^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

1987Fr09: E=12 MeV α beam was produced from the 6 MV Van de Graaff accelerator of the NAC at Faure. Target of natural CaO on a thin carbon backing. γ-rays were detected by Ge(Li) detectors and protons were detected at forward angles by two surface barrier detectors. Measured Eγ, Iγ, pγ-coin. Deduced levels, γ-branching ratios, mixing ratios, $T_{1/2}$ by DSAM.

1972Ba04, 1970Ba51: E=7-12 MeV (1972Ba04), E=11.8-15.5 MeV (1970Ba51) α beam was produced from the Chalk River MP Tandem accelerator. Targets of 400 μg/cm^2 natural Ca on thick gold backings. γ-rays were detected in a 44 cm^3 Ge(Li) detector inside a split annular NaI(Tl) detector and protons were detected by an annular surface barrier detector. Measured Eγ, Iγ, p$\gamma(\theta)$, pγ-coin. Deduced levels, J, π, mixing ratios, γ-branching ratios, $T_{1/2}$ by DSAM.

1971Po03: E=9.5 MeV and 11.0 MeV α beam was produced from the Utrecht 2×6-MV tandem Van de Graaff, current of up to 0.25 μA. Target of natural $CaCO_3$ on a thick carbon backing. γ-rays were detected in a 36-cc Ge(Li) detector and protons by two silicon surface barrier detectors. Measured Eγ, pγ-coin. Deduced levels, $T_{1/2}$ by DSAM.

Others:

1987Ar18: E=20 MeV. Isomer production and decay.

1980ShZN: measured Eγ, Iγ, pγ coin, $\gamma(\theta)$, γ(lin pol), lifetimes by DSAM.: details of this work are not available.

1978Ha07: E=21 MeV. Measured g factor and lifetime of 19/2$^-$ state by $\gamma(\theta$,H,t) (TDPAD method).

1977Mi10: E=20 MeV. Measured g factor of 152 level by $\gamma(\theta$,H,t).

1974Br04 (also 1974BrYR): E=14.0 MeV. Measured lifetime of 2987 level by recoil-distance method.

1973Sa10: E=12.2, 13.2, 14.2 MeV. Measured Eγ, $\gamma\gamma$, lifetimes by Doppler-shift method.

1971Na10: E=19 MeV. Measured lifetime and g factor of 19/2$^-$ level by $\alpha\gamma(\theta$,H,t).

1971Ba92: E=10.6 MeV. Measured lifetime of four levels by recoil-distance method:

1970Sa24: E=10-26 MeV. Measured decay mode and lifetime of 19/2$^-$ level.

1970Fo06: E=7-12 MeV. Measured Eγ, $\gamma(\theta)$, lifetimes of four levels by Doppler-shift attenuation method.

1968Me14: E=10 MeV. Measured lifetime of 472 level by pγ(t).

1967Ph01: E=9.00, 9.35 MeV. Measured Eγ, $\gamma(\theta)$.

1967Cr08: E=9.5 MeV. Measured lifetime of 472 level by RDM.

1967Sc08: E=12 MeV. Measured Eγ, Iγ, pγ-coin. Deduced levels.

1966WaZW: measured ce, deduced α(K)(expt) and K/L ratios for 152γ and 472γ.

1965De15: E=22 MeV. Measured lifetime of 150-keV isomer.

1964Ho14: E=8 MeV. Also ^{43}Ca(p,nγ) E=6 MeV. Measured lifetime of the 150-keV isomer.

1964Sa26: measured Eγ, $\gamma\gamma$, deduced resonances.

^{43}Sc Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0	7/2$^-$		
151.6 *3*	3/2$^+$	438 μs *7*	g=+0.232 *4* (1977Mi10) $T_{1/2}$: 470 μs *20* (1965De15), 435 μs *7* (1964Ho14).
471.9 *2*	3/2$^-$	158 ps *13*	$T_{1/2}$: 152 ps *21* (RDM,1971Ba92), 360 ps *104* (RDM,1967Cr08), 157 ps *13* (1968Me14), >7.6 ps (1971Po03).
843.9 *3*	5/2$^-$	0.17 ps *6*	$T_{1/2}$: 166 fs *35* (1971Po03), 0.31 ps *6* (1972Ba04), 76 fs *+69−42* (1987Fr09).
853.4 *9*	1/2$^+$	22 ps *3*	$T_{1/2}$: from 1971Ba92 by RDM. Others: >0.43 ps (1971Po03), >4.2 ps (1972Ba04).
879.9 *4*	5/2$^+$	4.2 ps *10*	$T_{1/2}$: from 1971Ba92 by RDM. Others: 4.0 ps *+18−10* (DSAM,1970Fo06, 1972Ba04), 0.56 ps *+19−13* (1971Po03), >1.73 ps (1987Fr09).
1158.0 *5*	3/2$^+$	4.4 ps *10*	$T_{1/2}$: from 1971Ba92 by RDM. Others: 2.1 ps *+25−8* (1971Po03); 236 fs *+388−125* (1987Fr09), 3.5 ps *+14−8* (1972Ba04).
1177.0 *8*	3/2$^-$	0.49 ps *14*	$T_{1/2}$: 0.34 ps *+16−11* (1971Po03), 0.59 ps *10* (1972Ba04).
1336.8 *2*	7/2$^+$	0.83 ps *35*	$T_{1/2}$: 1.39 ps *28* (DSAM,1970Fo06,1972Ba04), 0.58 ps *+24−14* (1971Po03).
1406.1 *3*	7/2$^-$	0.19 ps *6*	$T_{1/2}$: 166 fs *31* (1971Po03); 0.27 ps *4* (1972Ba04), 159 fs *+118−55* (1987Fr09).
1650.3 *6*	5/2$^+$	0.17 ps *3*	$T_{1/2}$: 204 fs *+87−65* (1971Po03), 0.159 ps *35* (1972Ba04).
1810.7 *8*	3/2$^-$	<55 fs	$T_{1/2}$: from 1972Ba04.
1829.3 *3*	11/2$^-$	0.20 ps *3*	$T_{1/2}$: 80 fs *+104−74*; 211 fs *44* (1971Po03); 0.26 ps *4* (1972Ba04), 132 fs *+69−42* (1987Fr09).

Continued on next page (footnotes at end of table)

^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03 (continued)

^{43}Sc Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	Comments
1882.3 *5*	(5/2,9/2)$^-$	35 fs *17*	T$_{1/2}$: <21 fs; 57 fs *+42−36* (1971Po03); 0.055 ps *21* (1972Ba04), 17 fs *14* (1987Fr09). J$^{\pi}$: 7/2 choice does not seem allowed from p$\gamma(\theta)$ (1970Ba51).
1930.6 *5*	9/2$^+$	2.4 ps *6*	T$_{1/2}$: from DSAM (1970Fo06,1972Ba04). Others: 0.83 ps +∞−50; 1.0 ps *+27−4* (1971Po03); >1.39 ps (1987Fr09).
1962.5 *5*	(3/2,5/2)$^-$	<83 fs	T$_{1/2}$: from 1987Fr09, 1972Ba04. J$^{\pi}$: 5/2 is preferred in p$\gamma(\theta)$ (1970Ba51).
2093.9 *12*	3/2$^-$	0.33 ps *9*	T$_{1/2}$: 0.34 ps *+15−10* (1971Po03), 0.32 ps *9* (1972Ba04).
2105.7 *5*	(3/2,5/2)	0.21 ps *7*	T$_{1/2}$: 121 fs *+69−42* (1987Fr09), 0.28 ps *6* (1972Ba04).
2141.2 *6*	(3/2$^-$,5/2$^+$)	0.21 ps *4*	T$_{1/2}$: 0.19 ps *+11−9* (1971Po03); 0.24 ps *10* (1972Ba04), 159 fs *+395−111* (1987Fr09).
2242.6 *4*	(3/2,5/2,7/2)$^-$	0.19 ps *9*	T$_{1/2}$: 0.30 ps *11* (1972Ba04), 194 fs *+118−63* (1987Fr09).
2288.8 *4*	5/2$^-$	<21 fs	T$_{1/2}$: from 1972Ba04. Other: <2.1 fs (1987Fr09).
2335.4 *4*	5/2$^-$	28 fs *14*	T$_{1/2}$: from 1987Fr09. Other: <0.042 ps (1972Ba04).
2382.1 *11*	3/2$^{(+)}$	>0.31 ps	T$_{1/2}$: from 1987Fr09.
2458.6 *5*	(5/2 to 9/2)$^-$	38 fs *14*	T$_{1/2}$: from 1987Fr09. Other: <0.042 ps (1972Ba04).
2550.7 *6*	11/2$^+$	0.51 ps *7*	T$_{1/2}$: from DSAM (1970Fo06,1972Ba04). Other: 270 fs *+242−111* (1987Fr09).
2579.9 *4*	(5/2)	0.19 ps *+19−9*	T$_{1/2}$: from 1987Fr09.
2635.5 *7*	9/2$^-$,11/2$^-$	0.21 ps *7*	T$_{1/2}$: from 1972Ba04. Other: 520 fs *+1143−243* (1987Fr09).
2650.5 *16*			
2669 *2*	3/2$^-$		
2762.2 *4*	(5/2 to 9/2)$^-$	<28 fs	T$_{1/2}$: from 1987Fr09. Other: <0.042 ps (1972Ba04).
2795.2 *5*		0.28 ps *+21−10*	T$_{1/2}$: from 1987Fr09.
2810.7 *8*	(5/2,7/2,9/2)	<62 fs	T$_{1/2}$: from 1987Fr09. Other: <0.083 ps (1972Ba04).
2840.0 *5*	(5/2,7/2)$^+$		
2846			
2862.7 *18*	(1/2,3/2,5/2)$^+$		
2984.1 *8*	(3/2,5/2)	62 fs *28*	T$_{1/2}$: from 1972Ba04. Other: 97 fs *+159−73* (1987Fr09).
2987.6 *4*	15/2$^-$	5.6 ps *7*	T$_{1/2}$: from 1974Br04, other: >0.55 ps (1987Fr09).
3123.2 *3*	19/2$^-$	473 ns *5*	g=+0.3286 *7* (1978Ha07) T$_{1/2}$: from 1978Ha07. Others: 450 ns *14* (1971Na10), 0.5 μs *1* (1970Sa24). g: other: +0.331 *2* (1971Na10).
3139.9 *7*	13/2$^+$	>0.55 ps	T$_{1/2}$: from 1987Fr09.
3158.8 *13*	(3/2$^-$,5/2,7/2$^+$)	<0.42 ps	T$_{1/2}$: from 1987Fr09.
3197.6 *18*		<0.28 ps	T$_{1/2}$: from 1987Fr09.
3264.0 *6*	(7/2,9/2)$^-$	42 fs *+28−21*	T$_{1/2}$: from 1987Fr09.
3293.7 *6*	7/2$^-$	>55 fs	T$_{1/2}$: from 1987Fr09.
3334 *1*		0.13 ps *+12−7*	T$_{1/2}$: from 1987Fr09.
3375.2 *5*	(7/2,9/2)$^-$	<62 fs	T$_{1/2}$: from 1987Fr09.
3451.2 *9*	5/2$^+$	<2.1 fs	T$_{1/2}$: from 1987Fr09.
3463.3 *14*	5/2$^-$		
4157			E(level): from 1970Ba51 only.

[†] From 1987Fr09.
[‡] From Adopted Levels.
[#] Weighted averages of values given in comments, unless otherwise stated.

^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03 (continued)

$\gamma(^{43}Sc)$

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	Comments
151.6	3/2$^+$	151.6	100	0.0	7/2$^-$	M2		0.0406	Mult.: from α(K)(expt)=0.031 *2*, K/L(expt)=9.0 *7* (1966WaZW).
471.9	3/2$^-$	320.3	4 *2*	151.6	3/2$^+$				Additional information 1.
		471.9	96	0.0	7/2$^-$	E2			Mult.: from α(K)(expt)=7.7×10^{-4} *19* (1966WaZW).
									A_2=+0.075 *34* (1967Ph01).
843.9	5/2$^-$	692.3	<4	151.6	3/2$^+$				
		843.9	100	0.0	7/2$^-$	M1+E2	+0.11 *2*		δ: average of +0.09 *2* (1987Fr09), +0.12 *3* (1970Ba51). Other: 0.13 (1967Ph01).
									A_2=−0.30 *3* (1967Ph01).
853.4	1/2$^+$	381.5	30 *6*	471.9	3/2$^-$				Iγ(383)/Iγ(703)=25/75 (1987Fr09).
		701.8	70 *6*	151.6	3/2$^+$				
879.9	5/2$^+$	728.3	100	151.6	3/2$^+$	M1+E2	−0.61 *24*		δ: from 1970Ba51. Others: −1.18 *7* (1987Fr09), 0.16 (1967Ph01).
									A_2=−0.703 *14*, −0.44 *3* (1967Ph01).
		879.9	2 *1*	0.0	7/2$^-$				
1158.0	3/2$^+$	278.1	19 *4*	879.9	5/2$^+$				Iγ(278)/Iγ(1006)=17/55 (1987Fr09).
		304.6	33 *5*	853.4	1/2$^+$				Iγ(303)/Iγ(1006)=28/55 (1987Fr09).
		314.1	<3	843.9	5/2$^-$				
		1006.4	48 *6*	151.6	3/2$^+$	M1+E2	−1.3 *+6−15*		δ: from 1970Ba51. Others: −0.51 *5* or −4.5 *+12−25* (1987Fr09), 0.85 or 2.2 (1967Ph01).
									A_2=−0.51 *6* (1967Ph01).
1177.0	3/2$^-$	333.1	19 *6*	843.9	5/2$^-$				Iγ(334)/Iγ(707)=8/68 (1987Fr09).
		705.1	68 *4*	471.9	3/2$^-$	M1+E2	−0.18 *13*		δ: −0.18 *13* or <−22 or >+4.9 (1970Ba51).
		1177.0	13 *4*	0.0	7/2$^-$				Iγ(1179)/Iγ(707)=19/73 (1987Fr09).
1336.8	7/2$^+$	456.9	19 *3*	879.9	5/2$^+$	M1+E2	−0.23 *4*		Iγ(457)/Iγ(1185)=23/64 (1987Fr09).
									δ: from 1970Fo06. Others: −0.28 *10* or −1.20 *18* (1970Ba51).
		1185.2	61 *3*	151.6	3/2$^+$	E2			δ: +0.02 *3* (1987Fr09) for 7/2 to 3/2.
									A_2=+0.48 *6*, A_4=−0.27 *7* (1967Ph01).
		1336.8	20 *3*	0.0	7/2$^-$	E1+M2	−0.10 *8*		Iγ(1337)/Iγ(1185)=13/64 (1987Fr09).
									δ: from 1970Ba51. Others: −0.03 *7* (1987Fr09), +1.8 *+7−5* (1970Ba51).
1406.1	7/2$^-$	562.2	10 *2*	843.9	5/2$^-$				Iγ(563)/Iγ(1406)=10/82 (1987Fr09).
		934.2	3 *1*	471.9	3/2$^-$				Iγ(936)/Iγ(1406)=9/82 (1987Fr09).
		1406.1	90 *2*	0.0	7/2$^-$	M1+E2	+0.15 *5*		δ: from 1970Ba51. Others: −0.16 *5* (1987Fr09), 0.02 (1967Ph01).
									A_2=+0.50 *4* (1967Ph01).
1650.3	5/2$^+$	492.3	22 *3*	1158.0	3/2$^+$				Iγ(492)/Iγ(1499)=21/58 (1987Fr09). Iγ=12 (1967Ph01).
		770.4	7	879.9	5/2$^+$				Iγ(771)/Iγ(1499)=7/58 (1987Fr09).
		796.9	4 *2*	853.4	1/2$^+$				
		1178.4		471.9	3/2$^-$				E_γ,I_γ: unresolved from 1179γ from 1179 level. Iγ=12 (1967Ph01).
		1498.7	57 *5*	151.6	3/2$^+$	M1(+E2)	0.06		δ: from 1967Ph01.
									A_2=+0.55 *4* (1967Ph01).
		1650.3	17 *3*	0.0	7/2$^-$				δ: 0.0 (1967Ph01).
									Iγ(1651)/Iγ(1499)=14/58 (1987Fr09).
									A_2=+0.19 *5* (1967Ph01).
1810.7	3/2$^-$	633.7	55 *4*	1177.0	3/2$^-$	M1+E2	−0.22 *7*		δ: from 1970Ba51. Other: >+8 or <−19 (1970Ba51).

$^{43}_{21}Sc_{22}$-3

^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03 (continued)

$\gamma(^{43}Sc)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[@]	Comments
1810.7	3/2$^-$	1338.8	45 *4*	471.9	3/2$^-$	M1+E2	−0.22 *7*	δ: from 1970Ba51. Other: >+8 or <−19 (1970Ba51). Iγ(1339)/Iγ(632)=43/42 (1987Fr09).
		1659.1	16	151.6	3/2$^+$			
		1810[‡a]		0.0	7/2$^-$			
1829.3	11/2$^-$	949[‡a]		879.9	5/2$^+$			E$_\gamma$,Mult.: this γ is suspect since implied E3 multipolarity is inconsistent with RUL.
		1677[‡a]		151.6	3/2$^+$			E$_\gamma$,Mult.: this γ is suspect since implied M4 multipolarity is inconsistent with RUL.
		1830.1 *5*	100	0.0	7/2$^-$			E$_\gamma$: from 1970Sa24.
1882.3	(5/2,9/2)$^-$	1038.4[a]	<5	843.9	5/2$^-$			
		1730[‡a]		151.6	3/2$^+$			
		1882.3	100	0.0	7/2$^-$	M1+E2		δ: −0.19 *2* for 9/2 to 7/2, +0.42 *3* or +4.1 *5* for 5/2 to 7/2 (1970Ba51); −0.22 *3* or −1.37 *6* for 9/2 to 7/2 (1987Fr09).
1930.6	9/2$^+$	593.8	31 *3*	1336.8	7/2$^+$	M1+E2	−0.21 *4*	Iγ(595)/Iγ(1051)=25/75 (1987Fr09). δ: weighted average of −0.14 *6* (1970Ba51), −0.24 *4* (1970Fo06).
		1050.7	69 *3*	879.9	5/2$^+$	E2		δ: −0.02 *2* (1987Fr09) for 9/2 to 5/2.
		1779[‡a]		151.6	3/2$^+$			E$_\gamma$,Mult.: this γ is suspect since implied M3 multipolarity is inconsistent with RUL.
1962.5	(3/2,5/2)$^-$	785.5	20	1177.0	3/2$^-$			
		1490.6	80	471.9	3/2$^-$	M1+E2	+0.21 *6*	δ: from 1970Ba51. Other: >+9 or <−17 (1970Ba51).
2093.9	3/2$^-$	916.9	58 *7*	1177.0	3/2$^-$			
		1250.0[a]	7 *7*	843.9	5/2$^-$			
		1622.0	31	471.9	3/2$^-$			
		1942.3	35 *6*	151.6	3/2$^+$			Iγ(1942)/Iγ(915)=16/52 (1987Fr09).
2105.7	(3/2,5/2)	455.4[a]	10 *5*	1650.3	5/2$^+$			
		947.7	32 *5*	1158.0	3/2$^+$			Iγ(948)/Iγ(1226)=19/73 (1987Fr09).
		1225.8	58 *6*	879.9	5/2$^+$			
		1954.1[a]	6	151.6	3/2$^+$			
2141.2	(3/2$^-$,5/2$^+$)	983.2	21	1158.0	3/2$^+$			
		1261.3	55 *5*	879.9	5/2$^+$			
		1669.3	19 *3*	471.9	3/2$^-$			
		1989.6	16 *3*	151.6	3/2$^+$			Iγ(1990)/Iγ(1261)=26/53 (1987Fr09).
		2141.1	10 *4*	0.0	7/2$^-$			
2242.6	(3/2,5/2,7/2)$^-$	1398.7	25	843.9	5/2$^-$			
		1770.7	57	471.9	3/2$^-$			δ: +0.58 *13* for 5/2 to 3/2, +0.14 *8* or +2.5 *+6−4* for 3/2 to 3/2 (1970Ba51).
		2242.5	18	0.0	7/2$^-$			
2288.8	5/2$^-$	2288.7	100.0 *7*	0.0	7/2$^-$	M1+E2	+0.08 *5*	δ: from 1970Ba51. Others: +0.35 *4* (1987Fr09), −12 *+4−12* (1970Ba51).
2335.4	5/2$^-$	2335.3	100	0.0	7/2$^-$	M1(+E2)		δ: +0.12 *3* for 5/2 to 7/2 (1987Fr09), +0.03 *3* or −6.9 *+21−14* for 5/2 to 7/2 and +0.07 *2* or >+6 or <−29 for 9/2 to 7/2 (1970Ba51).
2382.1	3/2$^{(+)}$	731.8	69	1650.3	5/2$^+$			
		1528.7	31	853.4	1/2$^+$	M1+E2	+0.49 *7*	δ: from 1987Fr09.
2458.6	(5/2 to 9/2)$^-$	2458.5	100	0.0	7/2$^-$	M1(+E2)		δ: +0.15 *7* or >+19 or <−11 for 5/2 to 7/2 and −0.02 *5* for 9/2 to 7/2 (1970Ba51).

^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03 (continued)

$\gamma(^{43}Sc)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Comments
2550.7	11/2$^+$	620.1	61 *4*	1930.6	9/2$^+$	δ: −0.06 *4* or −2.6 *3* (1987Fr09) for 11/2 to 9/2; −0.20 *7* for 11/2 to 9/2 (1970Fo06).
		1213.9	39 *4*	1336.8	7/2$^+$	δ: 0.00 *4* (1987Fr09) for 11/2 to 7/2.
						Iγ(1215)/Iγ(621)=46/54 (1987Fr09).
2579.9	(5/2)	1421.9	36	1158.0	3/2$^+$	
		1700.0	16	879.9	5/2$^+$	
		2428.2	48	151.6	3/2$^+$	
2635.5	9/2$^-$,11/2$^-$	806.2	17	1829.3	11/2$^-$	
		1229.4	23	1406.1	7/2$^-$	
		2635.4	60	0.0	7/2$^-$	δ: +0.15 *15* for 7/2 to 7/2, +0.49 *7* for 9/2 to 7/2 (1987Fr09); −0.42 *14* or −1.5 *+5−7* for 5/2 to 7/2, −0.15 *9* or +2.0 *+5−4* for 7/2 to 5/2 and +0.36 *7* for 9/2 to 7/2 (1970Ba51).
2650.5		1806.6		843.9	5/2$^-$	
2669	3/2$^-$	1816	56	853.4	1/2$^+$	
		2197.0	44	471.9	3/2$^-$	
2762.2	(5/2 to 9/2)$^-$	2762.1	100	0.0	7/2$^-$	δ: +0.30 *3* for 9/2 to 7/2 (1987Fr09); +0.16 *3* for 9/2 to 7/2 and −0.09 *5* or −3.8 *5* for 5/2 to 7/2 (1970Ba51).
2795.2		1389.1	16	1406.1	7/2$^-$	
		1951.3	39	843.9	5/2$^-$	
		2795.1	45	0.0	7/2$^-$	
2810.7	(5/2,7/2,9/2)	705.0	35 *4*	2105.7	(3/2,5/2)	Iγ(705)/Iγ(1474)=37/46 (1987Fr09).
		1473.9	46 *5*	1336.8	7/2$^+$	δ: +0.02 *4* for 9/2 (1987Fr09).
		2810.6	19 *5*	0.0	7/2$^-$	Iγ(2811)/Iγ(1474)=17/46 (1987Fr09).
2840.0	(5/2,7/2)$^+$	457.9	18	2382.1	3/2$^{(+)}$	
		1503.2	44	1336.8	7/2$^+$	
		2839.9	38	0.0	7/2$^-$	
2846		2846	100	0.0	7/2$^-$	
2862.7	(1/2,3/2,5/2)$^+$	1212.4	21	1650.3	5/2$^+$	
		1982.8	29	879.9	5/2$^+$	
		2711.0	50	151.6	3/2$^+$	
2984.1	(3/2,5/2)	1053.5[a]		1930.6	9/2$^+$	Iγ(1052)/Iγ(2104)=22 *3*/34 *5* (1970Ba51).
		1647.3	27	1336.8	7/2$^+$	Iγ(1647)/Iγ(2104)=35 *5*/34 *5* (1970Ba51).
		2104.1	28	879.9	5/2$^+$	
		2140.1	13	843.9	5/2$^-$	
		2832.4	32	151.6	3/2$^+$	I$_\gamma$: weak γ in 1970Ba51, but the most intense γ from this level in 1987Fr09. Iγ(2833)/Iγ(2104)=9 *4*/34 *5* (1970Ba51).
2987.6	15/2$^-$	1157.1 *2*	100	1829.3	11/2$^-$	δ: +0.01 *5* for 15/2 to 11/2 and +0.74 *+17−14* for 11/2 to 11/2 (1987Fr09), +0.04 *+110−21* for 11/2 to 11/2 (1970Ba51).
						E$_\gamma$: from 1970Sa24.
3123.2	19/2$^-$	135.8 *2*	100	2987.6	15/2$^-$	E$_\gamma$: from 1970Sa24.
3139.9	13/2$^+$	1209.3	100	1930.6	9/2$^+$	δ: −0.48 *12* or −1.4 *4* for 7/2 to 9/2; −0.08 *10* or +1.27 *23* for 9/2 to 9/2 and +0.41 *7* for 11/2 to 9/2 (1970Ba51). But the adopted J^π for the 3140 level is 13/2$^+$.
3158.8	(3/2$^-$,5/2,7/2$^+$)	2278.8	21	879.9	5/2$^+$	
		3007.1	37	151.6	3/2$^+$	
		3158.7	42	0.0	7/2$^-$	

^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03 (continued)

$\gamma(^{43}Sc)$ (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
3197.6		2725.6	100	471.9	$3/2^-$	3334		3334	31	0.0	$7/2^-$
3264.0	$(7/2,9/2)^-$	1434.7	4	1829.3	$11/2^-$	3375.2	$(7/2,9/2)^-$	1492.9	16	1882.3	$(5/2,9/2)^-$
		3263.9	96	0.0	$7/2^-$			1545.9	19	1829.3	$11/2^-$
3293.7	$7/2^-$	1363.1	32	1930.6	$9/2^+$			1969.1	30	1406.1	$7/2^-$
		2116.6	26	1177.0	$3/2^-$			2038.3	12	1336.8	$7/2^+$
		2413.7	10	879.9	$5/2^+$			3375.1	23	0.0	$7/2^-$
		2449.7	32	843.9	$5/2^-$	3451.2	$5/2^+$	1640.5	73	1810.7	$3/2^-$
3334		2157	22	1177.0	$3/2^-$			2571.2	27	879.9	$5/2^+$
		2490	21	843.9	$5/2^-$	3463.3	$5/2^-$	3311.6	100	151.6	$3/2^+$
		2862	26	471.9	$3/2^-$	4157		1606	100	2550.7	$11/2^+$

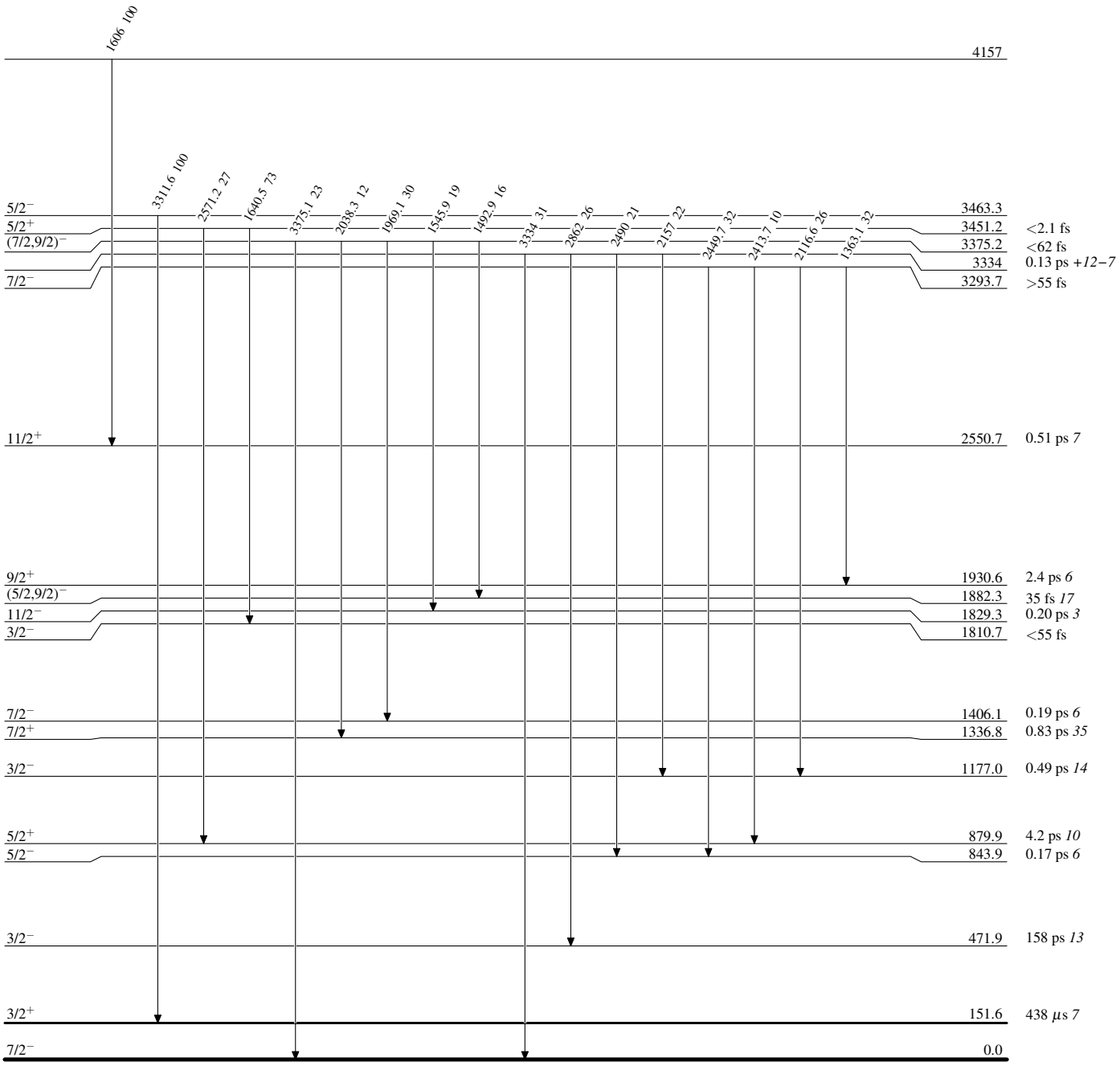
[†] Level-energy differences.
[‡] Reported only by 1967Sc08.
[#] Values quoted with uncertainties are from 1970Ba51 and/or 1972Ba04, others are from 1987Fr09.
[@] From $\gamma(\theta)$ and RUL (for E2 and M2).
[&] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[a] Placement of transition in the level scheme is uncertain.

$^{43}_{21}Sc_{22}$-6

^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03

Level Scheme

Intensities: % photon branching from each level



$^{43}_{21}Sc_{22}$

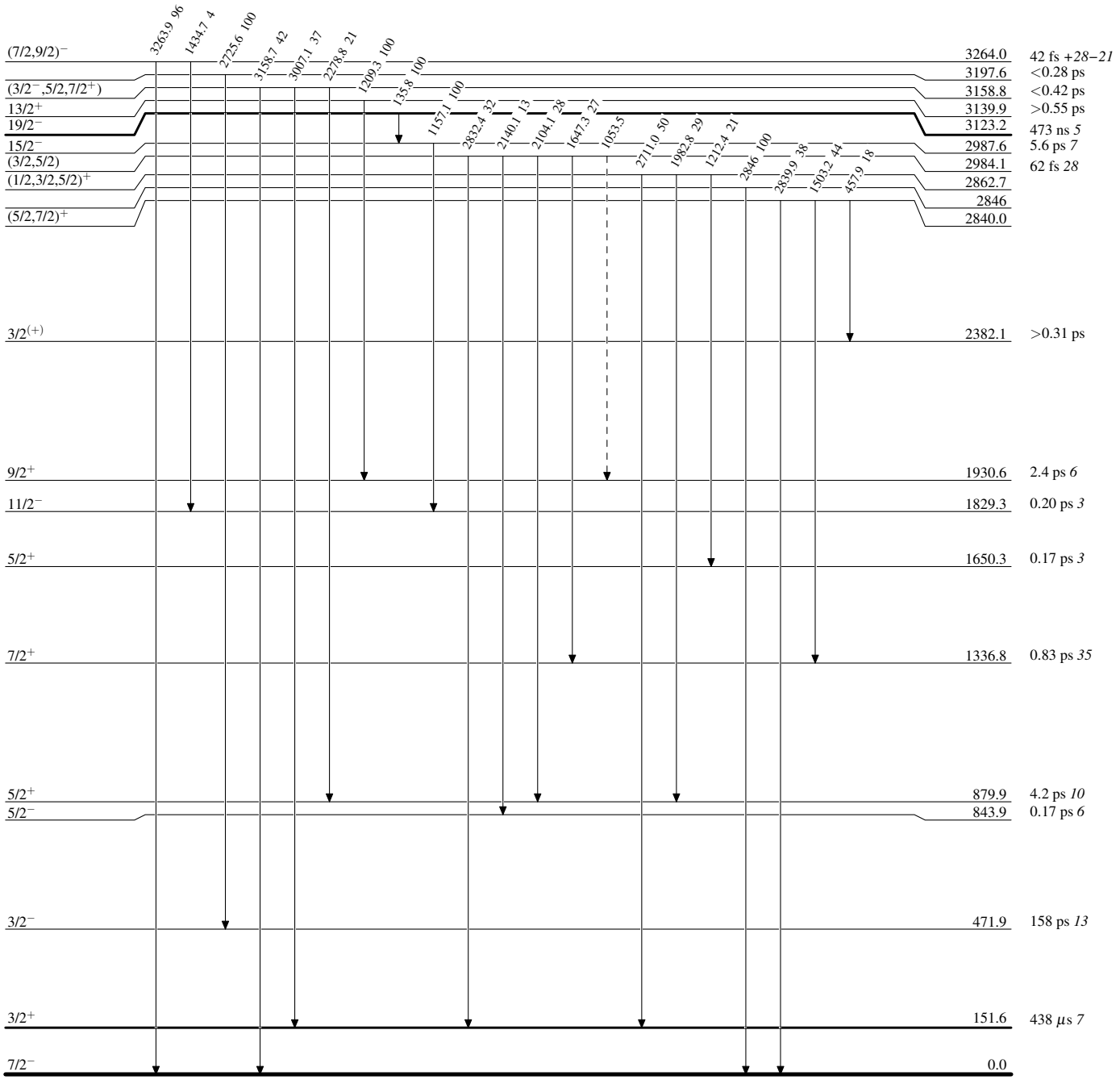
^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{43}_{21}Sc_{22}$

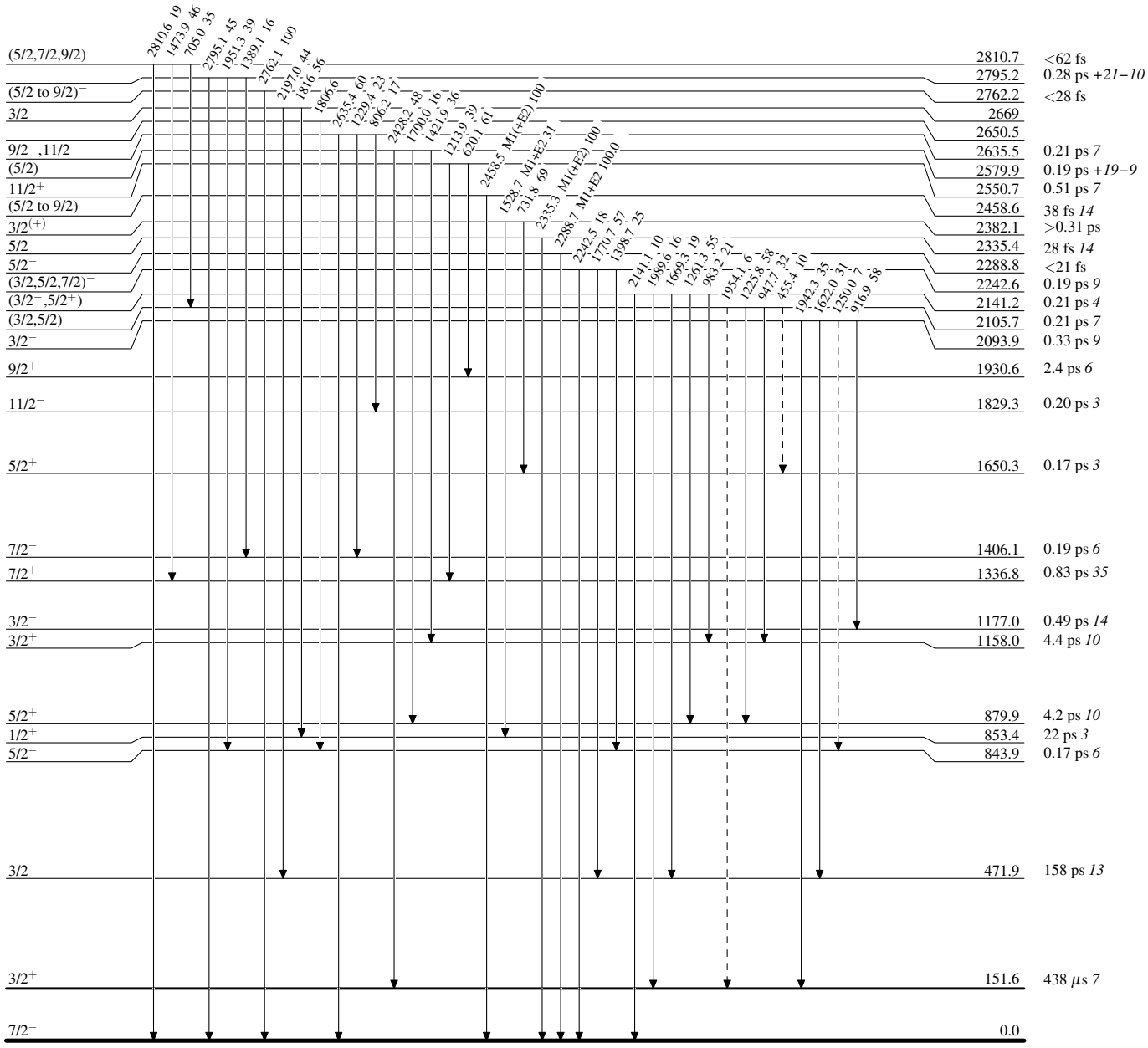
^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{43}_{21}Sc_{22}$

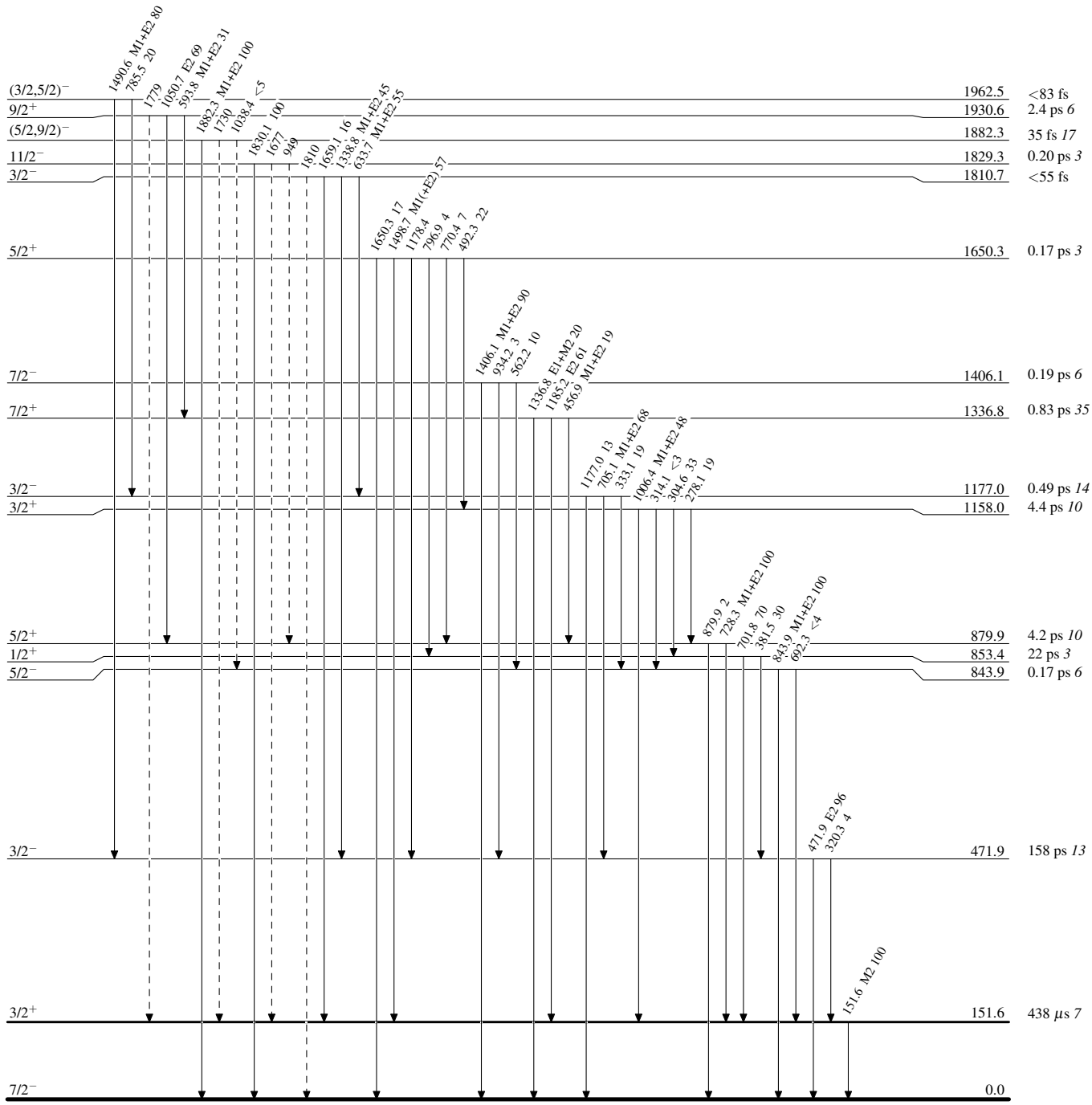
^{40}Ca(α,pγ) 1987Fr09,1972Ba04,1971Po03

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{43}_{21}Sc_{22}$