988.0	(3$^-$,4$^+$)	2010[&]	12	8978	5$^+$,6$^+$,7$^+$	
		4079.1	12	6908.70	2$^+$	
		4702.6	25	6285.15	3$^-$	
		5358.2	25	5629.41	2$^+$	
		7083.0	100	3904.38	2$^+$	
		7250.6	88	3736.69	3$^-$	
10994.7	(2$^+$,3,4$^+$)	5715.5		5278.80	4$^+$	
		5745.3		5248.79	2$^+$	
		7257.3		3736.69	3$^-$	
11003.0	(10$^+$)	1698		9305.2	(8$^+$)	(Q)
		2902		8100.1	8$^+$	(Q)
11011.0	3$^-$	2672.9	27 *7*	8338.0	(2$^+$,3,4)	
		3334.3	16 *4*	7676.6	(6$^+$)	[E3]
		6519.0	100 *7*	4491.43	5$^-$	[E2]
		7273.6	29	3736.69	3$^-$	
		11009.4	14	0.0	0$^+$	[E3]
11042.0	(1$^-$ to 4$^+$)	7136.9		3904.38	2$^+$	
		7304.6		3736.69	3$^-$	
11070.6	(3,4$^+$)	5456.1	8	5613.52	4$^-$	
		5790.7	15	5278.80	4$^+$	
		5820.7	15	5248.79	2$^+$	
		7164.9	100	3904.38	2$^+$	
		7332.6	15	3736.69	3$^-$	
11078.4	1$^-$	11078		0.0	0$^+$	
11685.8	(10$^+$)	2381		9305.2	(8$^+$)	(Q)
		3585		8100.1	8$^+$	(Q)
11708.7	(9$^+$)	2773		8935.8	(7$^+$)	(Q)
11988	0$^+$	1666.5[@] *4*	75 *9*	10318.8	1$^+$	
		2119.5 *4*	100 *9*	9869.3	1$^+$,2$^+$	
12201.2	3$^-$	12202		0.0	0$^+$	[E3]
12331	2$^+$	12332		0.0	0$^+$	
12334.9	(10$^+$)	2481		9853.5	(8$^+$)	(Q)
		3030		9305.2	(8$^+$)	(Q)
12591.9	(10$^+$)	3287		9305.2	(8$^+$)	(Q)
		4491		8100.1	8$^+$	(Q)
12604		12602		0.0	0$^+$	
12668	1$^-$	9314		3352.62	0$^+$	
		12666		0.0	0$^+$	
12688		12686		0.0	0$^+$	
12875		9521		3352.62	0$^+$	
		12873		0.0	0$^+$	

$^{40}_{20}Ca_{20}$-42

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	Mult.[#]	Comments
12923	(11$^-$)	2028	10895	(9$^-$)		
12980		12978	0.0	0$^+$		
12996		9642	3352.62	0$^+$		
13086		13084	0.0	0$^+$		
13113		9759	3352.62	0$^+$		
		13111	0.0	0$^+$		
13115.1	(12$^+$)	1429	11685.8	(10$^+$)	(Q)	
		2112	11003.0	(10$^+$)	(Q)	
13194		9840	3352.62	0$^+$		
		13192	0.0	0$^+$		
13195	(10$^-$)	2300	10895	(9$^-$)		
13203		13201	0.0	0$^+$		
13289		9935	3352.62	0$^+$		
		13287	0.0	0$^+$		
13535.5	(11$^+$)	1827	11708.7	(9$^+$)	(Q)	
13822		13819	0.0	0$^+$		
13913		10559	3352.62	0$^+$		
		13910	0.0	0$^+$		
13993		10639	3352.62	0$^+$		
		13990	0.0	0$^+$		
14232.4	(12$^+$)	2547	11685.8	(10$^+$)	(Q)	
		3229	11003.0	(10$^+$)	(Q)	
15152.4	(13$^+$)	1617	13535.5	(11$^+$)	(Q)	
		2037	13115.1	(12$^+$)	(D)	
15267.1	(12$^+$)	2932	12334.9	(10$^+$)	(Q)	
15306	(13$^-$)	2383	12923	(11$^-$)		
15748.1	(12$^+$)	3156	12591.9	(10$^+$)	(Q)	
16529.4	(14$^+$)	2297	14232.4	(12$^+$)	(Q)	
		3414	13115.1	(12$^+$)	(Q)	
16579.7	(13$^+$)	3044	13535.5	(11$^+$)	(Q)	
17698.6	(14$^+$)	3466	14232.4	(12$^+$)	(Q)	
18054.6	(14$^+$)	3822	14232.4	(12$^+$)	(Q)	
18215?	(15$^-$)	2909[&]	15306	(13$^-$)		
18260	1	18256	0.0	0$^+$	D	Mult.: from $\gamma(\theta)$ in (p,γ).
18497.2	(14$^+$)	3230	15267.1	(12$^+$)	(Q)	
18680	1	18675	0.0	0$^+$	D	
18719.2	(14$^+$)	3452	15267.1	(12$^+$)	(Q)	
19070	1	19065	0.0	0$^+$	D	
19195.6	(15$^+$)	4043	15152.4	(13$^+$)	(Q)	
19450	1	19445	0.0	0$^+$	D	
19850	1	19845	0.0	0$^+$	D	

$^{40}_{20}Ca_{20}$-43

Adopted Levels, Gammas (continued)

γ(^{40}Ca) (continued)

E_i(level)	J_i^π	E_γ †	E_f	J_f^π	Mult.#
20130		20125	0.0	0^+	
20430	1	20424	0.0	0^+	D
20578.6	(16^+)	4049	16529.4	(14^+)	(Q)
20650	1	20644	0.0	0^+	D
20940	1	20934	0.0	0^+	D
21490		21484	0.0	0^+	
21690		21684	0.0	0^+	
22060		22053	0.0	0^+	
22060.4	(16^+)	3563	18497.2	(14^+)	(Q)

† Values with uncertainties are averaged values from different γ-ray studies. A large number of values without uncertainties are from ^{39}K(p,γ), which are from level-energy differences since most γ-ray energies are not available. In ^{39}K(p,γ), many γ rays are shown with upper limits on intensities, these are not given here. See ^{39}K(p,γ) for details.

‡ Averaged values from different γ-ray studies if available, but most values are available only from ^{39}K(p,γ).

From γ(θ) in (HI,xnγ) and (p,p′γ), unless otherwise noted.

@ Poor fit. Level-energy difference=1669.2.

& Placement of transition in the level scheme is uncertain.

$^{40}_{20}Ca_{20}$-44

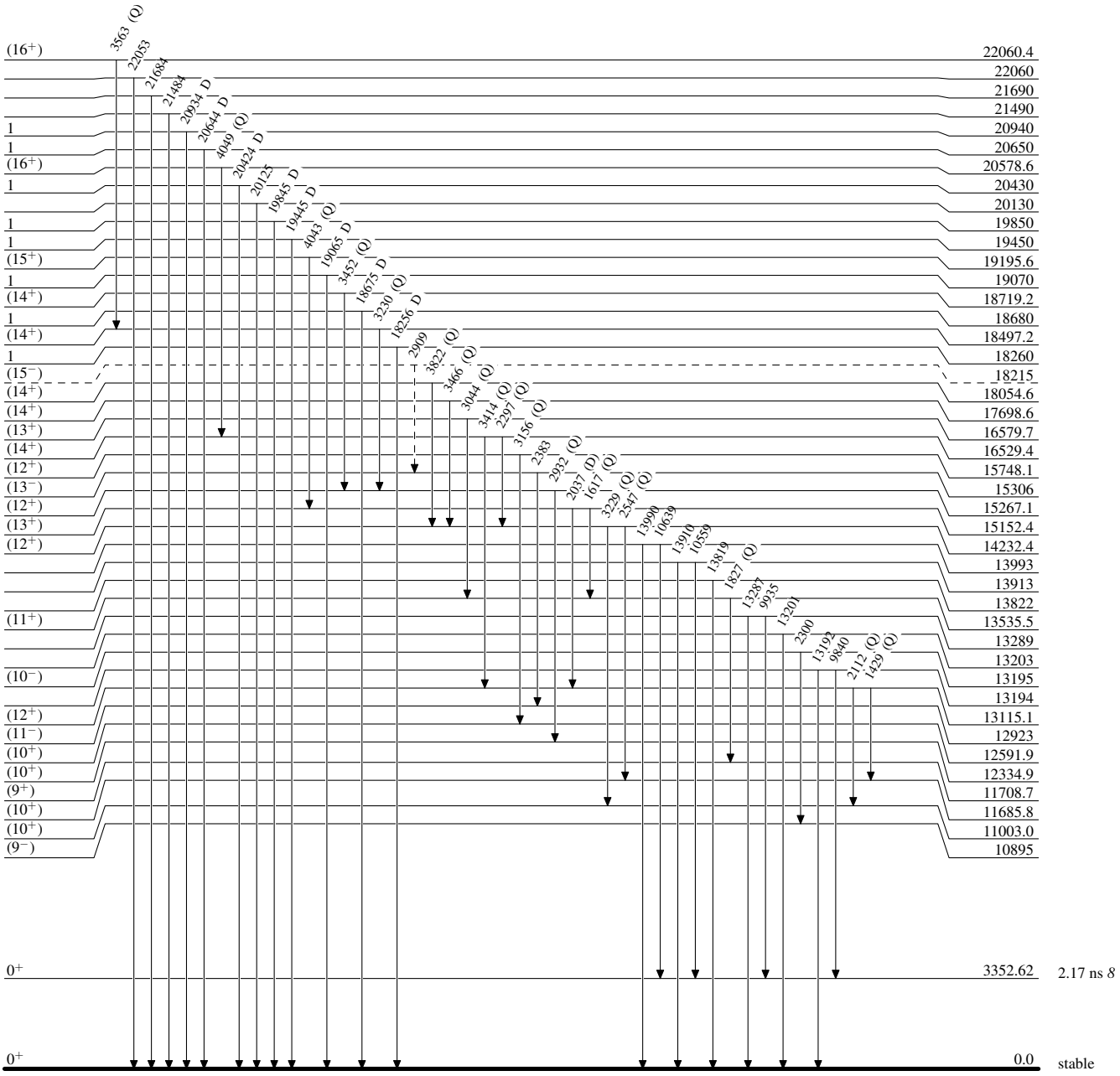
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

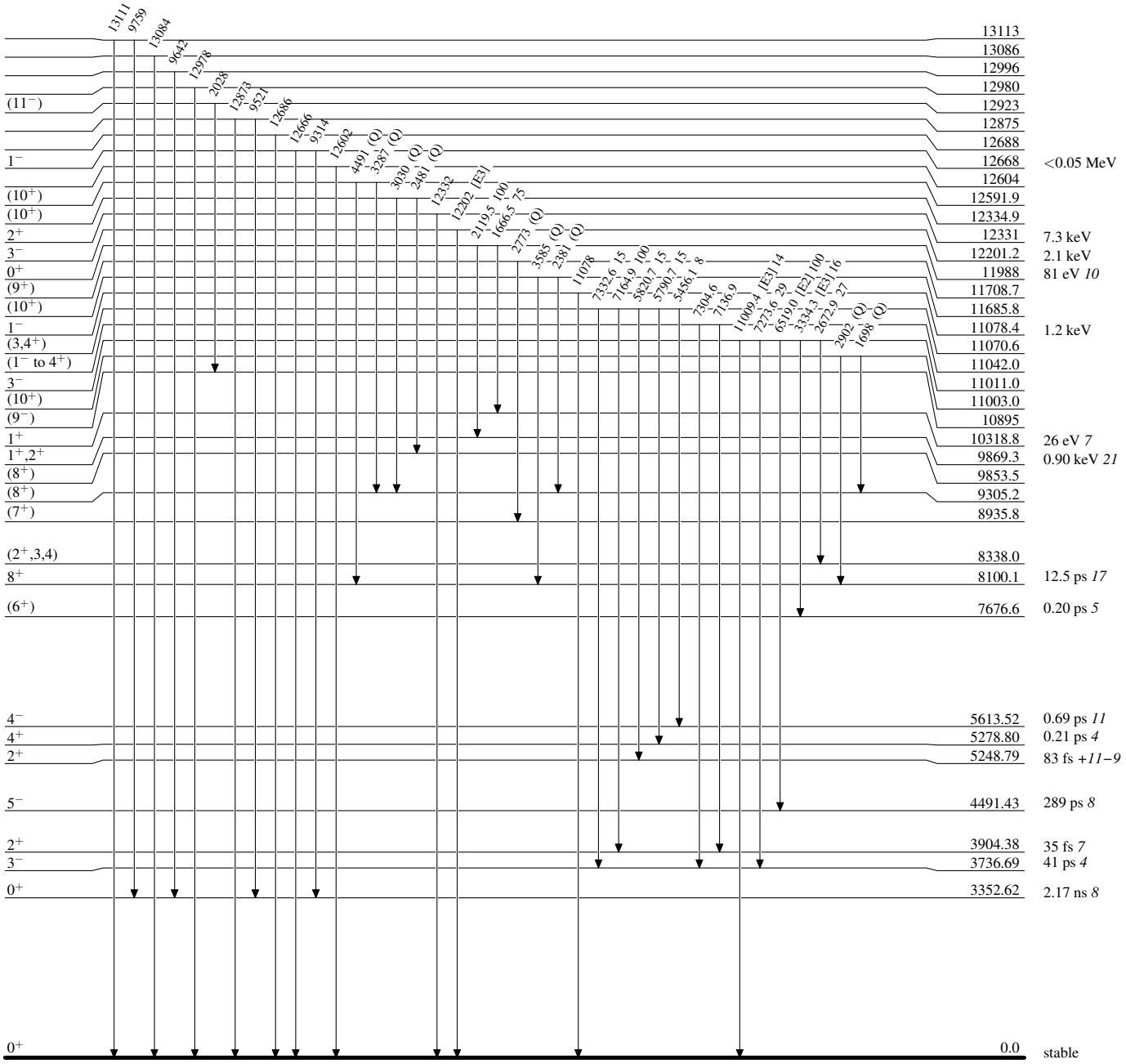


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{40}_{20}Ca_{20}$

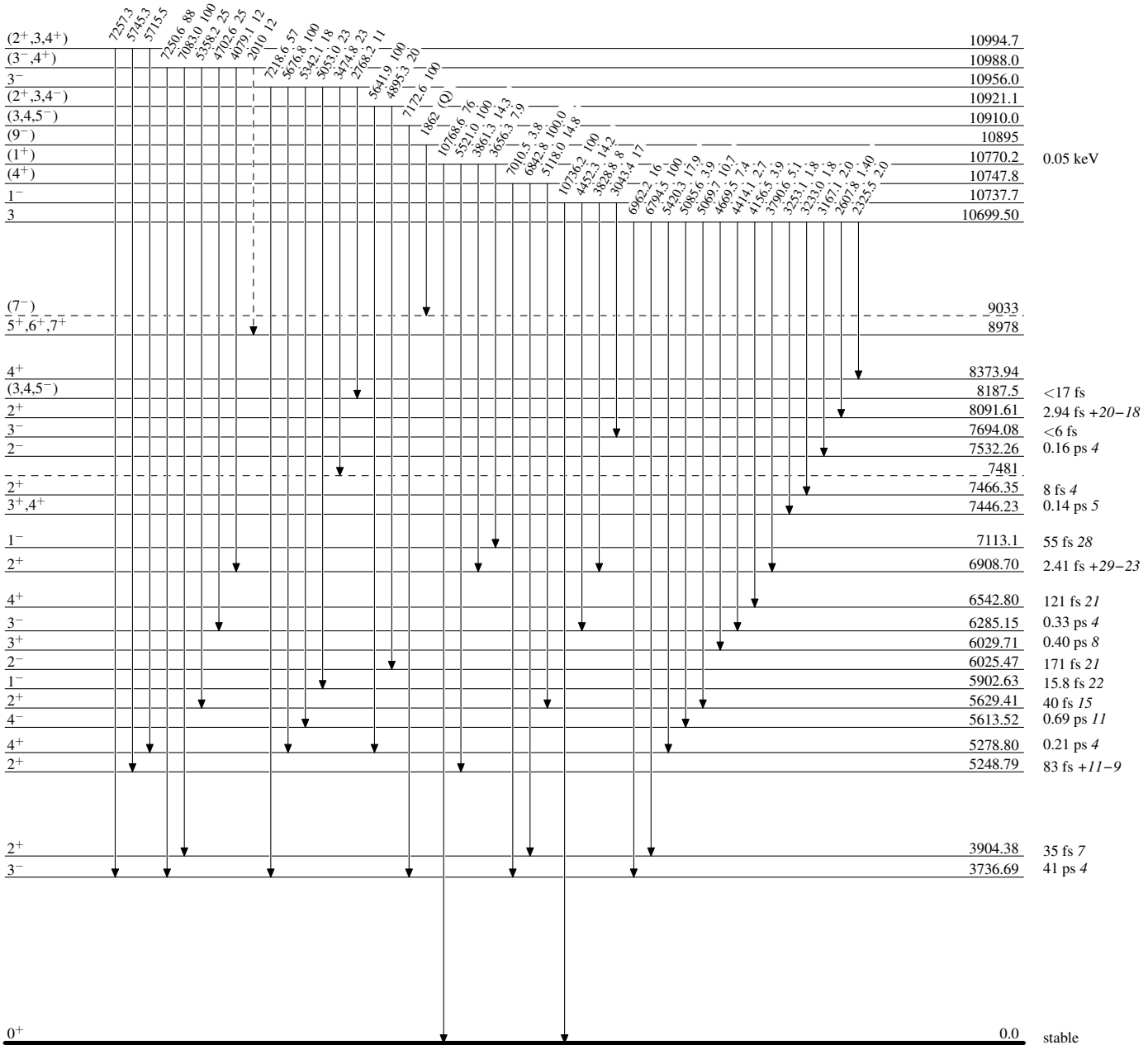
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

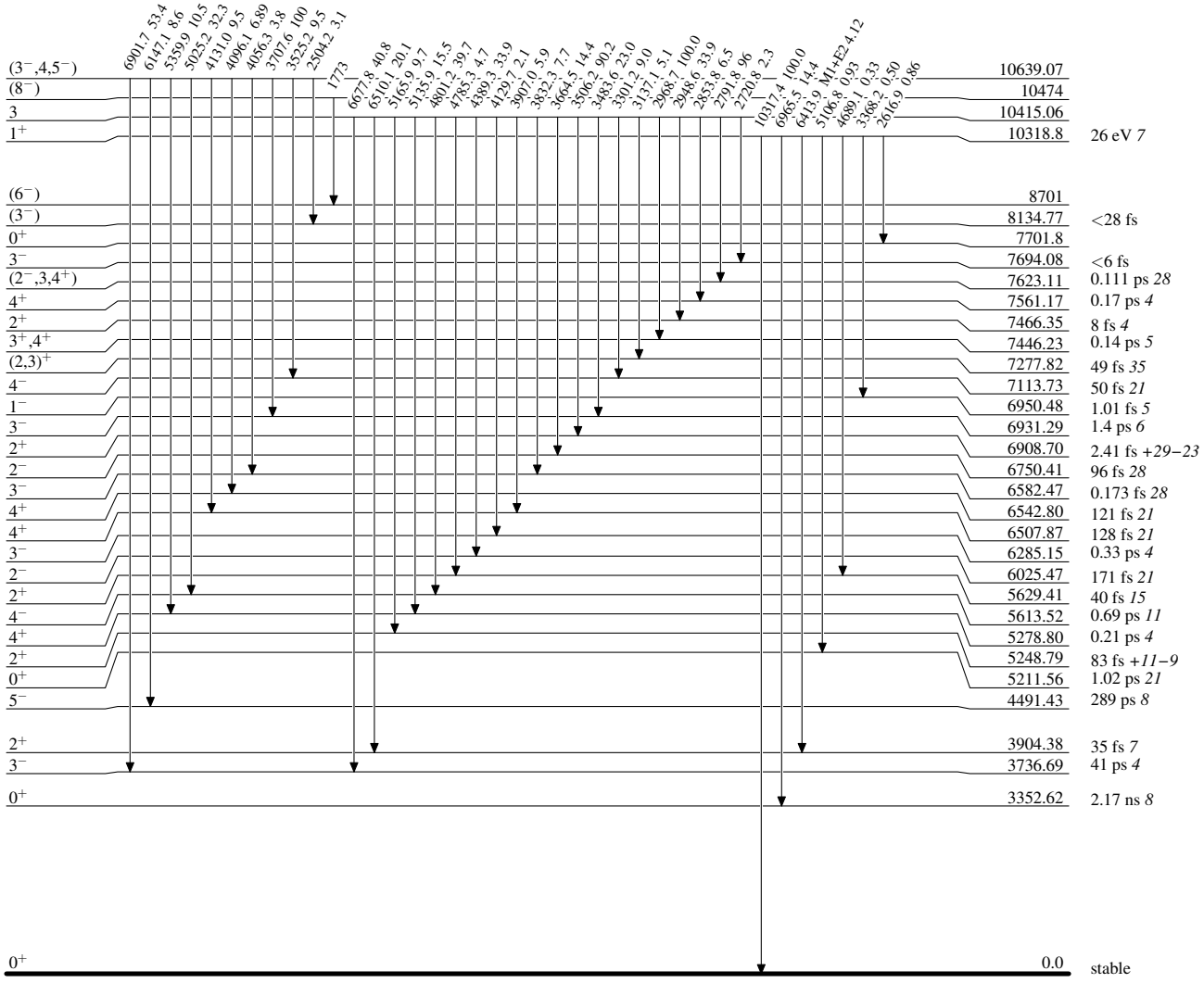


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

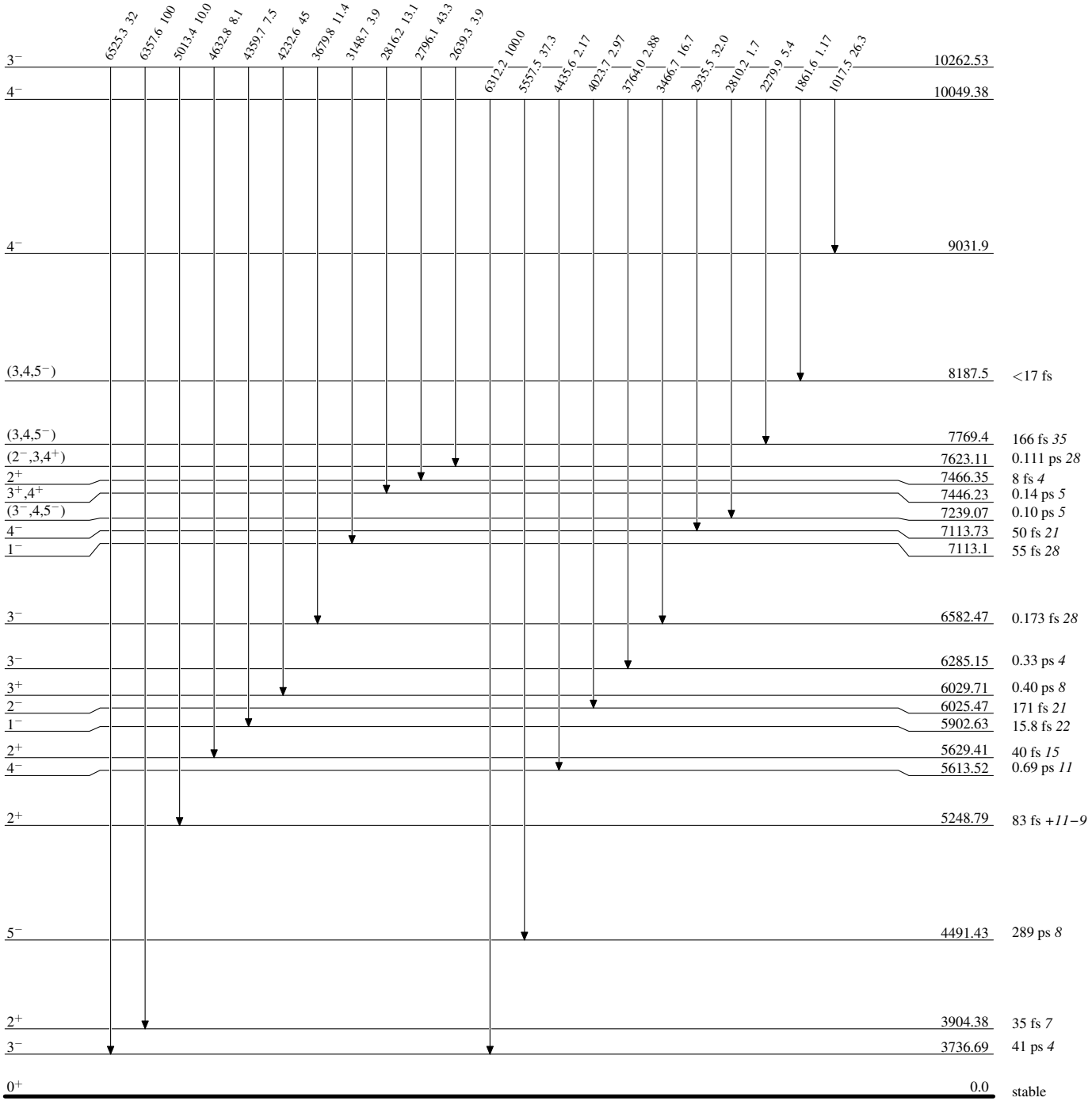


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

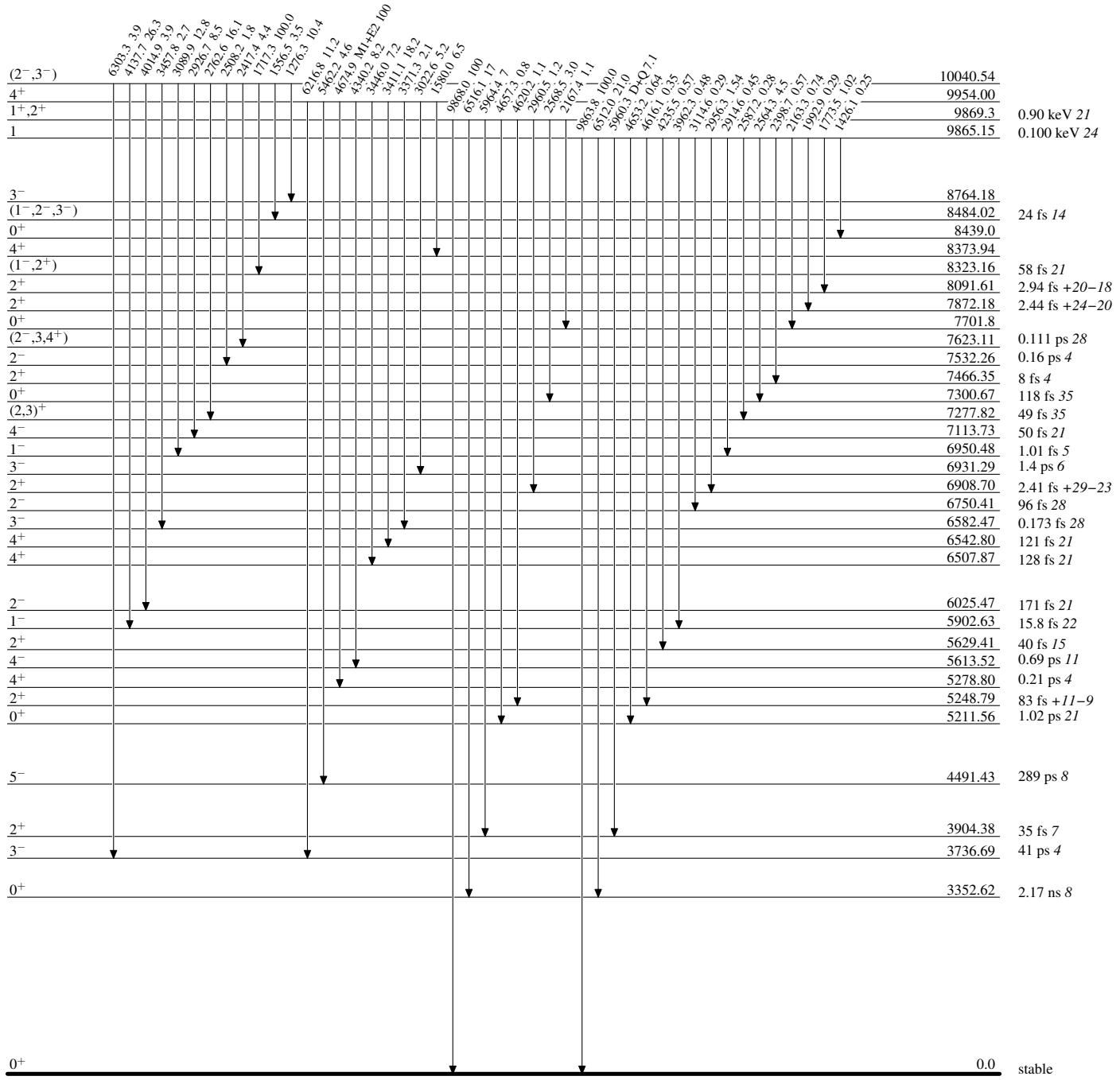


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

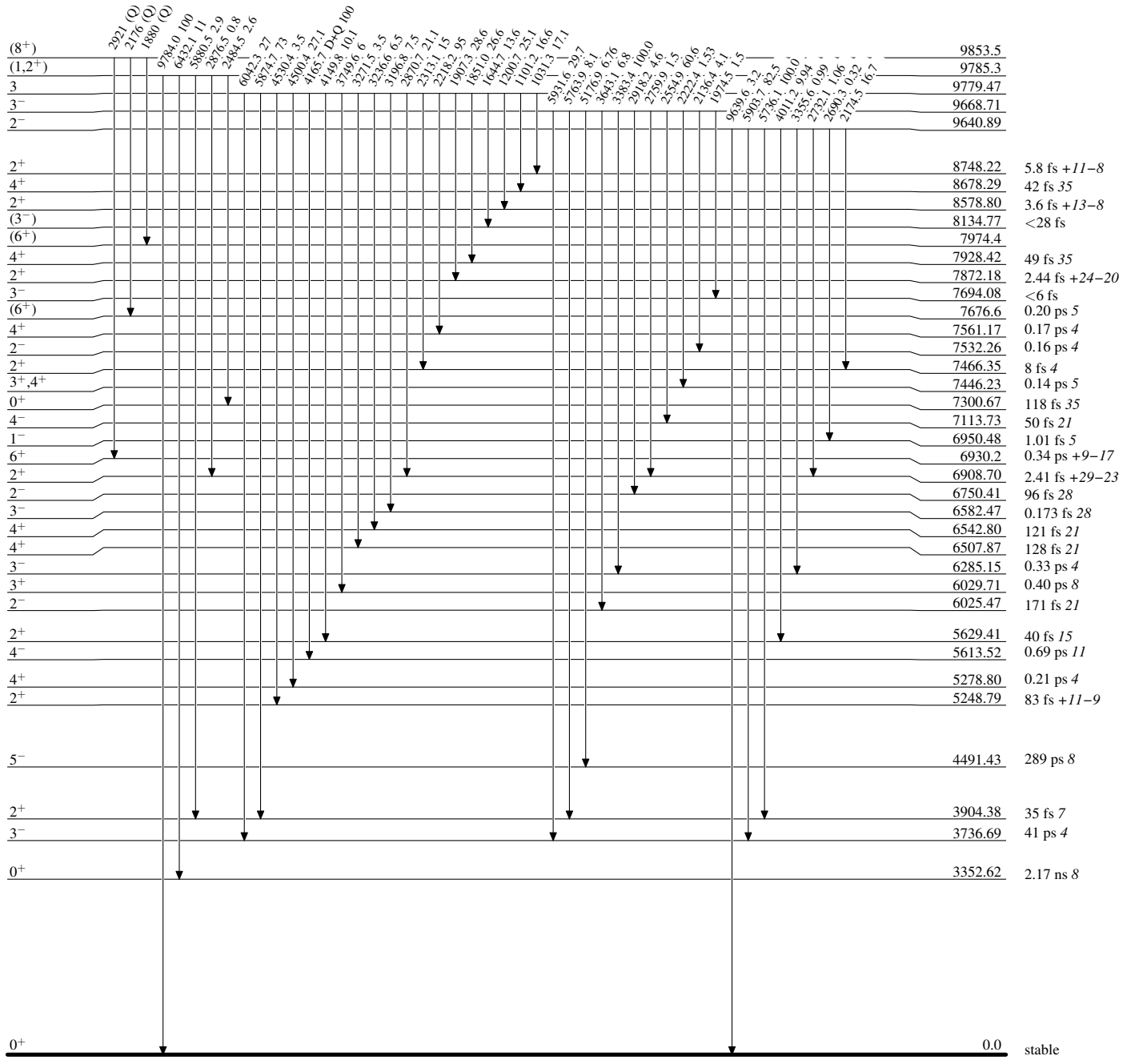


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

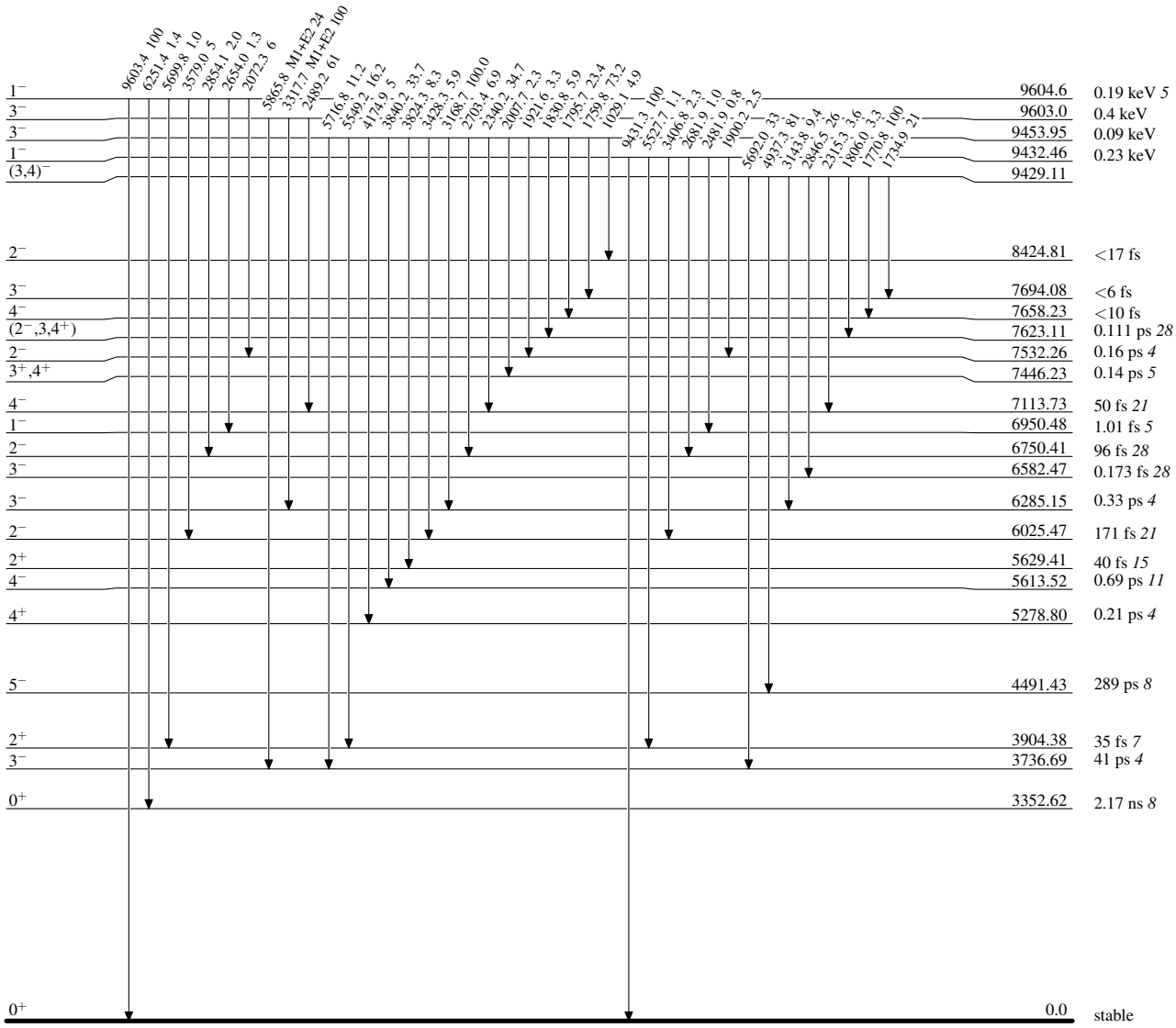


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

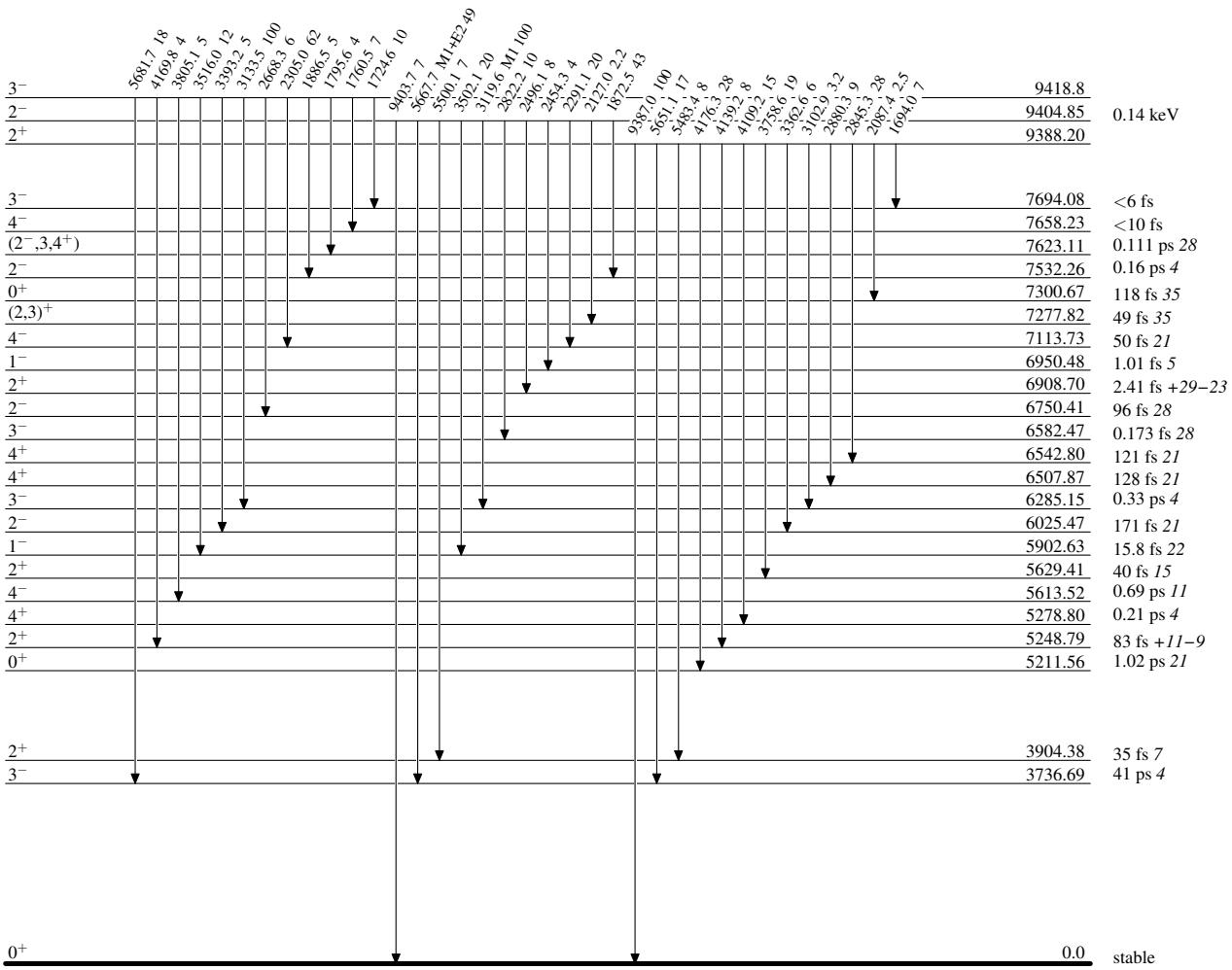


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

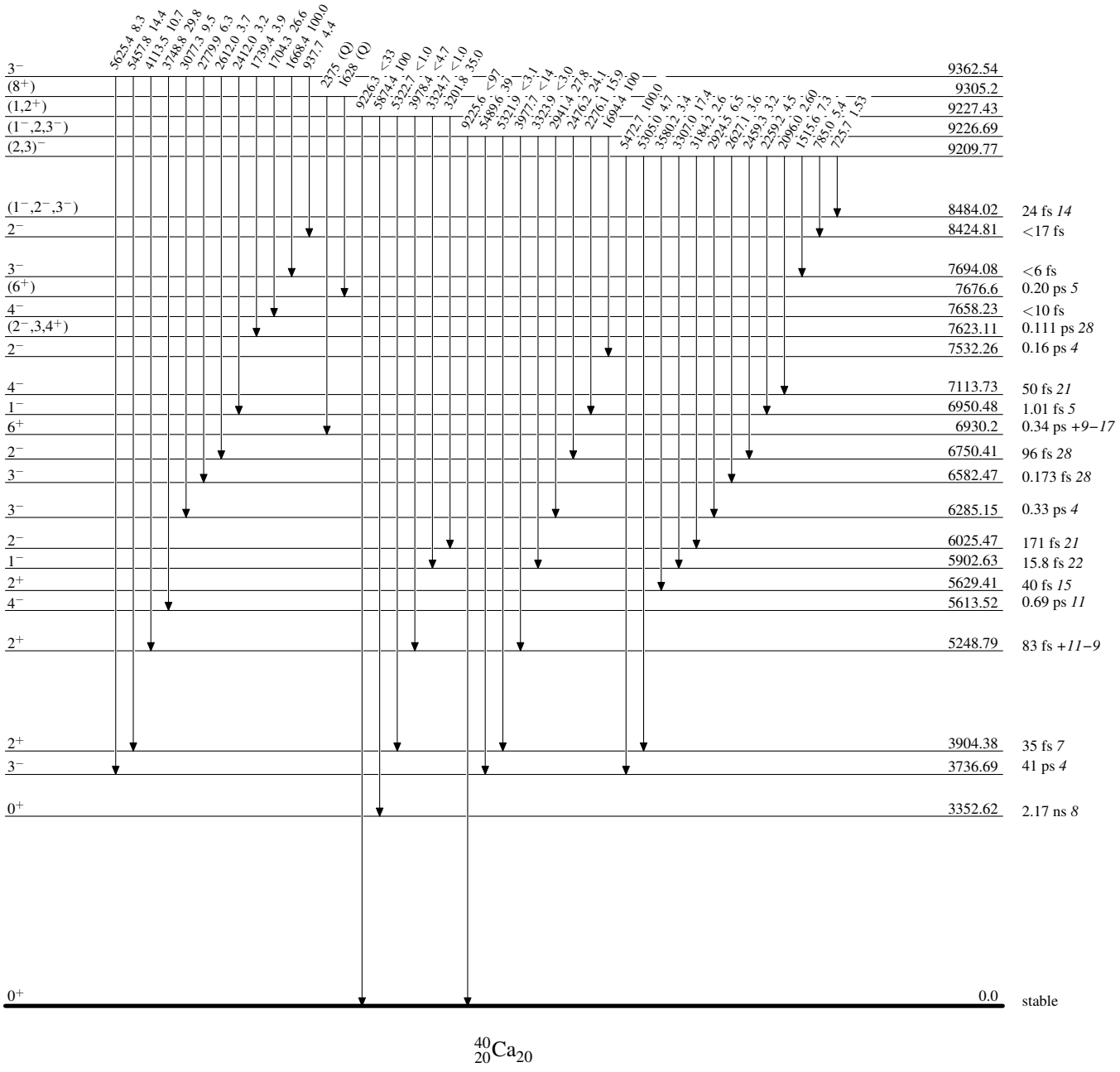


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

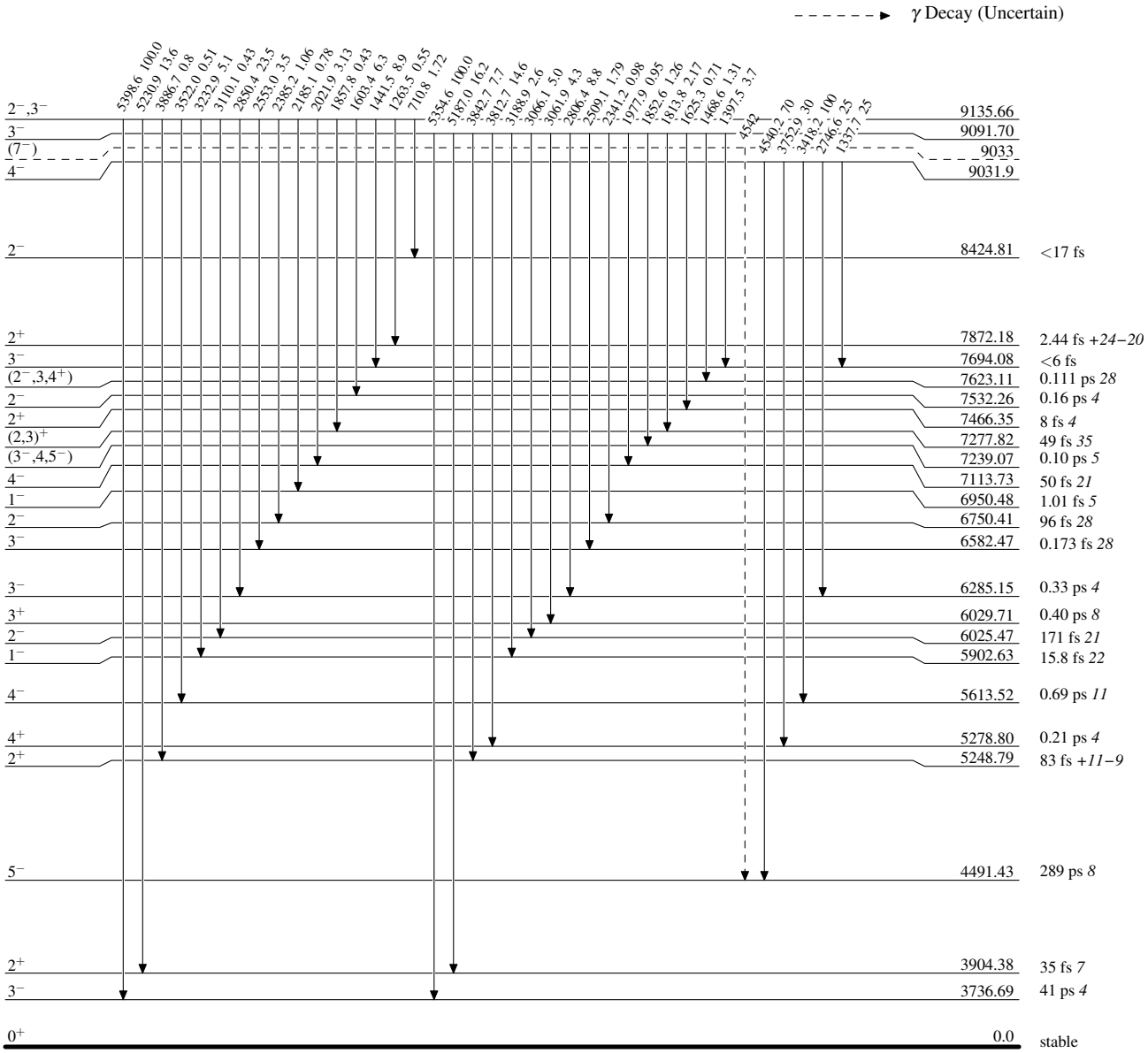


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

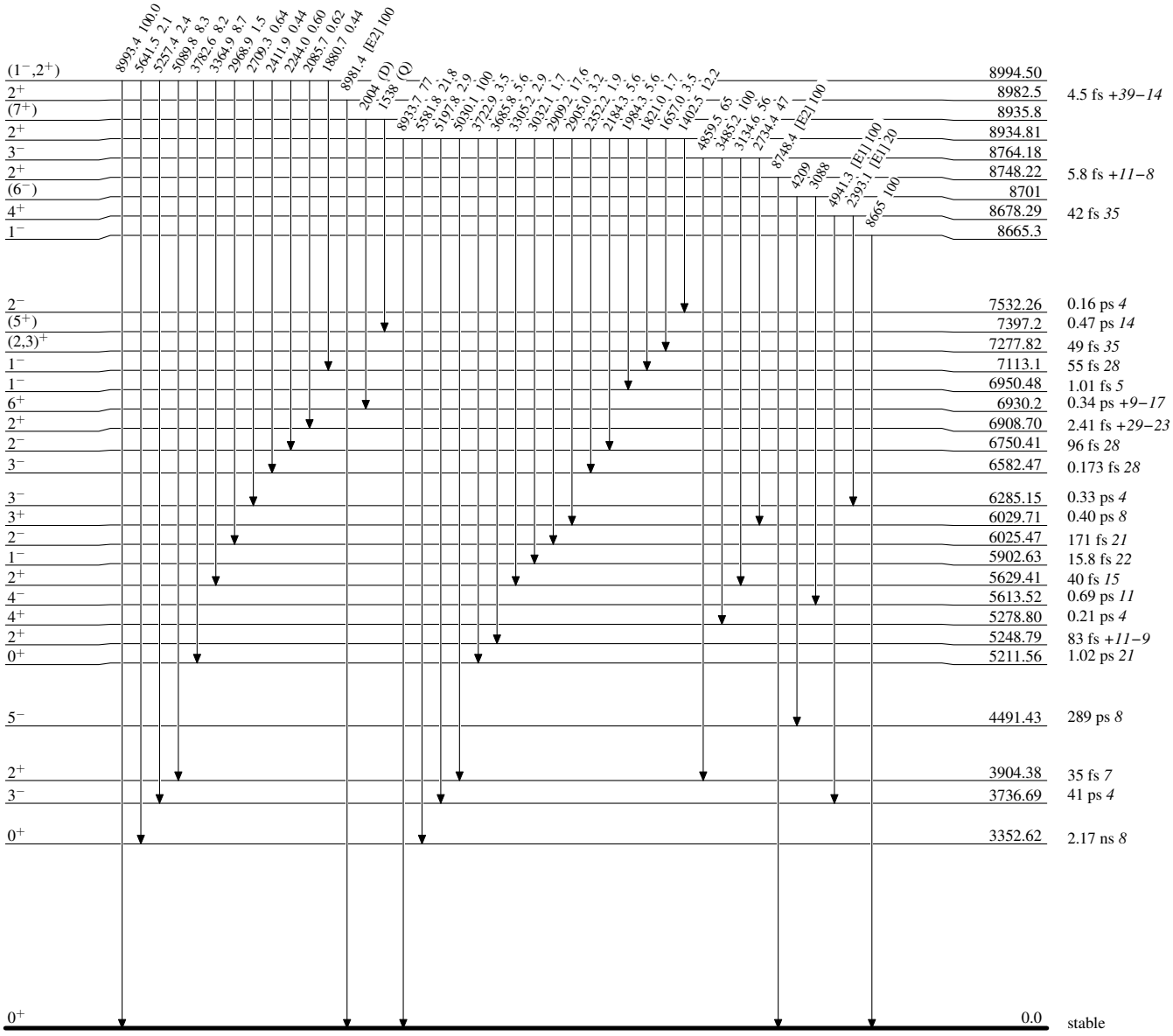


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{40}_{20}Ca_{20}$

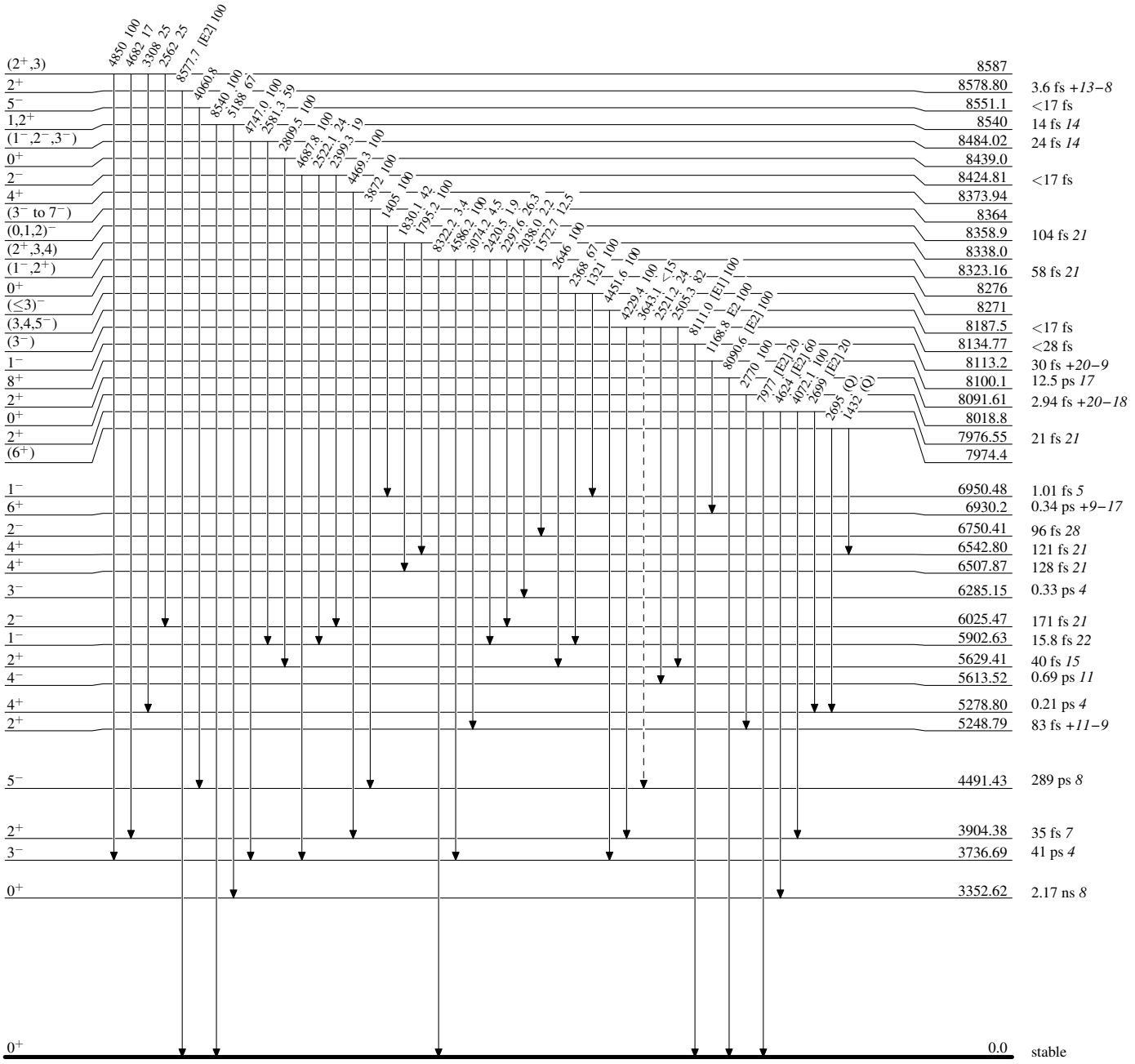
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)

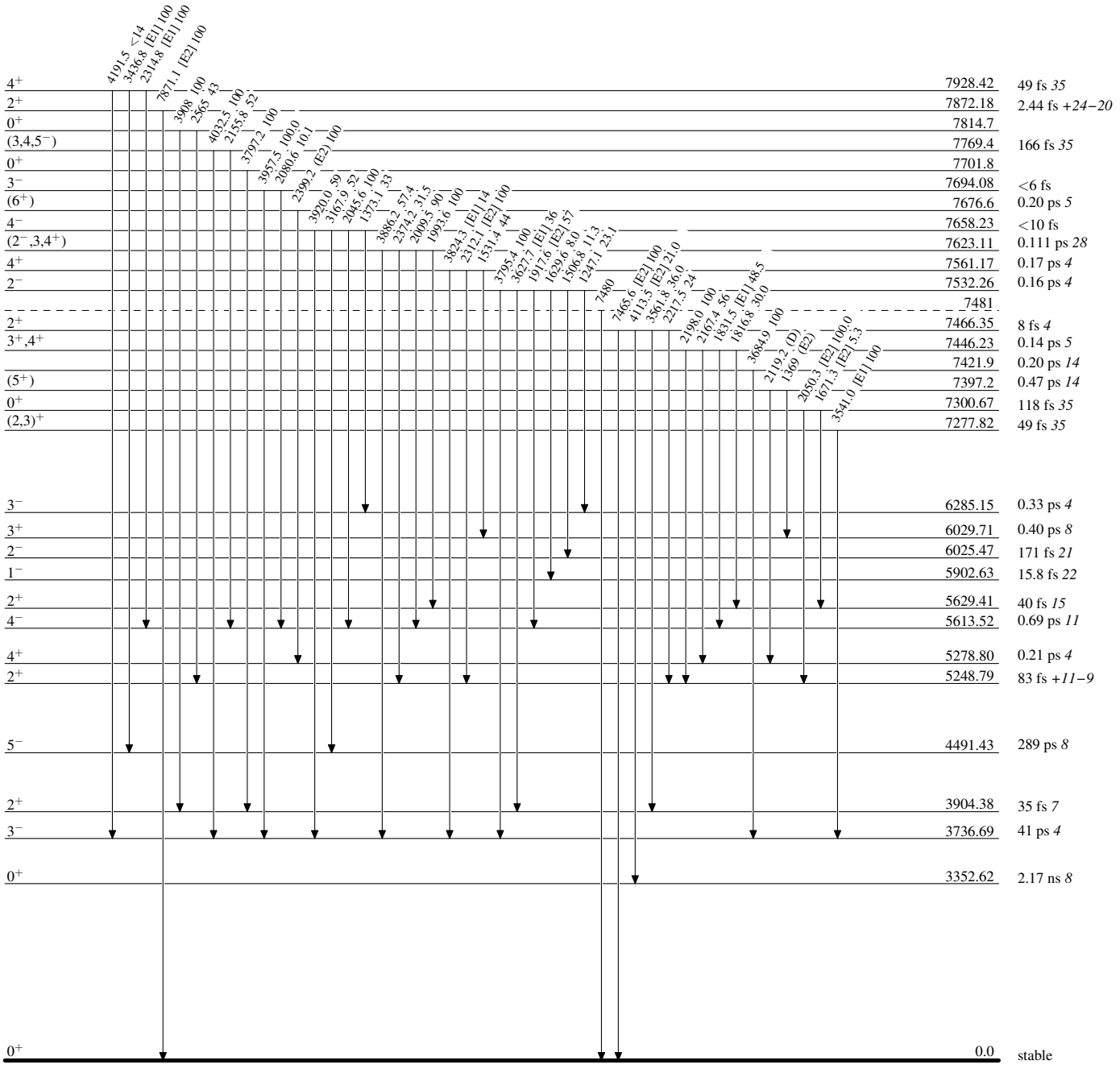


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{40}_{20}Ca_{20}$

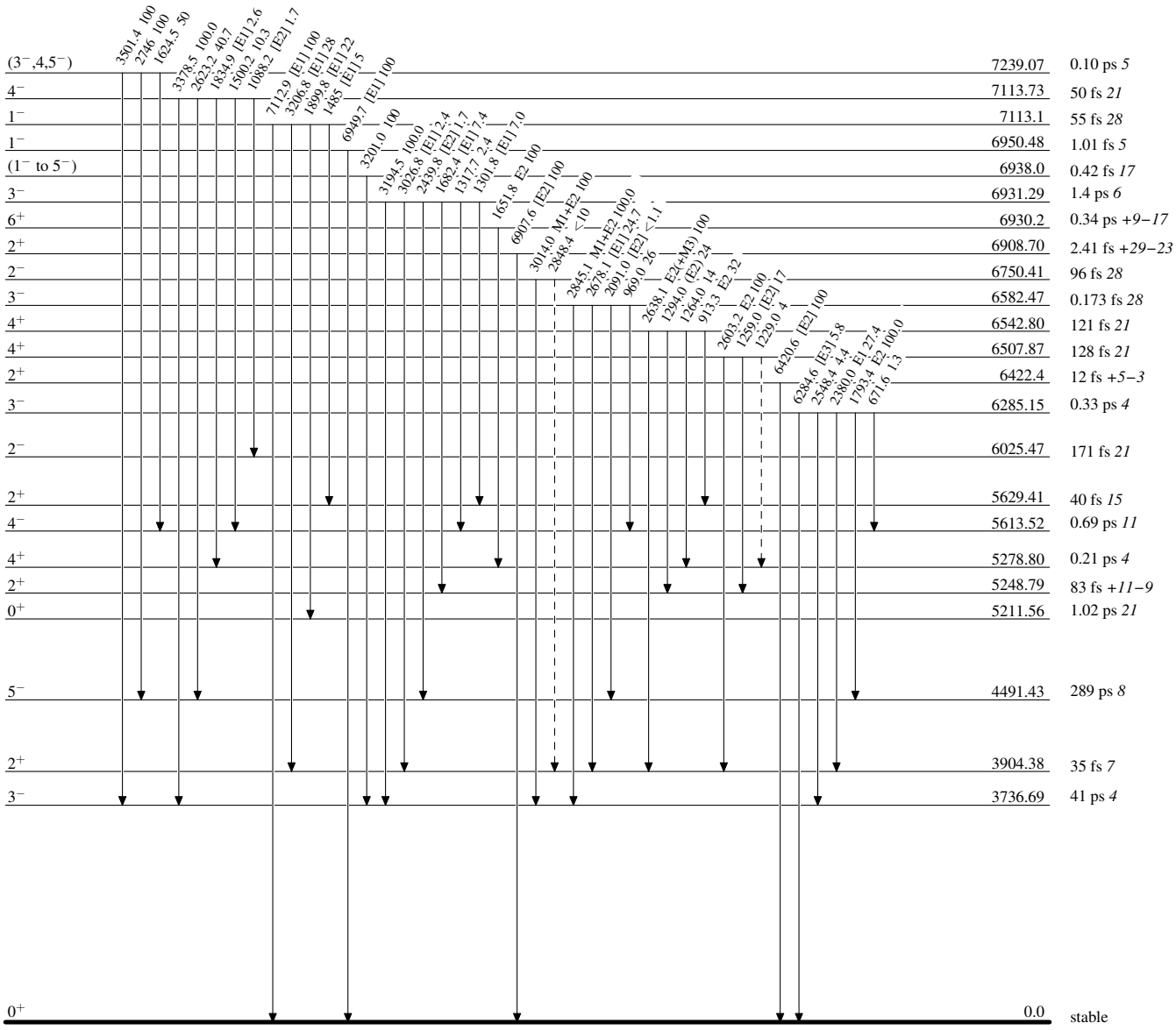
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)

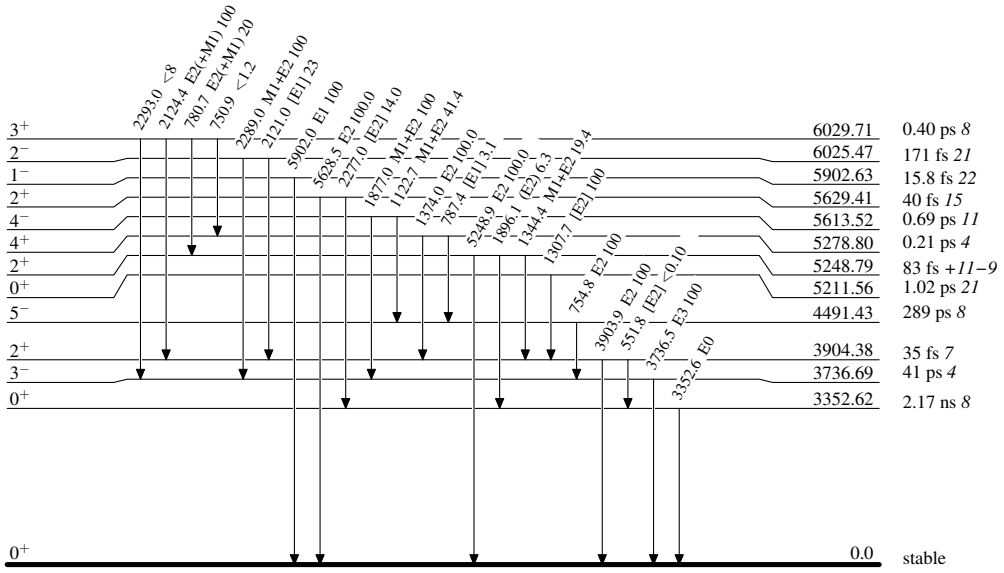


$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas

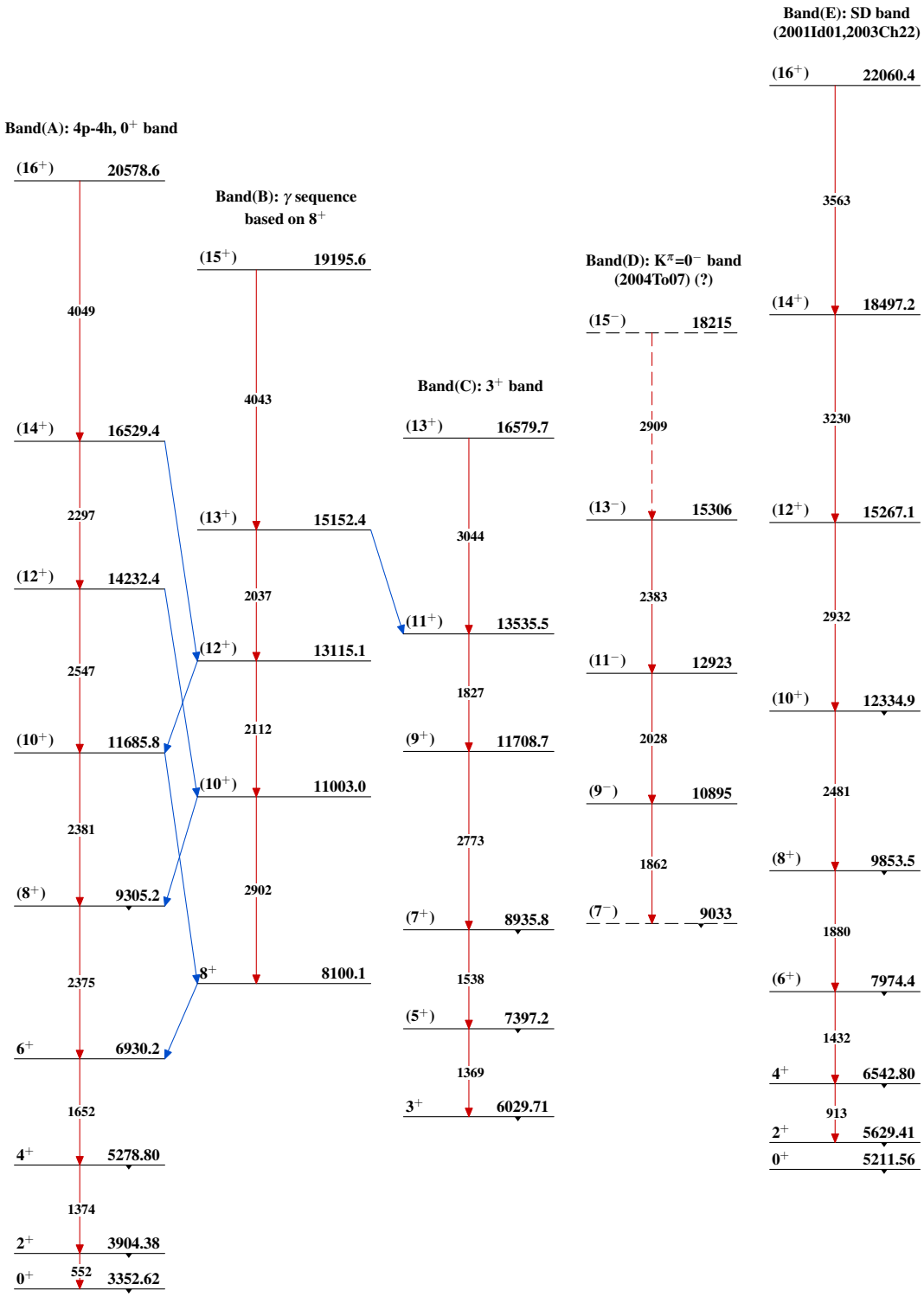
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{40}_{20}Ca_{20}$

Adopted Levels, Gammas



$^{40}_{20}Ca_{20}$