^{32}S(^{3}He,pγ)

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ninel Nica, Balraj Singh	NDS 113, 1563 (2012)	28-May-2012

1973Ca15: ^{32}S(^{3}He,pγ) E=9 MeV, natural Sb_2S_3 target on Au backing. Used Si surface-barrier detector for protons and Ge(Li) for γ rays. DSAM for mean lifetimes determination.
1972AlZT: ^{32}S(^{3}He,pγ) E=8.5 MeV, natural Sb_2S_3 target on Au backing. Used DSAM for mean lifetimes determination.
1971De27: ^{32}S(^{3}He,pγ) E=8.0-9.0 MeV, natural CdS target on C backing. Used annular Si surface-barrier detector for protons and 5-6 NaI γ-ray detectors, to measure pγ angular correlations. Two Ge(Li) detectors also used to determine Eγ values.
1971Sn01: ^{32}S(^{3}He,pγ) E=6.8 MeV, 95%-enriched ^{32}S source, Ge(Li) placed At 0° and 90° relative to the beam axis.
1970Br11: ^{32}S(^{3}He,pγ) E=7.5 MeV, natural ZnS target on Au backing. Used annular Si surface-barrier detector for protons and Ge(Li) detector for γ rays. Used DSAM for mean lifetimes determination.
1970Br10: ^{32}S(^{3}He,pγ) E=5.2 MeV, natural CdS target on Au backing. Used annular Si surface-barrier detector for protons, and Ge(Li) and NaI detectors for γ rays. Measured γ, P, $\gamma(\theta)$.
1970Sy01: ^{32}S(^{3}He,pγ) E=5.75 MeV, natural ZnS target on $\alpha\gamma$ backing. Used annular Si surface-barrier detector for protons and NaI detectors for γ rays. Measured γp(θ).
1970Th10: ^{32}S(^{3}He,pγ) E=9, 9.5, 10 MeV, natural ZnS target on Ta backing. Si surface-barrier detector for protons and NaI detector for γ rays. Measured γp(θ).

^{34}Cl Levels

E(level)[†]	J$^\pi$	$T_{1/2}$	Comments
0.0	0$^+$		J$^\pi$: adopted value.
146.36 *3*	3		J$^\pi$: D+Q ΔJ=1 γ from J=2 *1887* level.
461.00 *4*	1	4.9 ps *5*	J$^\pi$: D ΔJ=1 γ to 0$^+$ g.s.. $T_{1/2}$: mean lifetime τ in ps: 7.1 *7* (1971Sn01); 9 *4* (1970Br10); adopted: 7.1 *7*.
665.56 *4*	1	8.9 ps *7*	J$^\pi$: D ΔJ=1 γ to 0$^+$ g.s.. $T_{1/2}$: mean lifetime τ in ps: 12.8 *10* (1971Sn01); 14 *+11−6* (1970Br10); adopted: 12.8 *10*.
1230.26 *4*	2	13 ps *1*	J$^\pi$: D+Q ΔJ=1 γ to J=1, 461 level. $T_{1/2}$: mean lifetime τ in ps: 19.4 *14* (1971Sn01);>14 (1970Br10); adopted: 19.4 *14*.
1887.14 *5*	2	1.2 ps *5*	J$^\pi$: D+Q ΔJ=1 γ to J=1, 461 level. $T_{1/2}$: mean lifetime τ in fs: 2400 *1300* (1973Ca15); 940 *400* (1970Br11); adopted unweighted 1670 *730*.
2158.05 *5*		51 fs *19*	$T_{1/2}$: mean lifetime τ in fs: 100 *30* (1973Ca15); 46 *15* (1970Br11); adopted unweighted average: 73 *27*.
2181.5 *7*		320 fs *58*	$T_{1/2}$: mean lifetime τ in fs: 600 *150* (1973Ca15); 400 *100* (1970Br11); adopted weighted average: 462 *83* (external uncertainty).
2376.5 *4*		186 fs *35*	$T_{1/2}$: mean lifetime τ in fs: 275 *70* (1973Ca15); 260 *75* (1970Br11); adopted weighted average: 268 *51*.
2580.4 *2*	(1)	33 fs *8*	J$^\pi$: (D) ΔJ=1 γ to 0$^+$ g.s.. E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 2.58 MeV (1973Ca15); 2587 (1970Sy01). $T_{1/2}$: mean lifetime τ in fs: 47 *12* (1973Ca15).
2611.05 *11*		568 fs *242*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 2.61 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in fs: 820 *350* (1973Ca15).
2721.8 *5*	2	>1.4 ps	J$^\pi$: D(+Q) ΔJ=1 γ to J=1, 461 level; γ to 0$^+$. $T_{1/2}$: mean lifetime τ in ps:>2 (1973Ca15).
3129.13 *12*		28 fs *8*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 3.13 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in fs: 40 *12* (1973Ca15).
3334.0 *2*		80 fs *24*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 3.33 MeV (1973Ca15). Additional information 1.
3383.3 *2*		<35 fs	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 3.38 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in fs:<50 (1973Ca15).
3545.07 *15*		97 fs *28*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 3.55 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in fs: 140 *40* (1973Ca15).
3600.27 *11*		>1.4 ps	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 3.60 MeV (1973Ca15).

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^{32}S(^{3}He,pγ) (continued)

^{34}Cl Levels (continued)

E(level)[†]	$T_{1/2}$	Comments
		$T_{1/2}$: mean lifetime τ in ps:>2 (1973Ca15).
3631.8 *3*	>2 ps	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 3.63 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in ps:>3 (1973Ca15).
3773.84 *15*	80 fs *21*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 3.77 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in fs: 115 *30* (1973Ca15).
4076.3 *2*	0.9 ps *+12−4*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 4.08 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in ps: 1.3 *+17−6* (1973Ca15).
4139.8 *2*	104 fs *35*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 4.14 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in fs: 150 *50* (1973Ca15).
4354.3 *2*	45 fs *14*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 4.35 MeV (1973Ca15). $T_{1/2}$: mean lifetime τ in fs: 65 *20* (1973Ca15).
4461.4 *3*	139 fs *42*	E(level): from 1983Wa27 (^{33}S(p,γ)). Others: 4.46 MeV (1973Ca15). Additional information 2.

[†] Levels up to 2722 inclusively, excluding 2580 and 2611, are from least-squares fit to Eγ data. See comments for levels above 2722 and 2580 and 2611.

γ(^{34}Cl)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	Comments
146.36	3	146.36[†] *3*		0.0	0^+			
461.00	1	314.64[†] *10*	<0.5[@]	146.36	3			
		461.00[†] *4*	100[@]	0.0	0^+	D		Mult.: D ΔJ=1 γ (1970Th10,1970Sy01). δ: 0 (1970Sy01). A_2=−0.30 *7*, A_4=−0.05 *14* (1970Sy01). Additional information 3.
665.56	1	204.55[†] *10*	9[&] *4*	461.00	1			
		519.19[†] *15*	7[&] *4*	146.36	3			
		665.55[†] *5*	84 *5*	0.0	0^+	D		Mult.: D ΔJ=1 γ (1970Th10,1970Sy01). Additional information 4. A_2=−0.12 *8*, A_4=−0.02 *15* (1970Sy01).
1230.26	2	564.68[†] *6*	28[&] *2*	665.56	1	D+Q	+0.32 *13*	Mult.: D+Q ΔJ=1 G. δ: +0.5 *2* (1971De27); −0.09 to +0.37 hence +0.23 *14* (1970Br10); adopted weighted average +0.32 *13* (external uncertainty). A_2=+0.37 *10*, A_4=+0.10 *10* (1970Br10). Additional information 5.
		769.25[†] *7*	38[&] *3*	461.00	1	D+Q	+1.2 *5*	Mult.: D+Q ΔJ=1 G. δ: +1.2 *5* (1970Br10). Additional information 6. A_2=+0.94 *9*, A_4=+0.41 *10* (1970Br10).
		1083.88[†] *10*	32[&] *2*	146.36	3	D+Q	+1.6 *12*	Mult.: D+Q ΔJ=1 G. δ: +1.2 *+23−7* (1971De27); +2.2 *18* (1970Br11,1970Br10); adopted weighted average +1.6 *12*. A_2=−0.80 *8*, A_4=+0.11 *9* (1970Br10). Additional information 7.
		1230.24[†] *10*	2[&] *1*	0.0	0^+			
1887.14	2	656.86[†] *10*	2[a] *2*	1230.26	2			

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^{32}S(^{3}He,pγ) (continued)

γ(^{34}Cl) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	Comments
1887.14	2	1221.55† *10*	2[a] *2*	665.56	1			
		1426.10† *10*	58[a] *3*	461.00	1	D+Q	−1.8 *2*	Mult.: D+Q ΔJ=1 G. δ: −1.8 *2* (1970Br10). A_2=−0.66 *6*, A_4=+0.39 *8* (1970Br10). Additional information 8.
		1740.74† *10*	38[a] *3*	146.36	3	D+Q	−1.2 *8*	Mult.: D+Q ΔJ=1 G. δ: −1.2 *8* (1970Br11,1970Br10,1970Sy01). A_2=+0.28 *8*, A_4=+0.05 *9* (1970Br10). Additional information 9.
		1887.10†d *10*	<5[a]	0.0	0^+			
2158.05		270.90† *10*	<1[@]	1887.14	2			
		927.76† *10*	7.0[@] *2*	1230.26	2			
		1492.45† *10*	<1[@]	665.56	1			
		1697.00† *10*	68.8[@] *3*	461.00	1			
		2011.64† *10*	7.1[@] *2*	146.36	3			
		2158.00† *10*	17.1[@] *2*	0.0	0^+			
2181.5		1515.9#	17[b] *5*	665.56	1			
		1720.5#	39[b] *4*	461.00	1			
		2035.1‡ *7*	44[b] *4*	146.36	3			
		2181.5#	<1[b]	0.0	0^+			
2376.5		1146.3#	10[a] *7*	1230.26	2			
		1710.9#	<40[a]	665.56	1			
		1915.5#	<40[a]	461.00	1			
		2230.1‡ *4*	90[a] *7*	146.36	3	D+Q	−6.0 *18*	Mult.: D+Q ΔJ=1 G. δ: +5.7 *25* (1971De27); +6.3 *26* (1970Br11); adopted weighted average +6.0 *18*. A_2=+0.4, A_4=+0.4 *1* (11971de27).
		2376.4#	<10[a]	0.0	0^+			
2580.4	(1)	2119.3#		461.00	1			
		2434.0#		146.36	3			
		2580.3#	100[&]	0.0	0^+	(D)		Mult.: (D) ΔJ=1 G. δ: 0 (1970Sy01). A_2=+0.08 *8*, A_4=−0.11 *15* (1970Sy01).
2611.05		1380.8#		1230.26	2			
		2464.6#		146.36	3			
2721.8	2	540.3[c]#	16[c]& *2*	2181.5				
		563.7[c]#	16[c]& *2*	2158.05				
		1491.5#	5& *2*	1230.26	2			
		2056.2#	12& *2*	665.56	1			
		2260.7‡ *5*	41& *3*	461.00	1	D(+Q)	−0.1 *3*	Mult.: D(+Q) ΔJ=1 G. δ: −3.7 *+13−28* or −0.1 *3* (1970Sy01, for J=2). A_2=−0.21 *14*, A_4=+0.52 *25* (1970Sy01).
		2575.3#	17& *2*	146.36	3			
		2721.7#	9& *2*	0.0	0^+			
3129.13		3129.0#	100&	0.0	0^+			
3334.0		1176.0#		2158.05				
3383.3		2153.0#		1230.26	2			

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^{32}S(^{3}He,pγ) (continued)

$\gamma(^{34}Cl)$ (continued)

E_i(level)	J_i^π	E_γ	E_f	J_f^π	E_i(level)	E_γ	E_f	J_f^π	E_i(level)	J_i^π	E_γ	E_f	J_f^π
3383.3		3236.8#	146.36	3	3631.8	1255.2#	2376.5		4354.3		4354.0#	0.0	0^+
3545.07		3398.5#	146.36	3	3773.84	3773.6#	0.0	0^+	4461.4		4314.8#	146.36	3
3600.27		878.5#	2721.8	2	4076.3	3929.7#	146.36	3					
		3453.7#	146.36	3	4139.8	3993.2#	146.36	3					

† Eγ from 1971Sn01. The uncertainties less than 0.10 keV are reported by 1971Sn01 (which used the so-called mixed-source technique); for all the other γ rays No uncertainties were reported, for which evaluators adopted 0.10 keV (these Eγ values were determined relative to the previous ones).

‡ Eγ (and uncertainty) from 1971De27.

Eγ estimated by evaluators As difference In between initial and final levels.

@ From 1971Sn01.

& From 1971De27.

a From 1970Sy01.

b From 1970Br11.

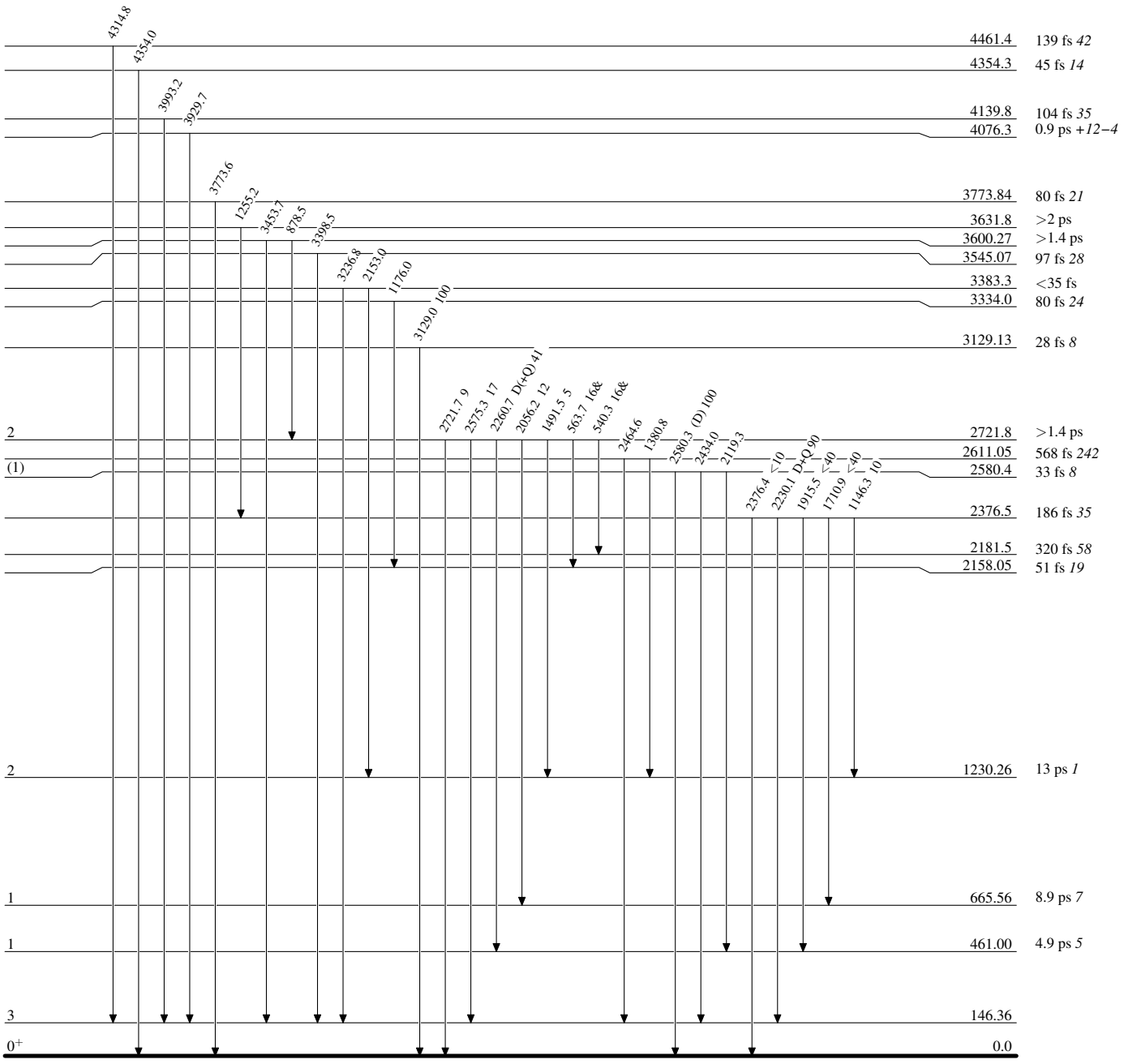
c Multiply placed with undivided intensity.

d Placement of transition in the level scheme is uncertain.

^{32}S(^{3}He,pγ)

Level Scheme

Intensities: % photon branching from each level
& Multiply placed: undivided intensity given



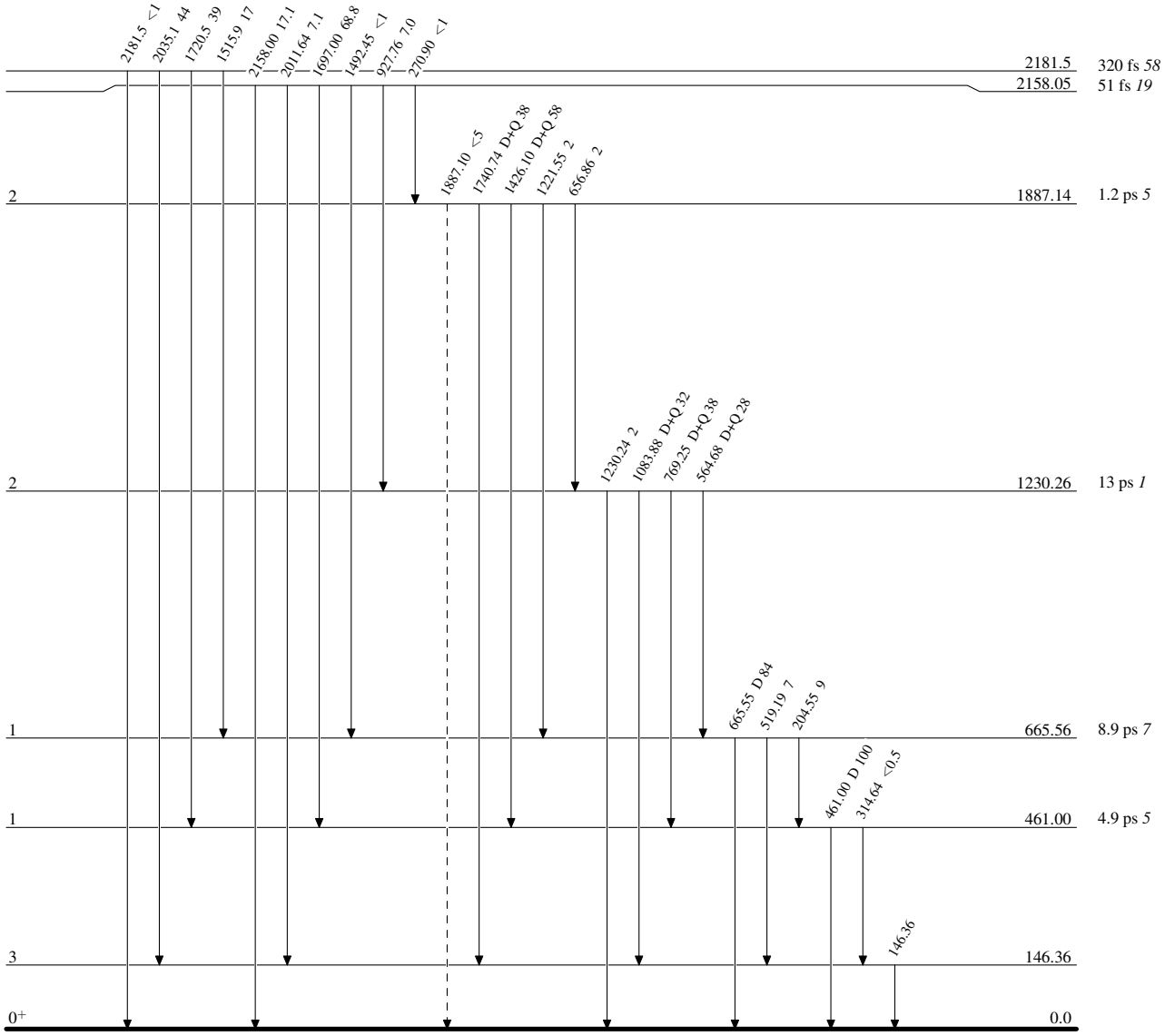
^{32}S(^{3}He,pγ)

Legend

Level Scheme (continued)

Intensities: % photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



$^{34}_{17}Cl_{17}$