$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 205,1 (2025)	31-May-2025

1988He15,1987He26: $^{12}C(^{14}N,p\gamma)$ E=23.5 MeV. Measured Eγ, Iγ, p$\gamma(\theta)$. E-ΔE Si telescope, Ge(Li) detectors.
1991Ti02: $^{12}C(^{15}N,pn\gamma)$ E=1.2-1.8 MeV. Measured DSA. Ge(Li), HPGe detectors.
Other references: 1987He26, 1974Ol06, 1972Vo02.

^{25}Mg Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0[@]	5/2$^+$		
585[&]	1/2$^+$		
975[&]	3/2$^+$		
1612[@]	7/2$^+$		
1965[&]	5/2$^+$	0.700 ps *55*	T$_{1/2}$: From τ=1010 fs *80*.
2738[&]	7/2$^+$		
2801	3/2$^+$		
3405.2[@] *3*	9/2$^+$	6 fs *4*	T$_{1/2}$: From τ=9 fs *6*.
3414[a]	3/2$^-$		
3908		6 fs *2*	T$_{1/2}$: From τ=9 fs *3*.
3967.5[a] *5*	7/2$^-$	25 fs *5*	T$_{1/2}$: From τ=36 fs *7*.
4059.9 *5*	9/2$^+$	55 fs *4*	T$_{1/2}$: From τ=80 fs *6*.
4711[&]	9/2$^+$	25 fs *3*	T$_{1/2}$: From τ=36 fs *4*.
4722	5/2$^+$,3/2$^+$		
5012	7/2$^+$		
5251.7 *3*	11/2$^+$	15 fs *2*	T$_{1/2}$: From τ=22 fs *3*.
5460.3 *2*	13/2$^+$	1.44 ps *13*	T$_{1/2}$: From τ=2.08 ps *19*.
5523.0[a] *3*	5/2$^-$	46 fs *6*	T$_{1/2}$: From τ=67 fs *8*.
5530.4[@] *5*	11/2$^+$	6 fs *2*	T$_{1/2}$: From τ=8 fs *3*.
5747	3/2$^+$,5/2$^+$	<7 fs	T$_{1/2}$: From τ<10 fs.
5793	11/2$^-$,(7/2)		J$^\pi$: in Table IV (1988He15), authors propose 11/2$^-$ as a possible member of the 1/2[330] band, however, 7/2 or 7/2$^+$ is also possible as noted considering the γ decay scheme as noted in the text. The level not adopted as a band member of 1/2[330] in the adopted dataset.
5972	9/2$^+$		
6033.4 *13*	7/2$^+$,11/2$^+$	<6 fs	T$_{1/2}$: From τ<8 fs.
6362 *4*			
6435 *2*			
6842 *2*			
6862.2 *12*		<9 fs	T$_{1/2}$: From τ<13 fs.
6911 *3*			
6958 *2*			
7184 *2*			E(level): appears to be a doublet of 7181 and 7185 in the Adopted Levels.
7225 *3*			
7287 *3*			
7493 *2*			
7501 *3*			
7526 *3*			
7550[@] *1*	(13/2)$^+$		
7653 *3*			
7685 *3*			
7791.0 *15*		<7 fs	T$_{1/2}$: From τ<10 fs.
7866 *2*			

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$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02 (continued)

^{25}Mg Levels (continued)

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
8016 *2*		37 fs *4*	$T_{1/2}$: From τ=53 fs *5*.
8074 *3*			
8264 *5*			
8534 *2*			
8550 *2*			
8818.5 *7*			
8895 *1*			
8999.5 *15*		<9 fs	$T_{1/2}$: From τ<13 fs.
9650 *3*			
9685 *2*			
9949 *2*	$(15/2)^+$		
10137 *4*			
10653[@] *2*	$(15/2^+)$		
11004 *3*			
11361 *3*			
11410 *3*			
11460 *3*			
11486 *6*			
13143 *4*			
13332 *10*			

[†] From 1988He15 if rounded to nearest keV. Otherwise from 1991Ti02. Agreement between 1988He15 and 1991Ti02 for levels >6800 keV is poor.
[‡] From Adopted Levels, except where otherwise noted.
[#] From 1991Ti02 − Doppler shift attenuation method. Mean lifetime values are listed in the comments.
[@] Band(A): 5/2[202].
[&] Band(B): 1/2[211].
[a] Band(C): 1/2[330].

$\gamma(^{25}Mg)$

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[#]	Comments
1612	$7/2^+$	1612	100	0	$5/2^+$	D+Q	−0.18 *7*	A_2=−0.59; A_4=+0.010 (1988He15)
1965	$5/2^+$	990	25 *3*	975	$3/2^+$	D+Q	−0.25 *17*	A_2=−0.68; A_4=+0.016 (1988He15)
		1380	50 *3*	585	$1/2^+$	Q		A_2=+0.29; A_4=−0.48 (1988He15) δ: −0.34 *25* (1988He15).
		1965	25 *3*	0	$5/2^+$	D+Q	−0.58 *7*	A_2=−0.15; A_4=−0.04 (1988He15)
2801	$3/2^+$	2216[‡]		585	$1/2^+$	D+Q	+0.21 *9*	A_2=−0.060; A_4=+0.0 (1988He15)
3405.2	$9/2^+$	1793	75 *3*	1612	$7/2^+$	D+Q	−0.12 *2*	A_2=−0.052; A_4=+0.01 (1988He15)
		3405	25 *3*	0	$5/2^+$	Q		A_2=+0.058; A_4=−0.024 (1988He15) δ: +0.14 *9* (1988He15).
4059.9	$9/2^+$	2448	45 *4*	1612	$7/2^+$	D+Q	−0.53 *12*	A_2=−1.8; A_4=+0.10 (1988He15)
		4060	55 *4*	0	$5/2^+$	Q		A_2=+0.34; A_4=−0.32 (1988He15) δ: −0.09 *5* (1988He15).
4711	$9/2^+$	2746[‡]		1965	$5/2^+$	Q		A_2=+0.49; A_4=−0.14 (1988He15) δ: +0.05 *8* (1988He15).
4722	$5/2^+,3/2^+$	3747	100	975	$3/2^+$	D(+Q)	−0.02 *7*	A_2=−0.35; A_4=+0.0 (1988He15) for $5/2^+$ to $3/2^+$ A_2=−0.34; A_4=+0.0 (1988He15) for $3/2^+$ to $3/2^+$ δ: assuming $J^\pi=5/2^+$. δ=1.28 *63* for $J^\pi=3/2^+$ (1988He15).
5012	$7/2^+$	3047[‡]		1965	$5/2^+$	D(+Q)	−0.11 *11*	A_2=−0.50; A_4=+0.005 (1988He15)
5251.7	$11/2^+$	1191	22 *4*	4059.9	$9/2^+$	D(+Q)	−0.052 *58*	A_2=−0.39; A_4=+0.001 (1988He15)

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$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02 (continued)

$\gamma(^{25}Mg)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[#]	E_f	J^π_f	Mult.[@]	δ[#]	Comments
5251.7	11/2$^+$	1846	19 *3*	3405.2	9/2$^+$	D+Q	+0.14 *9*	A_2=−0.027; A_4=+0.009 (1988He15)
		2513	12 *4*	2738	7/2$^+$			
		3639	48 *5*	1612	7/2$^+$	Q		A_2=+0.34; A_4=−0.28 (1988He15) δ: −0.07 *9* (1988He15).
5460.3	13/2$^+$	2055	100	3405.2	9/2$^+$	Q		A_2=+0.33; A_4=−0.26 (1988He15) δ: −0.07 *7* (1988He15).
5530.4	11/2$^+$	2125	71 *4*	3405.2	9/2$^+$	D+Q	−0.12 *6*	A_2=−0.52; A_4=+0.01 (1988He15)
		3918	29 *4*	1612	7/2$^+$			
5747	3/2$^+$,5/2$^+$	5747[‡]		0	5/2$^+$	D+Q		A_2=−0.18; A_4=−0.044 (1988He15) for 5/2$^+$ to 5/2$^+$ A_2=−0.19; A_4=−0.0 (1988He15) for 3/2$^+$ to 5/2$^+$ δ: −0.62 *11* for J^π=5/2$^+$ and −0.19 *13* for J^π=3/2.
5793	11/2$^-$,(7/2)	1822	26 *4*	3967.5	7/2$^-$	Q		A_2=+0.40; A_4=−0.21 (1988He15)
		2388	74 *4*	3405.2	9/2$^+$	D+Q	−0.18 *6*	A_2=−0.61; A_4=−0.01 (1988He15) δ: assuming J^π=11/2$^-$.
5972	9/2$^+$	1912	27 *6*	4059.9	9/2$^+$	D(+Q)	+0.27 *54*	A_2=+0.54; A_4=−0.03 (1988He15)
		4360	73 *6*	1612	7/2$^+$	D(+Q)	−0.07 *10*	A_2=−0.43; A_4=+0.06 (1988He15)
6033.4	7/2$^+$,11/2$^+$	2628[‡]		3405.2	9/2$^+$	D+Q	−0.31 +*15*−*21*	A_2=−0.08; A_4=+0.039 (1988He15) for 11/2$^+$ to 9/2$^+$ A_2=−0.78; A_4=+0.026 (1988He15) for 7/2$^+$ to 9/2$^+$ δ: For 11/2$^+$.
6362		6362	100	0	5/2$^+$			
6435		1423	21 *7*	5012	7/2$^+$			
		1724	17 *7*	4711	9/2$^+$			
		2375	7 *4*	4059.9	9/2$^+$			
		2527	14 *4*	3908				
		4823	41 *8*	1612	7/2$^+$			
6842		1830	3 *2*	5012	7/2$^+$			
		4104	79 *8*	2738	7/2$^+$			
		6842	18 *10*	0	5/2$^+$			
6862.2		5250	100	1612	7/2$^+$			
6911		6911	100	0	5/2$^+$			
6958		6958	100	0	5/2$^+$			
7184		5219	44 *16*	1965	5/2$^+$			E_γ: comparable with the stronger γ transition (5216γ) from 7182 keV level. See comment for the level.
		5572	56 *16*	1612	7/2$^+$			E_γ: comparable with the stronger γ transition (5573γ) from 7185 keV level. See comment for the level.
7225		7225	100	0	5/2$^+$			
7287		5322	46 *16*	1965	5/2$^+$			
		7287	54 *16*	0	5/2$^+$			
7493		1521	4 *2*	5972	9/2$^+$			
		2031	28 *4*	5460.3	13/2$^+$			
		3433	68 *8*	4059.9	9/2$^+$			
7501		4763	100	2738	7/2$^+$			
7526		4788	100	2738	7/2$^+$			
7550	(13/2)$^+$	2017	18 *5*	5530.4	11/2$^+$			
		2088	9 *3*	5460.3	13/2$^+$			
		2299	50 *7*	5251.7	11/2$^+$	D+Q	−0.23 *4*	δ: assuming J^π=13/2$^+$.
		4145	23 *7*	3405.2	9/2$^+$			
7653		4915	100	2738	7/2$^+$			

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$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02 (continued)

$\gamma(^{25}Mg)$ (continued)

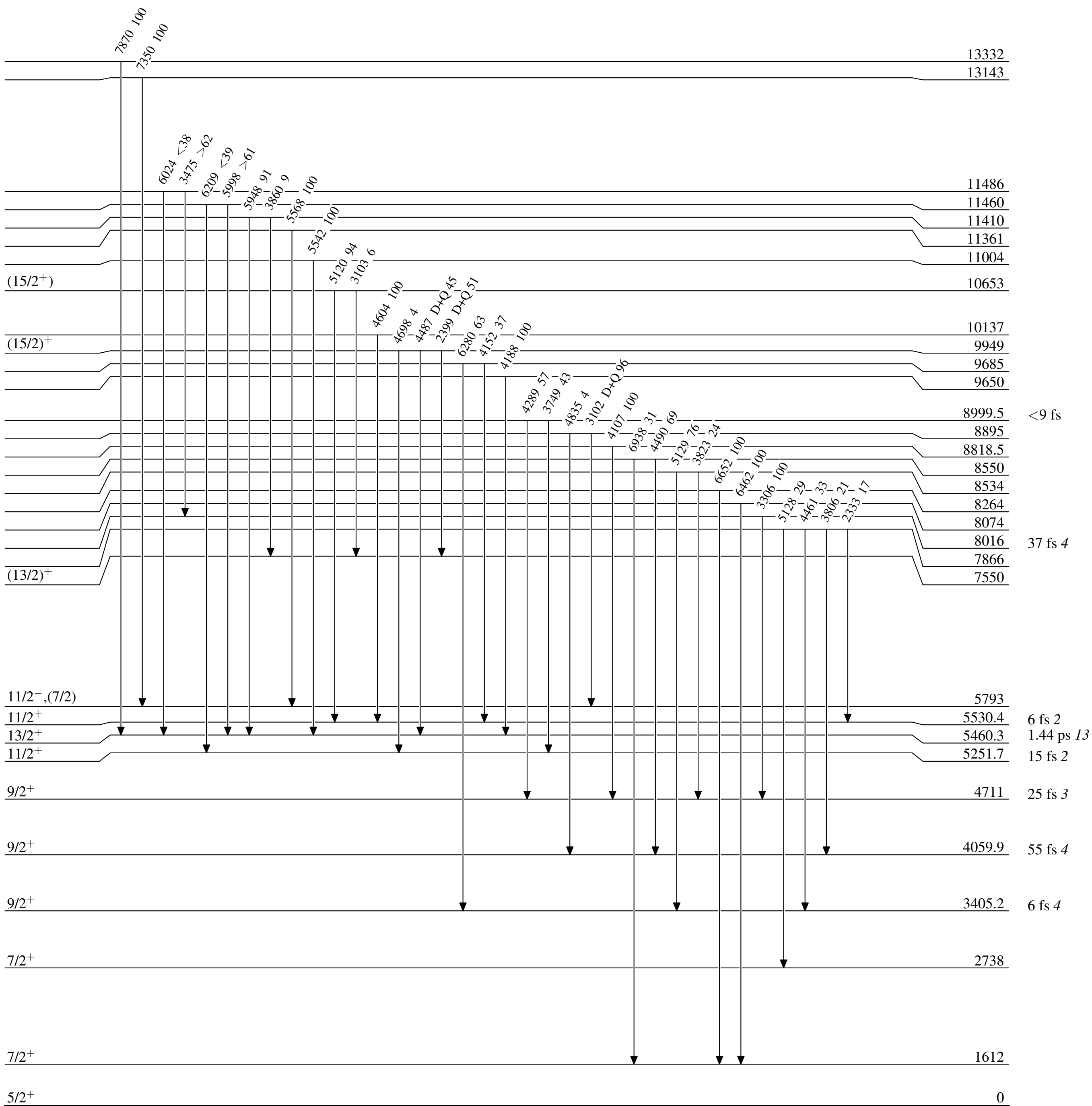
E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[@]	δ[#]	Comments
7685		3625	100	4059.9	9/2+			
7791.0		4386	3 *2*	3405.2	9/2+			
		6179	97 *2*	1612	7/2+			
7866		2333	17 *7*	5530.4	11/2+			
		3806	21 *10*	4059.9	9/2+			
		4461	33 *16*	3405.2	9/2+			
		5128	29 *13*	2738	7/2+			
8016		3306	100	4711	9/2+			
8074		6462	100	1612	7/2+			
8264		6652	100	1612	7/2+			
8534		3823	24 *11*	4711	9/2+			
		5129	76 *11*	3405.2	9/2+			
8550		4490	69 *13*	4059.9	9/2+			
		6938	31 *13*	1612	7/2+			
8818.5		4107	100	4711	9/2+			
8895		3102	96 *6*	5793	11/2−,(7/2)	D+Q	−0.93 *−44+33*	δ: assuming J^π=9/2−. +0.3 *3* for 11/2 or +0.7 *3* for 13/2+.
		4835	4 *3*	4059.9	9/2+			
8999.5		3749	43 *15*	5251.7	11/2+			
		4289	57 *15*	4711	9/2+			
9650		4188	100	5460.3	13/2+			
9685		4152	37 *7*	5530.4	11/2+			
		6280	63 *7*	3405.2	9/2+			
9949	(15/2)+	2399	51 *8*	7550	(13/2)+	D+Q	−0.16 *4*	
		4487	45 *9*	5460.3	13/2+	D+Q	+0.5 *5*	I_γ: single and double-escape yields not included.
		4698	4 *2*	5251.7	11/2+			I_γ: at 158° detector only (1988He15).
10137		4604	100	5530.4	11/2+			
10653	(15/2+)	3103	6 *3*	7550	(13/2)+			
		5120	94 *3*	5530.4	11/2+			
11004		5542	100	5460.3	13/2+			
11361		5568	100	5793	11/2−,(7/2)			
11410		3860	9 *3*	7550	(13/2)+			
		5948	91 *3*	5460.3	13/2+			
11460		5998	>61	5460.3	13/2+			
		6209	<39	5251.7	11/2+			
11486		3475	>62	8016				
		6024	<38	5460.3	13/2+			
13143		7350	100	5793	11/2−,(7/2)			
13332		7870	100	5460.3	13/2+			

† From level energy difference, recoil energy subtracted.
‡ Weaker branches not observed.
# From 1988He15, except where otherwise noted.
@ Assigned by the evaluators based on the mixing ratio and A_2, A_4 data.

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

Level Scheme

Intensities: % photon branching from each level

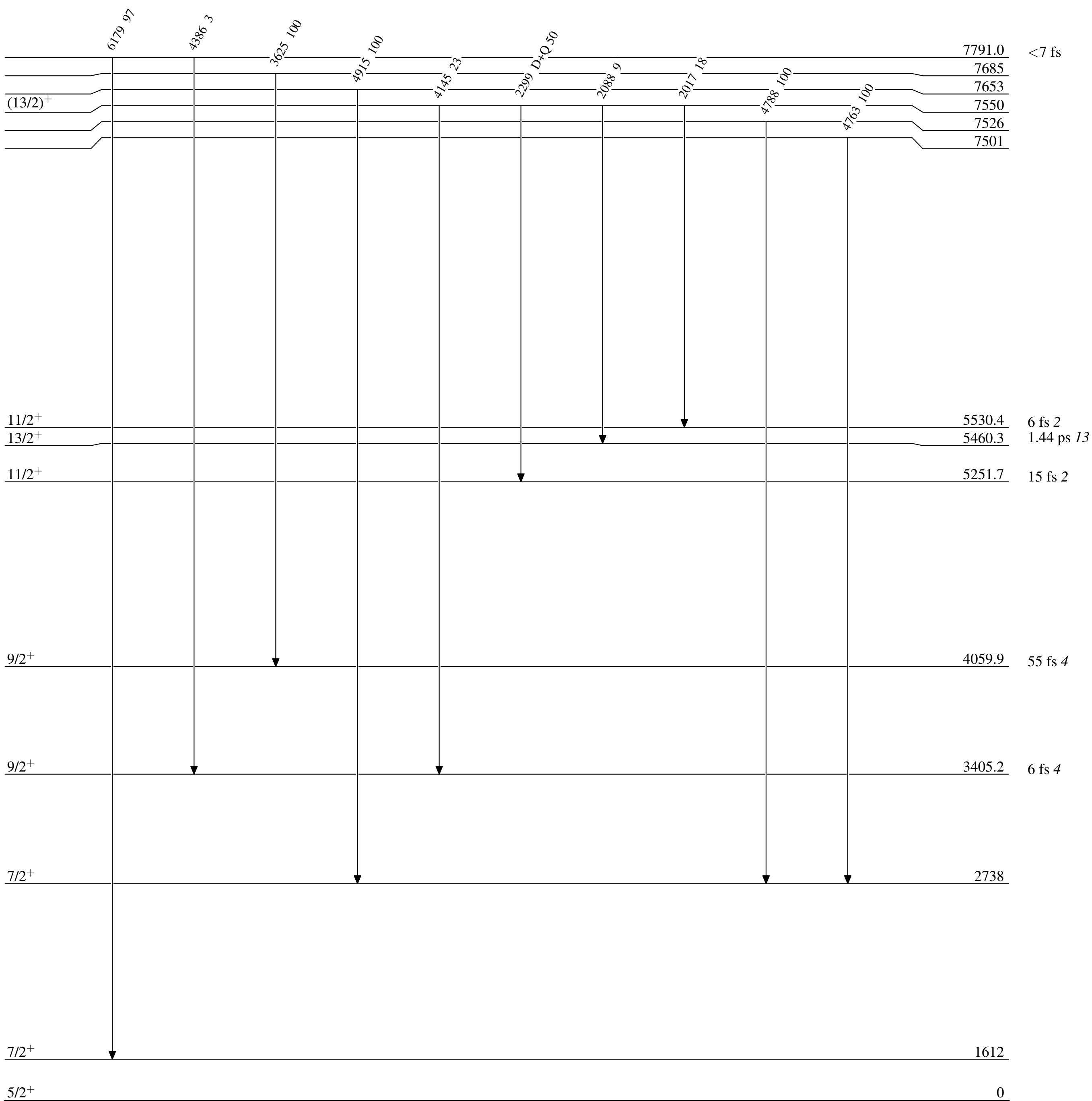


$^{25}_{12}Mg_{13}$

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

Level Scheme (continued)

Intensities: % photon branching from each level

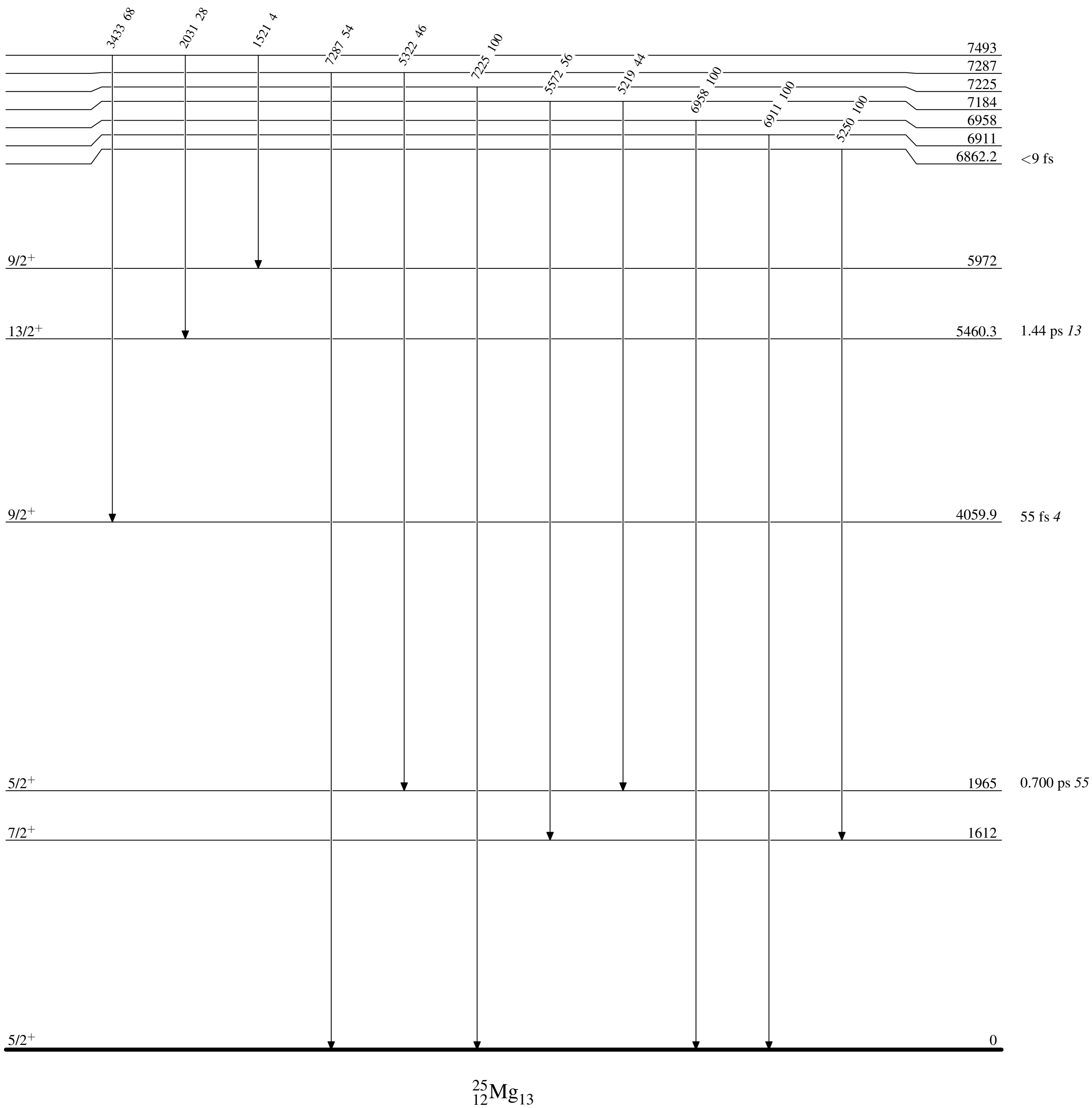


$^{25}_{12}Mg_{13}$

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

Level Scheme (continued)

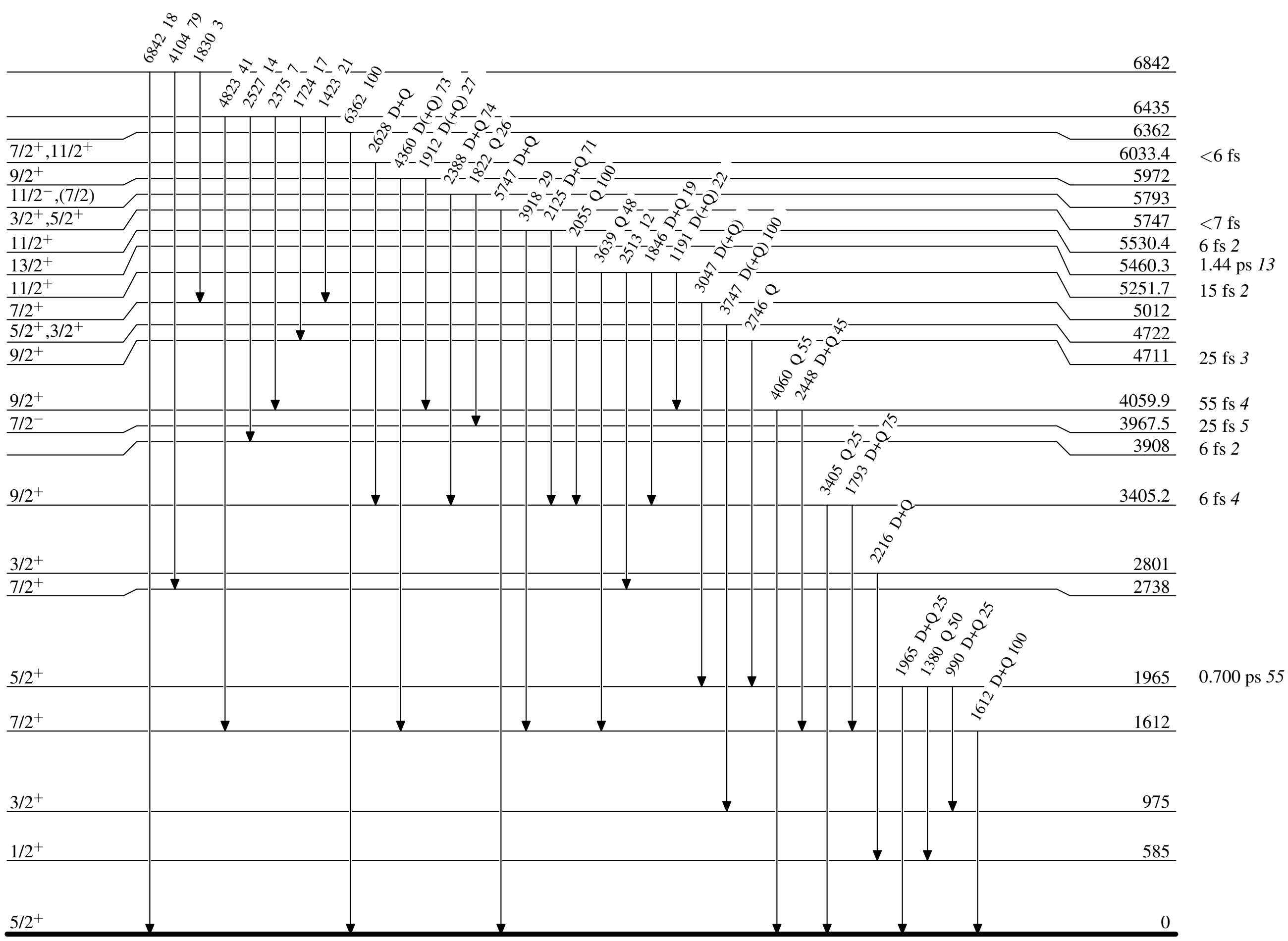
Intensities: % photon branching from each level



$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02

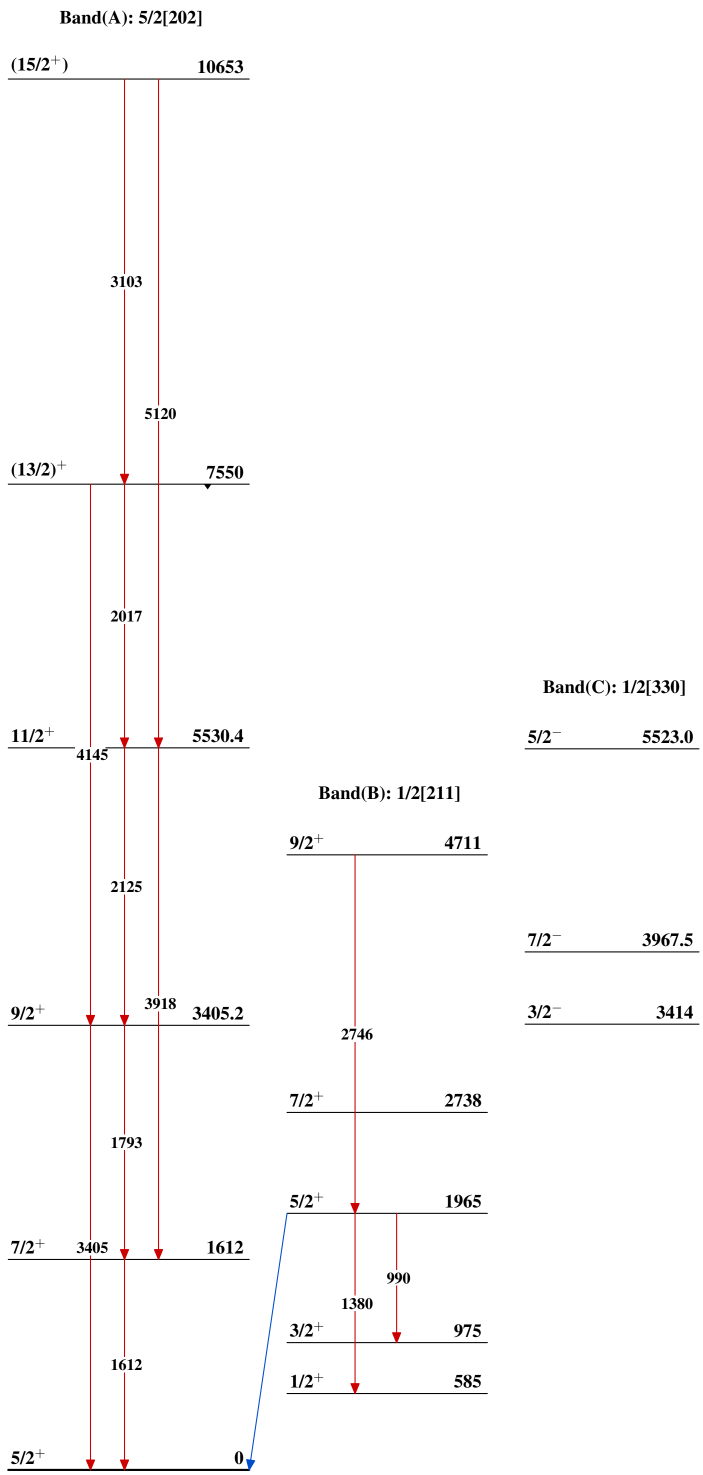
Level Scheme (continued)

Intensities: % photon branching from each level



$^{25}_{12}Mg_{13}$

$^{12}C(^{14}N,p\gamma),(^{15}N,pn\gamma)$ 1988He15,1991Ti02



$^{25}_{12}Mg_{13}$