Adopted Levels, Gammas 1990Aj01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, C. G. Sheu	NP A880, 88 (2012)	1-Jan-2011

Q(β^-)=−1.365×10^4 *5*; S(n)=13119.8 *9*; S(p)=8689.4 *9*; Q(α)=−7543.6 *10* 2012Wa38
Note: Current evaluation has used the following Q record.
Based on mass excess (^{11}C)=10650.4 *9* Here the mass excess for ^{11}N = 24477 keV 60 differs from that in (2011AuZZ) (24303 keV 46).
Q(β^-)=−13826 *60*; S(n)=13119.7 *10*; S(p)=8689.4 *10*; Q(α)=−7543.6 *9* 2011AuZZ

^{11}C Levels

Cross Reference (XREF) Flags

A	^{1}H(^{11}C,^{11}C)	I	^{10}B(^{3}He,d)	Q	^{12}C(^{3}He,pt)
B	^{6}Li(^{6}Li,n)	J	^{10}B(^{7}Li,^{6}He)	R	^{13}C(π^+,d)
C	^{6}Li(^{10}B,^{11}C)	K	^{11}B(p,n)	S	^{13}C(p,t)
D	^{7}Be(α,γ)	L	^{11}B(^{3}He,t)	T	^{14}N(p,α)
E	^{9}Be(^{3}He,n)	M	^{12}C(π^+,p)	U	^{16}O(d,^{7}Li)
F	^{10}B(p,γ) res	N	^{12}C(p,d)	V	^{16}O(^{9}Be,α^7Be)
G	^{10}B(p,p),(p,α)	O	^{12}C(d,t)	W	^{10}B(p,n)
H	^{10}B(d,n)	P	^{12}C(^{3}He,α)		

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0	3/2$^-$	20.364 min *14*	AB EF HIJKLMNOPQRSTU	%ε+%β^+=100 T=1/2; μ=−0.964 *1* (1969Wo03) Q=0.03426 (1978LeZA) T$_{1/2}$: T$_{1/2}$=1221.8 s *8*=20.364 min *14*. From weighted average of T$_{1/2}$=20.334 min *24* (2002Wo02), 20.382 min *20* (1975Az01), 20.34 min *4* (1964Ka31) and 20.40 min *4* (1969Aw02). Γ: Other values are T$_{1/2}$=20.370 min *29* (ddep) 20.32 min *12* (1975Be28), 19.8 min *8* (1973Ho43), 20.0 min *3* (1973SiYS), 20.8 min *4* (1965Pa10), 20.11 min *13* (1958Ar15), 20.8 min *2* (1957Pr53), 20.26 min *10* (1955Ba63), 20.74 min *10* (1953Ku09), 20.0 min *1* (1951Di12), 20.0 min *4* (1944Si30), 20.50 min *60* (1941So01), 20.35 min *8* (1941Sm11).
2000.0 *4*	1/2$^-$	7.1 fs *5*	AB EF HIJKLMNOPQ STU	E(level): from weighted average of 2000.6 keV *9* from ^{10}B(^{3}He,d), 1999.7 keV *5* from ^{12}C(p,d) and 2000.5 keV *9* from ^{12}C(^{3}He,α). Γ: From ^{12}C(^{3}He,α).
4318.8 *12*	5/2$^-$	<8.3† fs	AB EF HIJKLMNOPQ STU	E(level): from ^{12}C(^{3}He,α); also see 4332 keV *10* from ^{10}B(^{3}He,d). Γ: From ^{10}B(p,γ). It: branching ratios from (1961Do03): ^{10}B(p,γ) and (1968Ea03): ^{12}C(^{3}He,α).
4804.2 *12*	3/2$^-$	<7.6† fs	B EF HIJKLMN PQ STU	E(level): from ^{12}C(^{3}He,α); also see 4808 keV *10* from ^{10}B(^{3}He,d). Γ: From ^{10}B(p,γ). It:branching ratios from (1965Ol03): ^{9}Be(^{3}He,n) and ^{10}B(d,n), (1961Do03): ^{10}B(p,γ), (1962Fr06):^{10}B(d,n) and (1968Ea03): ^{12}C(^{3}He,α).
6339.2 *14*	1/2$^+$	<76.2 fs	B E HI K PQ U	E(level): from ^{12}C(^{3}He,α); also see 6345 keV *10* from

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Adopted Levels, Gammas 1990Aj01 (continued)

^{11}C Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF	Comments
				^{10}B(^{3}He,d).
				Γ: From ^{9}Be(^{3}He,n).
				It: branching ratios from (1965Ro07): ^{9}Be(^{3}He,n) and (1968Ea03): ^{12}C(^{3}He,α).
6478.2 *13*	7/2$^-$	<5.5† fs	AB EF HIJKLMN P RS U	E(level): from ^{12}C(^{3}He,α); also see 6476 keV *10* from ^{10}B(^{3}He,d).
				Γ: From ^{10}B(p,γ).
				It: branching ratios from (1962Fr06):^{10}B(d,n), (1962Br26): ^{10}B(d,n) and (1968Ea03): ^{12}C(^{3}He,α).
6904.8 *14*	5/2$^+$	<48 fs	B E HIJKL N P S U	E(level): from ^{12}C(^{3}He,α); also see 6903 keV *10* from ^{10}B(^{3}He,d).
				Γ: From ^{6}Li(^{6}Li,n).
				It: branching ratios to ^{11}C*(0,2,4.3,4.8 MeV) from (1968Ea03): ^{12}C(^{3}He,α). See also (1965Ol03) who report Branching=89(3), <2, 11(3), <3, <5 and <5% for decay to ^{11}C*(0,2,4.3,4.8,6.3,6.5,6.9 MeV).
7.4×10^3?	3/2$^+$		H K	
7499.7 *15*	3/2$^+$	<63 fs	B E I KL N P S	E(level): from ^{12}C(^{3}He,α). Also see 7498 keV *10* from ^{10}B(^{3}He,d), and a reported J^π=3/2$^+$ state at E_x=7400 keV *40* observed in ^{10}B(d,n).
				Γ: From ^{6}Li(^{6}Li,n).
				It: branching ratios from (1965Ol03) who report Branching=36(2), 64(2), <3, <3, <3, <3, <4 to ^{11}C*(0,2,4.3,4.8,6.3,6.5,6.9 MeV) and from (1968Ea03) who report Branching=37(3), 63(8), <1, <1 for decay to ^{11}C*(0,2,4.3,4.8 MeV).
8104.5 *17*	3/2$^-$	6 eV *+12−2*	CDE HI L N P	%IT=5.5 *36*; %α=94.5 *36*
				Γ=6 eV *+12−2*; Γα=6 eV *+12−2*; Γ$_\gamma$=0.350 eV *56*
				E(level): from ^{12}C(^{3}He,α), also see 8107 keV *5* from ^{7}Be(α,γ).
				Γ: From ^{7}Be(α,γ).
				Γ: Γ=Γα+Γ$_\gamma$. In (1985Aj01) a footnote on the adopted table indicated Γ=11 eV *7*; however this assumed a symmetric uncertainty in the Γα.
				%IT=5.5 +2.5-3.6; %α=94.5 +3.6-2.5.
				Γ=Γ$_\gamma$+Γα.
				It: Branching from (1984Ha13): ^{7}Be(α,γ).
8420 *2*	5/2$^-$	0.030 fs *8*	BCDEF HIJ L N P S	%IT=20 *5*; %α=80 *5*
				Γ=15.7 eV *40*; Γ$_\gamma$/Γ=0.20 *5* (1983Wi09)
				E(level): Γ: from ^{7}Be(α,γ).
				Γ=Γ$_\gamma$+Γα.
				It: Branching from (1984Ha13): ^{7}Be(α,γ).
8654 *4*	7/2$^+$	≤5 keV	C EF HIJ L N V	%α≈100 (1988Le17); %IT>0
				E(level): from ^{10}B(d,n), (1963Ov02) finds this state 45 keV *4* below the E_x=8700 keV state; this yields E_x=8654 keV *5*. Also from ^{10}B(d,n) (1955Ma76) E_x=8653 keV *5*. The weighted averge of these values is 8654 keV *4*.
				Γ: From ^{10}B(p,γ).
				Γ(c.m.)≤4.5 keV; Γ$_\gamma$/Γ<0.06 (1983Wi09).
8699 *2*	5/2$^+$	15 keV *1*	EF HIJ L	%IT<10 (1983Wi09); %p>90
				E(level): from E_{res}=10 keV *2* and Q(β^-)value=8689.4 keV *8* in ^{10}B(p,γ) (1983Wi09).

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Adopted Levels, Gammas 1990Aj01 (continued)

^{11}C Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF	Comments
				Γ: From ^{10}B(^{3}He,d).
				Γ(c.m.)=14.5 keV *25* and $\Gamma_\gamma/\Gamma \leq 0.1$ (1983Wi09), based on direct capture data; however, based on resonance parameters Γ(c.m.)=16 keV *1* and $\Gamma_\gamma/\Gamma \neq 2.60\times10^{-4}$ *15* (1983Wi09).
				It: Branching from (1983Wi09): ^{10}B(p,γ).
9200 *50*	5/2$^+$	500 keV *90*	F N	%IT>0; %p<100
				E(level): Γ: from ^{10}B(p,γ).
				Additional levels seen in H at 8970,9130,9280,9690.
				It: Branching from (1983Wi09): ^{10}B(p,γ).
9645 *50*	(3/2$^-$)	210 keV *40*	FG N	%IT>0; %p<100; %α<100
				E(level): Γ: from ^{10}B(p,γ), ^{10}B(p,p) and ^{10}B(p,α). Also see the uncertain E_x=9690 keV *30* level observed in ^{10}B(d,n).
				Additional levels seen 9730 L.
				It: Branching from (1983Wi09): ^{10}B(p,γ). Also see (1979An16).
9780 *50*	(5/2$^-$)	240 keV *50*	FG N	%IT>0; %p<100
				E(level): Γ: from ^{10}B(p,γ).
				Additional levels seen 9850 V.
				It: Branching from (1983Wi09): ^{10}B(p,γ). Also see (1979An16).
9970 *50*	(7/2$^-$)	120 keV *20*	F	%IT>0; %p<100
				It: Branching from (1983Wi09): ^{10}B(p,γ).
10083 *5*	7/2$^+$	≈230 keV	FGHI L N	%IT>0; %p≈36; %α≈64
				E(level): Γ: from ^{10}B(p,γ).
				It: Branching from (1983Wi09): ^{10}B(p,γ).
10679 *5*	9/2$^+$	200 keV *30*	EFGHI L N V	%IT>0; %p≈50; %α≈50
				E(level): Γ: from ^{10}B(p,γ).
				Additional levels seen at 10799 G, 10890 H.
				It: Branching from (1983Wi09): ^{10}B(p,γ).
11030 *30*		300 keV *60*	G L N P S	%p<100; %α<100
				T=1/2
				E(level): from ^{10}B(p,p) and ^{10}B(p,α). Also see E_x=10957 keV *20* and Γ=250 keV *30* from ^{9}Be(^{3}He,n).
				Γ: From ^{13}C(p,t).
				Additional levels seen at 11260 H.
11440 *10*		360 keV	G L N	%p>0; %α≈100
				E(level): Γ: from ^{10}B(p,p) and ^{10}B(p,α).
				Additional levels seen at 11520 H, 11954 G, 12100 V.
12160 *40*		270 keV *50*	E G L	%p=?
				T=3/2
				E(level): from weighted average of 12170 keV *50* from ^{9}Be(^{3}He,n) and 12150 keV *50* from ^{11}B(^{3}He,t).
				Γ: From weighted average of 200 keV *100* from ^{9}Be(^{3}He,n) and 290 keV *50* from ^{11}B(^{3}He,t).
12400	$^-$	1.4 MeV *4*	F P	%IT=?; %p=?
				E(level): Γ: from ^{10}B(p,γ).
12510 *30*	1/2$^-$	500 keV *50*	E G LM S	%p=?
				T=3/2
				E(level): from weighted average of 12550 keV *50* from ^{9}Be(^{3}He,n), 12570 keV *70* from ^{11}B(^{3}He,t) and 12477 keV *33* from ^{13}C(p,t).

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Adopted Levels, Gammas 1990Aj01 (continued)

^{11}C Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF	Comments
				Γ: From analysis of Γ=350 keV *100* from ^{9}Be(^{3}He,n), 400 keV *100* from ^{10}B(p,p)/(p,α), 370 keV *90* from ^{11}B(^{3}He,t) and 546 keV *38* from ^{13}C(p,t). Additional levels seen at 12600 V.
12650 *20*	(7/2$^+$)	360 keV	G L	%p≈50; %^{3}He>0; %α≈50 E(level): Γ: from ^{10}B(p,p) and ^{10}B(p,α).
13010?			F	%IT>0; %p<100 E(level): from ^{10}B(p,γ).
13330 *60*		270 keV *80*	M S	E(level): Γ: from ^{13}C(p,t).
13400		11×10^2 keV *1*	G N V	%p=?; %α=? E(level): Γ: from ^{10}B(p,p) and ^{10}B(p,α). Also see 13300 keV from ^{12}C(π$^+$,p), 13400 keV from ^{16}O(^{9}Be,α+^{7}Be), and 13220 keV *250* observed in ^{12}C(p,d).
13900 *20*		200 keV *40*	E G L S	%p=? T=3/2 T: tentative. E(level): from weighted average of 13900 keV *20* from ^{10}B(p,p)/(p,α), 13920 keV *50* from ^{11}B(^{3}He,t) and 13900 keV *40* from ^{13}C(p,t). Also see 13700 keV *100* from ^{9}Be(^{3}He,n). Γ: From weighted average of 260 keV *50* from ^{11}B(^{3}He,t) and 150 keV *50* from ^{13}C(p,t).
14070 *20*		135 keV *50*	G L S W	%n=?; %p=? E(level): from ^{10}B(p,n). Γ: From ^{13}C(p,t).
14760 *40*		≈450 keV	E G W	%n=?; %p=?; %^{3}He=? E(level): from ^{10}B(p,p) and ^{10}B(p,n). Γ: From ^{10}B(p,p).
15350 *50*	−		FG P W	%IT>0; %n<100; %p<100 E(level): from ^{10}B(p,p)/ ^{10}B(p,α) and ^{10}B(p,n). Γ: Broad. Γ: From ^{10}B(p,p)/ ^{10}B(p,α).
15590 *50*		≈450 keV	G W	%n=?; %p=? E(level): from ^{10}B(p,p)/ ^{10}B(p,α) and ^{10}B(p,n). Γ: From ^{10}B(p,p)/ ^{10}B(p,α).
16700	−	0.82 MeV *9*	F	%IT>0; %p<100 E(level): Γ: from ^{10}B(p,γ).
18200?			F	%IT>0; %p<100 E(level): Γ: from ^{10}B(p,γ).
23000?			P	E(level): Γ: from ^{12}C(^{3}He,α).
28000?			P	E(level): Γ: from ^{12}C(^{3}He,α).

† From (1979An16). See also (1981Ca06) for mean life of ^{11}C*(4319, 4804, 6478).

Adopted Levels, Gammas 1990Aj01 (continued)

$\gamma(^{11}C)$

Mostly from (1965Ol03) and (1968Ea03): see Table 11.20 in (1980Aj01) for other references and additional information.

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	Comments
2000.0	$1/2^-$	2000.0	100	0	$3/2^-$	M1	$\Gamma_\gamma=6.43\times10^{-2}$ eV *45*; B(M1)(W.u.)=0.38 *3*
4318.8	$5/2^-$	2318	<2	2000.0	$1/2^-$		
		4318.8	100	0	$3/2^-$		
4804.2	$3/2^-$	2804.2	14.8 *14*	2000.0	$1/2^-$		
		4804.2	85.2 *14*	0	$3/2^-$		
6339.2	$1/2^+$	1535	<3	4804.2	$3/2^-$		
		2020	<7	4318.8	$5/2^-$		
		4339.2	33.5 *21*	2000.0	$1/2^-$		
		6339.2	66.5 *21*	0	$3/2^-$		
6478.2	$7/2^-$	1674	<2	4804.2	$3/2^-$		
		2159.4	11.5 *14*	4318.8	$5/2^-$		
		4477	<2	2000.0	$1/2^-$		
		6478.2	88.5 *14*	0	$3/2^-$		I_γ: cascades via ^{11}C*(2000, 4804)<2%.
6904.8	$5/2^+$	427	<5	6478.2	$7/2^-$		
		566	<5	6339.2	$1/2^+$		
		2100.6	4.5 *10*	4804.2	$3/2^-$		
		2586.0	4.5 *10*	4318.8	$5/2^-$		
		4904	<1	2000.0	$1/2^-$		
		6904.8	91 *2*	0	$3/2^-$		
7499.7	$3/2^+$	595	<4	6904.8	$5/2^+$		
		1021	<3	6478.2	$7/2^-$		
		1160	<3	6339.2	$1/2^+$		
		2695	<1	4804.2	$3/2^-$		
		3181	<1	4318.8	$5/2^-$		
		5499.7	64 *2*	2000.0	$1/2^-$		
		7499.7	36 *2*	0	$3/2^-$		
8104.5	$3/2^-$	6104.5[&]	26 *5*	2000.0	$1/2^-$	M1	$\Gamma_\gamma=9.1\times10^{-2}$ eV *23*; B(M1)(W.u.)=1.9×10^{-2} *5*
		8104.5[&]	74 *12*	0	$3/2^-$	M1	$\Gamma_\gamma=0.26$ eV *6*; B(M1)(W.u.)=2.3×10^{-2} *5*
8420	$5/2^-$	4101	<7	4318.8	$5/2^-$		
		8420[&]	100	0	$3/2^-$	M1	$\Gamma_\gamma=3.1$ eV *11*; B(M1)(W.u.)=0.25 *9*
8699	$5/2^+$	2221[#]	13.6 *46*	6478.2	$7/2^-$		
		3895[#]	2.4 *15*	4804.2	$3/2^-$		
		4380[#]	42 *10*	4318.8	$5/2^-$		
		8699[#]	42 *10*	0	$3/2^-$		
9200	$5/2^+$	2722[#]	20 *10*	6478.2	$7/2^-$		
		4881[#]	6 *5*	4318.8	$5/2^-$		
		9200[#]	74 *18*	0	$3/2^-$		
9645	$(3/2^-)$	4846[#@]	8 *4*	4804.2	$3/2^-$		
		5331[#@]	32 *10*	4318.8	$5/2^-$		
		9650[#@]	60 *5*	0	$3/2^-$		
9780	$(5/2^-)$	3302[#@]	12 *4*	6478.2	$7/2^-$		
		4976[#@]	4 *2*	4804.2	$3/2^-$		
		5461[#@]	8 *2*	4318.8	$5/2^-$		
		9780[#@]	76 *16*	0	$3/2^-$		
9970	$(7/2^-)$	3492[#]	10 *7*	6478.2	$7/2^-$		
		5651[#]	90 *10*	4318.8	$5/2^-$		
10083	$7/2^+$	3605[#]	13 *6*	6478.2	$7/2^-$		

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Adopted Levels, Gammas 1990Aj01 (continued)

$\gamma(^{11}C)$ (continued)

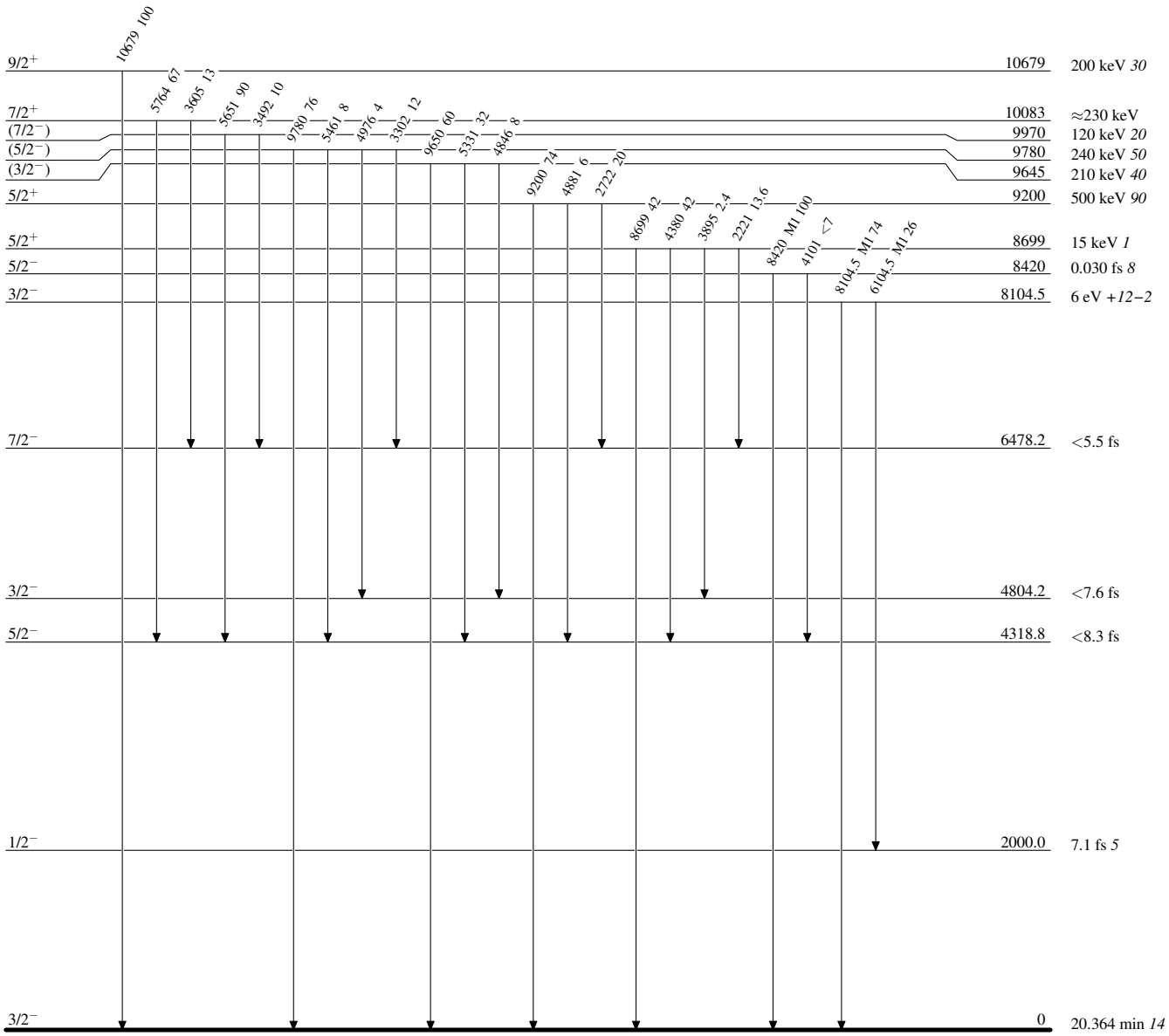
E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π
10083	$7/2^+$	5764#	67 *8*	4318.8	$5/2^-$
10679	$9/2^+$	10679#	100	0	$3/2^-$

† From level energy difference; no recoil correction.
‡ % branching from each level.
# See (1983Wi09).
@ See also (1979An16).
& See (1984Ha13).

Adopted Levels, Gammas 1990Aj01

Level Scheme

Intensities: % photon branching from each level

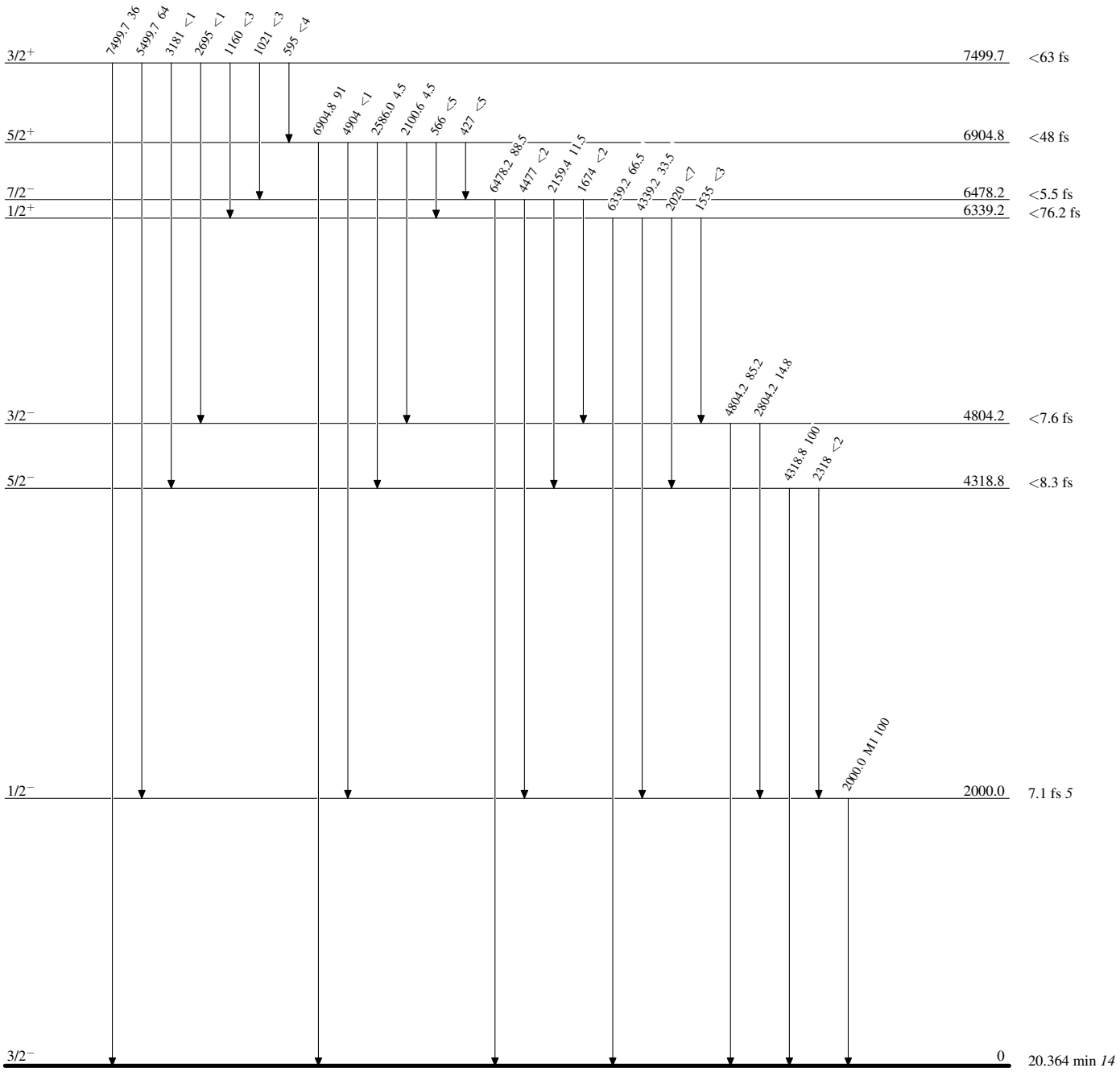


$^{11}_{6}C_{5}$

Adopted Levels, Gammas 1990Aj01

Level Scheme (continued)

Intensities: % photon branching from each level



$^{11}_{6}C_5$