

$^{33}\text{S}(p,\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03**

Type	Author	History	Citation	Literature Cutoff Date
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$^{33}\text{S}$  target  $J^\pi$ :  $3/2^+$ .

**1983Wa27**:  $^{33}\text{S}(p,\gamma)$   $E=0.4\text{-}2$  MeV, 92%-enriched S target ( $\text{Ag}_2\text{S}$  on Ta backing), Ge(Li) detectors. Measured  $E_\gamma$ ,  $I_\gamma(\theta)$ ,  $T_{1/2}$  by DSAM, resonances and strengths. Studied 41 resonances.

**1977Da02**:  $^{33}\text{S}(p,\gamma)$   $E=1.0\text{-}2.0$  MeV, 92%-enriched S target ( $\text{Ag}_2\text{S}$  on Au backing), Ge(Li) detectors At  $55^\circ$  and  $90^\circ$  relative to the beam direction. Measured level  $\Gamma$ ,  $\gamma$ -branching,  $T_{1/2}$  (DSAM) resonances and strengths. Studied 45 resonances.

**1977Da03**:  $^{33}\text{S}(p,\gamma)$   $E=1.0\text{-}2.0$  MeV. Measured proton elastic scattering with 92%-enriched S target ( $\text{Ag}_2\text{S}$  on C backing), using four surface barrier Si detectors placed At angles between  $90^\circ$  and  $170^\circ$ . Also measured  $\gamma$ -ray angular distributions with 92%-enriched S target ( $\text{Ag}_2\text{S}$  on Au backing) and Ge(Li) detectors, one placed At  $0^\circ$ ,  $30^\circ$ ,  $45^\circ$ ,  $55^\circ$ , and  $90^\circ$ , and the other At  $55^\circ$ , relative to the beam direction. Deduced  $J$ ,  $\pi$ ,  $T_{1/2}$ ,  $\delta$ . Studied 5 resonances.

Others:

**2011Fr04**:  $^{33}\text{S}(p,\gamma)$   $E(p)(\text{c.m.})=200\text{-}710$  keV at  $\approx 45$   $\mu\text{A}$ . Target consisted of  $10^{16}$   $^{33}\text{S}$  ions of 45 keV implanted into an oxygen-free copper substrate. Measured  $E_\gamma$ ,  $I_\gamma$  using two HPGe detectors at  $\pm 55^\circ$ , surrounded by plastic scintillators operating in anticoincidence mode. Deduced stellar reaction rates for each of the three resonances, and percentage of decays resulting in  $^{34}\text{Cl}$  g.s. and  $^{34\text{m}}\text{Cl}$  at 147. Relevance to production of sulfur isotopes and  $^{34\text{m}}\text{Cl}$  in novae.

**2010PaZT** (showing preliminary results related by astrophysics interest and authorship to **2011Fr04** and **2009Pa28**):  $^{34}\text{S}(^3\text{He,t})$ ,  $^{33}\text{S}(^3\text{He,d})$ ,  $E=25$  MeV, targets of 99.999%  $^{34}\text{S}$ -enriched  $\text{Ag}_2\text{S}$  for first reaction and of 99.9%  $^{33}\text{S}$ -enriched  $\text{Ag}_2\text{S}$ , measured reaction products and deduced new states At MLL;  $^{33}\text{S}(p,\gamma)$ ,  $E(p)(\text{C.M.})=210\text{-}710$  keV, targets of  $^{33}\text{S}$  by rastering an ion beam into OFHC copper plates, measured  $E_\gamma$ ,  $I_\gamma$  At CENPA;  $^1\text{H}(^{33}\text{S},\gamma)$ , inverse kinematics of previous reaction corresponding to  $E(p)(\text{C.M.})=180\text{-}495$  keV, hydrogen-gas target At 6 torr, measured  $E(\text{particle})$ ,  $I(\text{particle})$ ,  $E_\gamma$ ,  $I_\gamma$ , (particle) $\gamma$ -coin using DRAGON.

**1994Li20**:  $^{33}\text{S}(p,\gamma)$   $E=0.973\text{-}1.997$  MeV, 98%-enriched S target ( $\text{Ag}_2\text{S}$  on Ta backing), 22% Ge(Li) ( $\gamma$  rays,  $90^\circ$  relative to the beam direction), NaI (resonance yield) and E- $\Delta E$  plastic scintillator (resonance yield by positrons of  $^{34}\text{Cl}$  decay). Enge split-pole proton spectrograph with FWHM=200-250 ppm. Studied three resonances. Measured  $E_\gamma$ ,  $S(p)$ .

**1992Ka39**:  $^{33}\text{S}(p,\gamma)$   $E=1.8\text{-}3.5$  MeV,  $\text{Ag}_2\text{S}$  target, Ge(Li) and NaI detectors. Measured  $I_\gamma(\theta)$ , deduced M1 resonance. Studied 90 resonances.

**1985La16**, **1984Ke01**:  $^{33}\text{S}(p,\gamma)$   $E=1.05\text{-}1.98$  MeV (**1985La16**),  $E=0.82$ ,  $1.43$  MeV (**1984Ke01**), enriched S target (Ta backing), Ge(Li) detector. Measured  $T_{1/2}$  using DSAM At angles  $0^\circ$  and  $90^\circ$  relative to the beam direction.  $\gamma$ -ray spectra recorded At  $55^\circ$  (**1984Ke01**). Studied one resonance.

**1983Ra04**:  $^{33}\text{S}(p,\gamma)$   $E=0.9\text{-}1.4$  MeV, 88.2%-enriched S target (CdS on carbon backing), NaI detector ( $\gamma$  rays,  $90^\circ$  relative to the beam direction) and Si surface barrier (proton detector,  $135^\circ$  relative to the beam direction) proton resolution 300-400 eV. Measured one resonance and deduced  $S(p)$ .

**1973An13**:  $^{33}\text{S}(p,\gamma)$   $E=1.3\text{-}1.8$  MeV, 76%-enriched S target (Ta backing), Ge(Li) detector placed At  $0^\circ$  and  $90^\circ$  relative to beam direction. Measured  $T_{1/2}$  by DSAM,  $J$ ,  $\pi$ ,  $\gamma$ -branching, resonances and strengths. Studied five resonances.

**1971Hy02**:  $^{33}\text{S}(p,\gamma)$   $E=1058$ ,  $1098$ ,  $1121$  MeV, 84%-enriched S target (Ag backing soldered on brass disk), Ge(Li) and NaI detectors. Measured  $\gamma(\theta)$ ,  $\gamma$ -branching,  $\delta$ , resonance strengths. Studied three resonances.

**1969Gr29**:  $^{33}\text{S}(p,\gamma)$   $E=1.0\text{-}1.3$  MeV, 25%-enriched S target ( $\alpha\gamma$  backing soldered on brass disk). Ge(Li) detector placed At  $0^\circ$  and  $115^\circ$  or  $120^\circ$  relative to beam direction. Measured  $J$ ,  $\pi$ ,  $\delta$ ,  $\gamma$ -branching,  $T_{1/2}$  by DSAM. Data for six resonances from 1057 to 1266 keV. Studied six resonances.

**1964G104**:  $^{33}\text{S}(p,\gamma)$   $E=0.3\text{-}1.3$  MeV, 22%-enriched S target (CdS on Cu or Ta backings), NaI detectors At  $+85^\circ$  and  $-85^\circ$  relative to the beam direction. Measured primary and secondary  $E_\gamma$ ,  $I_\gamma$ ,  $\gamma\gamma$ , levels, resonances and resonance strengths for  $E(p)(\text{lab})=447$ ,  $507$ ,  $546$ ,  $639$ ,  $662$ ,  $683$ ,  $731$ ,  $777$ , and  $822$  keV. For strong primary transitions the branching ratios are In general agreement with Ge data from **1993Wa27** with exception of a few cases As noted under comments for relevant  $\gamma$  rays. Studied 22 resonances.

Others: **1959Ku79**.

( $p,\gamma$ ) bound states and resonances: **1983Wa27**, **1977Da02**, **1977Da03**.

$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03 (continued) $^{34}\text{Cl}$  Levels

<u>E(level)<sup>†‡</sup></u>	<u>T<sub>1/2</sub> or <math>\Gamma</math></u>	<u>(2J+1)<math>\Gamma_p\Gamma_\gamma/\Gamma</math></u>	<u>Comments</u>
0			
146.4 <sup>#</sup> 1			
461.0 <sup>#</sup> 1			
665.5 <sup>#</sup> 3			
1230.33 8			
1887.31 8			
2157.90 8	32.7 fs 23		Additional information 1.
2181.10 8	450 fs 107		Additional information 2.
2375.7 2	139 fs 19		Additional information 3.
2580.4 2	2.1 fs 17		T <sub>1/2</sub> or $\Gamma$ : mean lifetime $\tau$ in fs:<7 (1985La16);<5 (1983Wa27); 3.0 25 (1977Da02, adopted).
2611.05 11	160 fs 38		Additional information 4.
2721.1 2	>277 fs		Additional information 5.
3129.13 12	1.9 fs 13		Additional information 6.
3334.0 2	37 fs 14		Additional information 7.
3383.3 2	5.4 fs 11		Additional information 8.
3545.07 15	102 fs 17		Additional information 9.
3600.27 11	>485 fs		Additional information 10.
3631.8 3	>485 fs		Additional information 11.
3646.3 2	152 fs 62		Additional information 12.
3660.0 3	<3.5 fs		Additional information 13.
3773.84 15	52 fs 18		Additional information 14.
3791.7 2			
3940.1 3	<4 fs		
3964.1 3	90 fs 32		Additional information 15.
3983.5 2	131 fs 23		Additional information 16.
4076.3 2	>173 fs		Additional information 17.
4139.8 2	90 fs 23		Additional information 18.
4147.8 2			
4325.91 15	5.1 fs 20		Additional information 19.
4354.3 2	30 fs 6		Additional information 20.
4417.4 2	24 fs 8		Additional information 21.
4446.6 2	116 fs 19		Additional information 22.
4461.4 3	256 fs 173		Additional information 23.
4515.8 2	10 fs 3		Additional information 24.
4605.8 <sup>@</sup> 10	243 fs 166		Additional information 25.
4609.7 <sup>@</sup> 15			Additional information 26.
4638.9 4	31 fs 10		Additional information 27.
4695.7 2	6 fs 3		Additional information 28.
4717.4 6	<9 fs		Additional information 29.
4824.5 2	333 fs 152		Additional information 30.
4941.9 4	<6 fs		Additional information 31.
4957.3 11	<12 fs		Additional information 32.
4995.6 3	5 fs 3		Additional information 33.
5020? <sup>@</sup>			
5171.6 3	50 fs 16		Additional information 34.
5386.8 15			
5540.8 11	>0.7 ps		Additional information 35.
5576.9 <sup>a</sup> 10		0.08 4	E(p)(lab)=447 1. Additional information 36.
5635.7 <sup>c</sup> 2		0.7 2	E(p)(lab)=507.6 2. Additional information 37.
5672.9 <sup>a</sup> 10		0.04 2	E(p)(lab)=546 1. Additional information 38.

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$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03** (continued) $^{34}\text{Cl}$  Levels (continued)

E(level) <sup>†‡</sup>	T <sub>1/2</sub> or $\Gamma$	(2J+1) $\Gamma_p\Gamma_\gamma/\Gamma$	Comments
5763.2 <sup>a</sup> 10		0.011 6	E(p)(lab)=639 1.
5785.5 <sup>a</sup> 10		0.034 17	E(p)(lab)=662 1.
5805.9 <sup>a</sup> 10		0.050 25	E(p)(lab)=683 1.
5852.8 <sup>c</sup> 3		0.5 2	E(p)(lab)=731.4 3. <a href="#">Additional information 39.</a>
5868.0 <sup>a</sup> 10		0.010 5	E(p)(lab)=747 1.
5897.1 <sup>a</sup> 10		0.050 25	E(p)(lab)=777 1.
5940.8 <sup>a</sup> 10		0.12 6	E(p)(lab)=822 1.
6030.0 <sup>a</sup> 19		0.050 25	E(p)(lab)=914 2.
6088.91 <sup>&amp;</sup> 8		1.0 3	E(p)(lab)=974.61 4 (1994Li20), 974.83 16 (1983Ra04), 976 2 (1964G104). E(level): unweighted average of 6088.84 8 (from E(p)(lab)=974.61 4 In 1994Li20) and 6088.97 8 (from $\gamma$ cascades In 1994Li20). (2J+1) $\Gamma_p\Gamma_\gamma/\Gamma$ : from 1983Wa27.
6136.2 <sup>b</sup> 11		0.6 2	E(p)(lab)=1023.4 11. <a href="#">Additional information 40.</a>
6141.7 <sup>b</sup> 11		0.9 5	E(p)(lab)=1029.1 11. <a href="#">Additional information 41.</a>
6169.1 <sup>b</sup> 11		1.5 7	E(p)(lab)=1057.3 11. <a href="#">Additional information 42.</a>
6181.1 <sup>c</sup> 2		3.6 5	E(p)(lab)=1069.7 2. <a href="#">Additional information 43.</a>
6207.1 <sup>b</sup> 12	<2 fs	2.2 10	E(p)(lab)=1096.5 12. <a href="#">Additional information 44.</a>
6219.2 <sup>b</sup> 12		0.10 6	E(p)(lab)=1109.0 12.
6228.5 <sup>c</sup> 3		1.2 3	E(p)(lab)=1118.5 3. <a href="#">Additional information 45.</a>
6266.5 <sup>b</sup> 13		0.2 1	E(p)(lab)=1157.7 13.
6273.1 <sup>b</sup> 13		2.7 10	E(p)(lab)=1164.5 13. <a href="#">Additional information 46.</a>
6322.3 <sup>b</sup> 13		1.9 7	E(p)(lab)=1215.2 13. <a href="#">Additional information 47.</a>
6361.3 <sup>b</sup> 13		0.4 2	E(p)(lab)=1255.4 13. <a href="#">Additional information 48.</a>
6369.8 <sup>c</sup> 2		2.7 6	E(p)(lab)=1264.4 2. <a href="#">Additional information 49.</a>
6382.4 <sup>b</sup> 14		0.3 1	E(p)(lab)=1277.1 14.
6399.7 <sup>b</sup> 14		0.2 1	E(p)(lab)=1295.0 14.
6441.5 <sup>b</sup> 14		0.2 1	E(p)(lab)=1338.4 14. <a href="#">Additional information 50.</a>
6450.5 <sup>c</sup> 2		0.9 3	E(p)(lab)=1347.3 2. <a href="#">Additional information 51.</a>
6479.2 <sup>b</sup> 14		0.2 1	E(p)(lab)=1376.9 14. <a href="#">Additional information 52.</a>
6488.3 <sup>b</sup> 14		0.8 3	E(p)(lab)=1386.3 14. <a href="#">Additional information 53.</a>
6527.5 <sup>b</sup> 15		0.2 1	E(p)(lab)=1426.7 15.
6547.8 <sup>b</sup> 15		1.6 5	E(p)(lab)=1447.6 15. <a href="#">Additional information 54.</a>
6576.1 <sup>b</sup> 15		0.6 2	E(p)(lab)=1476.8 15. <a href="#">Additional information 55.</a>
6583.6 <sup>b</sup> 15		0.4 2	E(p)(lab)=1484.5 15.

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$^{33}\text{S}(\text{p},\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03 (continued) $^{34}\text{Cl}$  Levels (continued)

<u>E(level)<sup>†‡</sup></u>	<u>(2J+1)Γ<sub>p</sub>Γ<sub>γ</sub>/Γ</u>	<u>Comments</u>
6608.3 <sup>?</sup> 20	1.1	E(p)(lab)=1506.7 20 (1973An13) only; adjusted to 1509.9 to match the energy scale of 1977Da02.
6626.2 <sup>b</sup> 15	0.2 1	E(p)(lab)=1528.4 15. Additional information 56.
6640.91 <sup>&amp;</sup> 6	3.8 6	E(p)(lab)=1543.49 5 (1994Li20); 1543.6 2 (1983Wa27); 1545.4 15. Additional information 57. E(level): unweighted average of 6640.85 9 (from E(p)(lab)=1543.49 5 In 1994Li20) and 6640.97 3 (from γ cascades In 1994Li20). (2J+1)Γ <sub>p</sub> Γ <sub>γ</sub> /Γ=3.8 6 (1977Da02).
6695.0 <sup>b</sup> 16	0.4 2	E(p)(lab)=1599.3 16.
6702.8 <sup>b</sup> 16	0.3 2	E(p)(lab)=1607.3 16.
6720.1 <sup>b</sup> 16	0.3 1	E(p)(lab)=1625.2 16.
6724.2 <sup>c</sup> 3	1.0 4	E(p)(lab)=1629.4. Additional information 58.
6738.4 <sup>b</sup> 16	0.5 2	E(p)(lab)=1644.0 16. Additional information 59.
6790.8 16	0.6 3	E(p)(lab)=1698.0 16.
6798.4 <sup>b</sup> 16	4.0 25	E(p)(lab)=1705.9 16. Additional information 60.
6807.9 <sup>b</sup> 16	0.10 7	E(p)(lab)=1715.6 16. Additional information 61.
6829.8 <sup>b</sup> 14	0.6 3	E(p)(lab)=1738.2 14. Additional information 62.
6842.7 <sup>b</sup> 14	1.8 10	E(p)(lab)=1751.5 14.
6853.0 <sup>b</sup> 14	2.3 7	E(p)(lab)=1762.1 14.
6871.0 <sup>c</sup> 3	0.4 2	E(p)(lab)=1780.7 3. Additional information 63.
6887.9 <sup>c</sup> 3	2.9 10	E(p)(lab)=1798.1 3. Additional information 64.
6901.7 <sup>c</sup> 3	2.4 6	E(p)(lab)=1812.3 3. Additional information 65.
6917.9 <sup>b</sup> 17	11 2	E(p)(lab)=1829.0 17.
6931.5 <sup>b</sup> 17	0.8 5	E(p)(lab)=1843.0 17.
6977.4 <sup>b</sup> 17	0.5 2	E(p)(lab)=1890.3 17.
6984.8 <sup>d</sup> 10	0.7 3	E(p)(lab)=1898 1. same As the 1898 2 component of the triplet resonance E(p)(lab)=1898 1 (1977Da02).
6986.8 <sup>b</sup>	1.7 10	E(p)(lab)=1900. resonance triplet E(p)(lab)=1898 2, 1900 2, 1904 2 (1977Da02).
6990.7 19	0.7 3	E(p)(lab)=1904 2 (1977DA02). component of a triplet resonance In 1977Da02 that might Be same E(p)(lab)=1906 1.
6992.6 <sup>d</sup> 10	2.5 6	E(p)(lab)=1906 1.
7018.8 <sup>d</sup> 10	0.7 3	E(p)(lab)=1933 1.
7051.5 <sup>b</sup> 18	0.3 2	E(p)(lab)=1966.7 18.
7059.0 <sup>c</sup> 3	8 2	E(p)(lab)=1974.4 3. Additional information 66.
7061.5 <sup>d</sup> 10	5 2	E(p)(lab)=1977 1.
7078.92 <sup>&amp;</sup> 9	4.4 20	E(p)(lab)=1994.86 7 (1994Li20); 1997.2 18 (1977Da02). E(level): unweighted average of 7078.83 10 (from E(p)(lab)=1994.86 7 In 1994Li20) and 7079.00 6 (from γ cascades In 1994Li20). (2J+1)Γ <sub>p</sub> Γ <sub>γ</sub> /Γ: from 1983Wa27.
7115.9 <sup>d</sup> 10	0.7 3	E(p)(lab)=2033 1.

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$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03** (continued) $^{34}\text{Cl}$  Levels (continued)

E(level) <sup>†‡</sup>	(2J+1)Γ <sub>p</sub> Γ <sub>γ</sub> /Γ	Comments
7122.7 <sup>d</sup> 10	1.0 3	E(p)(lab)=2040 1.
7126.5 <sup>d</sup> 10	0.7 3	E(p)(lab)=2044 1.
7145.0 <sup>d</sup> 10	2.5 6	E(p)(lab)=2063 1.
7165.4 <sup>d</sup> 10	1.0 3	E(p)(lab)=2084 1.
7175.1 <sup>d</sup> 10	1.5 5	E(p)(lab)=2094 1.
7183.8 <sup>d</sup> 10		E(p)(lab)=2103 1.
7203.2 <sup>d</sup> 10	1.0 3	E(p)(lab)=2123 1.
7218.7 <sup>d</sup> 10	2.0 6	E(p)(lab)=2139 1.
7238.1 <sup>d</sup> 10	3 1	E(p)(lab)=2159 1.
7249.8 <sup>d</sup> 10	4 1	E(p)(lab)=2171 1.
7271.1 <sup>d</sup> 10	1.0 3	E(p)(lab)=2193 1.
7284.7 <sup>d</sup> 10		E(p)(lab)=2207 1.
7295.4 <sup>d</sup> 10	2.5 6	E(p)(lab)=2218 1.
7321.6 <sup>d</sup> 10	1.5 5	E(p)(lab)=2245 1.
7346.8 <sup>d</sup> 10	1.7 5	E(p)(lab)=2271 1.
7375.9 <sup>d</sup> 10	1.0 3	E(p)(lab)=2301 1.
7382.7 <sup>d</sup> 10	1.5 5	E(p)(lab)=2308 1.
7406.0 <sup>d</sup> 10	2.0 6	E(p)(lab)=2332 1.
7424.4 <sup>d</sup> 10	1.5 5	E(p)(lab)=2351 1.
7440.9 <sup>d</sup> 10	1.0 3	E(p)(lab)=2368 1.
7449.7 <sup>d</sup> 10	1.0 3	E(p)(lab)=2377 1.
7462.3 <sup>d</sup> 10	0.7 3	E(p)(lab)=2390 1.
7470.0 <sup>d</sup> 10	0.7 3	E(p)(lab)=2398 1.
7486.5 <sup>d</sup> 10	3 1	E(p)(lab)=2415 1.
7496.2 <sup>d</sup> 10	1.0 3	E(p)(lab)=2425 1.
7505.9 <sup>d</sup> 10	1.0 3	E(p)(lab)=2435 1.
7511.8 <sup>d</sup> 10		E(p)(lab)=2441 1.
7517.6 <sup>d</sup> 10	4 1	E(p)(lab)=2447 1.
7527.3 <sup>d</sup> 10	2.0 6	E(p)(lab)=2457 1.
7539.9 <sup>d</sup> 10		E(p)(lab)=2470 1.
7543.8 <sup>d</sup> 10	0.5 3	E(p)(lab)=2474 1.
7562.2 <sup>d</sup> 10	0.7 2	E(p)(lab)=2493 1.
7577.8 <sup>d</sup> 10		E(p)(lab)=2509 1.
7582.6 <sup>d</sup> 10	1.5 5	E(p)(lab)=2514 1.
7588.4 <sup>d</sup> 10	1.0 3	E(p)(lab)=2520 1.
7609.8 <sup>d</sup> 10	4.5 1	E(p)(lab)=2542 1.
7624.3 <sup>d</sup> 10	0.7 2	E(p)(lab)=2557 1.
7630.2 <sup>d</sup> 10		E(p)(lab)=2563 1.
7643.7 <sup>d</sup> 10	1.5 5	E(p)(lab)=2577 1.
7649.6 <sup>d</sup> 10	1.0 3	E(p)(lab)=2583 1.
7666.1 <sup>d</sup> 10	4 1	E(p)(lab)=2600 1.
7675.8 <sup>d</sup> 10	12 3	E(p)(lab)=2610 1.
7690.3 <sup>d</sup> 10	2.0 6	E(p)(lab)=2625 1.
7708.7 <sup>d</sup> 10	1.5 5	E(p)(lab)=2644 1.
7720.4 <sup>d</sup> 10	0.7 2	E(p)(lab)=2656 1.

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$^{33}\text{S}(\text{p},\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03 (continued) $^{34}\text{Cl}$  Levels (continued)

<u>E(level)<sup>†‡</sup></u>	<u>(2J+1)Γ<sub>p</sub>Γ<sub>γ</sub>/Γ</u>	<u>Comments</u>
7730.1 <sup>d</sup> 10	2.0 6	E(p)(lab)=2666 1.
7753.4 <sup>d</sup> 10	2.5 6	E(p)(lab)=2690 1.
7784.4 <sup>d</sup> 10	1.5 5	E(p)(lab)=2722 1.
7803.8 <sup>d</sup> 10	5 2	E(p)(lab)=2742 1.
7809.7 <sup>d</sup> 10	2.0 6	E(p)(lab)=2748 1.
7831.0 <sup>d</sup> 10	3 1	E(p)(lab)=2770 1.
7848.5 <sup>d</sup> 10	1.0 3	E(p)(lab)=2788 1.
7853.3 <sup>d</sup> 10	1.5 5	E(p)(lab)=2793 1.
7878.6 <sup>d</sup> 10		E(p)(lab)=2819 1.
7886.3 <sup>d</sup> 10	1.0 3	E(p)(lab)=2827 1.
7898.9 <sup>d</sup> 10	1.5 5	E(p)(lab)=2840 1.
7904.8 <sup>d</sup> 10	2.0 6	E(p)(lab)=2846 1.
7909.6 <sup>d</sup> 10	1.0 3	E(p)(lab)=2851 1.
7934.8 <sup>d</sup> 10	1.0 3	E(p)(lab)=2877 1.
7942.6 <sup>d</sup> 10	4.5 10	E(p)(lab)=2885 1.
7966.9 <sup>d</sup> 10	2.0 6	E(p)(lab)=2910 1.
7979.5 <sup>d</sup> 10	1.5 5	E(p)(lab)=2923 1.
7990.1 <sup>d</sup> 10	1.0 3	E(p)(lab)=2934 1.
7996.9 <sup>d</sup> 10	3.5 10	E(p)(lab)=2941 1.
8030.9 <sup>d</sup> 10	2.0 6	E(p)(lab)=2976 1.
8035.8 <sup>d</sup> 10	4 1	E(p)(lab)=2981 1.
8048.4 <sup>d</sup> 10	1.5 5	E(p)(lab)=2994 1.
8070.7 <sup>d</sup> 10	3 1	E(p)(lab)=3017 1.
8132.8 <sup>d</sup> 10		E(p)(lab)=3081 1.
8141.5 <sup>d</sup> 10	7 3	E(p)(lab)=3090 1.
8154.1 <sup>d</sup> 10		E(p)(lab)=3103 1.
8191.0 <sup>d</sup> 10	4 1	E(p)(lab)=3141 1.
8195.9 <sup>d</sup> 10		E(p)(lab)=3146 1.
8214.4 <sup>d</sup> 10	9 3	E(p)(lab)=3165 1.
8235.6 <sup>d</sup> 10	4 2	E(p)(lab)=3187 1.
8248.3 <sup>d</sup> 10	6 2	E(p)(lab)=3200 1.
8258.9 <sup>d</sup> 10		E(p)(lab)=3211 1.
8280.3 <sup>d</sup> 10	2 1	E(p)(lab)=3233 1.
8305.5 <sup>d</sup> 10	27 5	E(p)(lab)=3259 1.
8319.1 <sup>d</sup> 10	7 2	E(p)(lab)=3273 1.
8337.5 <sup>d</sup> 10	12 3	E(p)(lab)=3292 1.
8361.8 <sup>d</sup> 10	5 3	E(p)(lab)=3317 1.
8372.5 <sup>d</sup> 10	9 4	E(p)(lab)=3328 1.
8389.9 <sup>d</sup> 10	4 2	E(p)(lab)=3346 1.

<sup>†</sup> From 1983Wa27, unless noted otherwise.

<sup>‡</sup> For resonances the level energies were deduced by evaluators using the formula:  $E_x = S(\text{p}) + E(\text{p})(\text{lab}) \times \text{AM}(\text{^{33}S}) / [\text{AM}(\text{^{33}S}) + \text{AM}(\text{P})]$ , with  $S(\text{p})(\text{^{34}Cl}) = 5143.14$  7 and the atomic masses (AM) of  $^{33}\text{S}$  and proton from 2011AuZZ.

Continued on next page (footnotes at end of table)

$^{33}\text{S}(p,\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $^{34}\text{Cl}$  Levels (continued)# From [1973An13](#).@ From [1977Da02](#).& From unweighted average of values obtained from E(p)(lab) measurements ([1994Li20](#)) using Sp=5143.14 7 ([2011AuZZ](#)) and those from  $\gamma$ -ray cascades in [1994Li20](#).<sup>a</sup> Deduced by evaluators from E(p)(lab) value of [1964GI04](#) (listed in comments).<sup>b</sup> Deduced by evaluators from E(p)(lab) values of [1977Da02](#) (listed in comments).<sup>c</sup> Deduced by evaluators from E(p)(lab) values of [1983Wa27](#) (listed in comments).<sup>d</sup> Deduced by evaluators from E(p)(lab) values of [1992Ka39](#) (listed in comments).

$E_i(\text{level})$	$\gamma(^{34}\text{Cl})$					
	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
461.0	314.6	<1	146.4			
	461.0	100	0			
665.5	204.5	<1	461.0			
	519.1	<1	146.4			
	665.5	100	0			$A_2=+0.28$ 4, $A_4$ set to zero; $A_2=+0.31$ 5, $A_4=-0.07$ 7 ( <a href="#">1969Gr29</a> ).
1230.33	564.8	35.8 13	665.5			
	769.3	35.2 4	461.0			
	1083.9	28.8 18	146.4			
	1230.3	<0.5	0			
1887.31	657.0	<2	1230.33			
	1221.8	<0.5	665.5			
	1426.3	57.7 7	461.0			
	1740.9	42.3 6	146.4			
	1887.3	<0.5	0			
2157.90	927.6	5.4 2	1230.33	D(+Q)	+0.1 +6-3	Mult.: D(+Q) $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.14$ 10, $A_4=0.00$ 10 ( <a href="#">1977Da03</a> ).
	1492.4	0.13 5	665.5			
	1696.9	66.1 3	461.0	D(+Q)	-0.05 3	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.12$ ,1 $A_4=-0.01$ 1 ( <a href="#">1977Da03</a> ). Additional information 67.
	2011.4	13.1 2	146.4	D+Q	+0.22 10	Mult.: D+Q $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.11$ 7, $A_4=+0.02$ 7 ( <a href="#">1977Da03</a> ). Additional information 68.
2181.10	2157.8	15.7 3	0			
	950.8	<1	1230.33			
	1515.6	12.5 6	665.5			
	1720.1	37.1 22	461.0			Additional information 69.
	2034.6	50.2 16	146.4			Additional information 70.
2375.7	2181.0	<1	0			
	1145.3	0.8 2	1230.33			
	1710.2	<2	665.5			
	1914.6	<4	461.0			
	2229.2	99.2 2	146.4			Additional information 71.
	2375.6	<2	0			
2580.4	1350.0	<1	1230.33			
	1914.8	<2	665.5			
	2119.3	<2	461.0			
	2433.9	<2	146.4			
	2580.3	100	0			
2611.05	453.1	22.6 8	2157.90			

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03** (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
2611.05	723.7	<1	1887.31			
	1380.7	26.2 22	1230.33			
	1945.5	16.3 7	665.5			
	2150.0	<2	461.0			
	2464.6	36.7 16	146.4			
2721.1	563.2	7.1 4	2157.90			
	833.8	2 2	1887.31			<a href="#">Additional information 72.</a>
	1490.7	2.1 2	1230.33			<a href="#">Additional information 73.</a>
	2055.5	7.4 4	665.5			<a href="#">Additional information 74.</a>
	2260.0	47.1 7	461.0			<a href="#">Additional information 75.</a>
	2574.6	18.4 4	146.4			<a href="#">Additional information 76.</a>
	2721.0	15.5 6	0			<a href="#">Additional information 77.</a>
3129.13	1898.7	<2	1230.33			
	2668.0	<2	461.0			
	2982.6	<2	146.4			
	3129.0	100	0			
3334.0	1176.1	46 10	2157.90			
	1446.7	<2	1887.31			
	2103.6	<2	1230.33			
	2668.4	31 7	665.5			
	2872.9	18 5	461.0			
	3187.4	<2	146.4			
	3333.8	<3	0			
3383.3	2152.9	17.2 6	1230.33			
	2717.7	26.2 10	665.5			
	2922.2	24.1 9	461.0			
	3236.7	31.6 8	146.4			
	3383.1	<1	0			
3545.07	2314.7	3.4 6	1230.33			
	3083.9	<3	461.0			
	3398.5	96.6 6	146.4	D(+Q)	-0.09 3	Mult.: D(+Q), $\Delta J=0$ $\gamma$ (1977Da03). $\delta$ : weighted average of +0.11 4 (1977Da03) and +0.06 5 (1971Hy02). $A_2=+0.19$ 3, $A_4=+0.022$ 21 (weighted average of values from 1977Da03). <a href="#">Additional information 78.</a>
	3544.9	<3	0			
3600.27	879.2	44.9 5	2721.1	Q		Mult.: Q $\Delta J=2$ $\gamma$ (1977Da03). $\delta$ : +0.01 4 (1971Hy02); +0.08 5 (1977Da03, also +14 +4-5). $A_2=+0.30$ 3, $A_4=+0.02$ 3, $A_6=+0.01$ 4 (1977Da03). <a href="#">Additional information 79.</a> <a href="#">Additional information 80.</a>
	1224.6	7.3 7	2375.7			
	2934.6	<2	665.5			
	3139.1	<2	461.0			
	3453.7	47.7 5	146.4	D(+Q)	+0.057 24	Mult.: D(+Q) $\Delta J=1$ $\gamma$ (1977Da03). $\delta$ : weighted average of +0.05 3 (1977Da03, also -7 2) and +0.07 4 (1971Hy02). $A_2=-0.12$ 3, $A_4=-0.01$ 3 (1977Da03). <a href="#">Additional information 81.</a>
3631.8	3600.1	<2	0			
	1256.1	54.5 7	2375.7	D(+Q)	0.00 +2-1	Mult.: D(+Q) $\Delta J=1$ $\gamma$ (1977Da03). $\delta$ : from 1977Da03. $A_2=-0.22$ 3, $A_4=-0.04$ 3 (1977Da03). <a href="#">Additional information 82.</a>
	2401.4	<2	1230.33			
	2966.2	<2	665.5			
	3170.6	<3	461.0			

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$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03** (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
3631.8	3485.2	45.5 7	146.4			Additional information 83.
	3631.6	<3	0			
3646.3	x @	25				
	2415.9	<2	1230.33			
	3185.1	<3	461.0			
	3499.7	75 5	146.4			
	3646.1	<3	0			
3660.0	1502.1	100	2157.90			
	1772.6	<2	1887.31			
	2429.6	<2	1230.33			
	2994.4	<2	665.5			
	3198.8	<2	461.0			
	3513.4	<5	146.4			
3773.84	x @	23				
	3773.6	77 5	0			Additional information 84.
3791.7	x @	15				
	2561.3	<3	1230.33			
	3330.5	85 6	461.0			
	3645.1	<7	146.4			
	3791.5	<6	0			
3940.1	2709.7	<2	1230.33			
	3274.4	52 7	665.5			
	3478.9	48 7	461.0			
	3939.9	<3	0			
3964.1	1588.4	8 4	2375.7			
	1806.1	69 9	2157.90			
	3817.5	22 10	146.4			
3983.5	1262.4	8.6 6	2721.1	D+Q	-0.8 3	Mult.: D+Q $\Delta J=1$ $\gamma$ (1977Da03). $\delta$ : from 1977Da03. $A_2=-0.59$ 7, $A_4=+0.05$ 7 (1977Da03).
	1825.5	27.5 9	2157.90	D(+Q)	+0.02 4	Mult.: D(+Q), $\Delta J=1$ $\gamma$ (1977Da03). $\delta$ : from 1977Da03. $A_2=-0.158$ 19, $A_4=+0.02$ 3 (weighted average of values from 1977Da03 and 1971Hy02). Additional information 85.
	2753.1	<4	1230.33			
	3522.3	<1	461.0			
	3836.9	64 1	146.4	D(+Q)	-0.02 2	Mult.: D(+Q), $\Delta J=0$ $\gamma$ (1977Da03). $\delta$ : from 1977Da03; -0.06 5 (1971Hy02). $A_2=+0.20$ 3, $A_4=0.02$ 3 (weighted average of values from 1977Da03). Additional information 86.
4076.3	1355.2	5.5 6	2721.1			
	1700.6	21.3 7	2375.7	D+Q	-0.27 +4-3	Mult.: D+Q $\Delta J=0$ $\gamma$ (1977Da03). $\delta$ : from 1977Da03. $A_2=+0.18$ 2, $A_4=0.00$ 2 (1977Da03).
	1895.1	13.2 7	2181.10	D(+Q)	+0.05 +3-1	Mult.: D(+Q) $\Delta J=1$ $\gamma$ (1977Da03). $\delta$ : from 1977Da03. $A_2=-0.16$ 3, $A_4=+0.02$ 3 (1977Da03).
	2845.8	<3	1230.33			
	3615.1	<2	461.0			
	3929.7	59.6 12	146.4	D(+Q)	0.00 +1-2	Mult.: D(+Q) $\Delta J=1$ $\gamma$ (1977Da03). $\delta$ : from 1977Da03. $A_2=-0.27$ 2, $A_4=+0.01$ 2 (1977Da03). Additional information 87.
	4076.0	<2	0			

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$^{33}\text{S}(\text{p},\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
4139.8	1559.4	19 3	2580.4			
	1981.8	23 2	2157.90			
	2909.3	7 2	1230.33			
	3474.1	<5	665.5			
	3679.6	<2	461.0			
	3993.1	54 4	146.4			<a href="#">Additional information 88.</a>
	4139.5	<2	0			
4147.8	1966.6	3.7 5	2181.10			
	1989.8	3.2 7	2157.90			
	2917.3	52.9 12	1230.33			
	3482.1	35 10	665.5			
	4001.1	<2	146.4			
	4147.5	5.2 8	0			
4325.91	x @	20				
	2167.9	80 5	2157.90			
	2438.5	<1	1887.31			
	3660.2	<2	665.5			
	3864.7	<3	461.0			
	4179.2	<2	146.4			
	4325.6	<4	0			
4354.3	2196.3	23 1	2157.90			
	3688.6	<3	665.5			
	3893.1	8 1	461.0			
	4207.6	<2	146.4			
	4354.0	69 2	0			<a href="#">Additional information 89.</a>
4417.4	3186.9	<2	1230.33			
	3751.7	37 3	665.5			
	3956.2	63 3	461.0			
	4270.7	<4	146.4			
	4417.1	<5	0			
4446.6	4299.9	100	146.4	D(+Q)	-0.02 +2-1	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.29$ 3, $A_4=0.00$ 4 ( <a href="#">1977Da03</a> ).
	4446.3	<3	0			
4461.4	4314.8	100	146.4			
4515.8	3285.3	<3	1230.33			
	3850.1	80 2	665.5			<a href="#">Additional information 90.</a>
	4054.5	<2	461.0			
	4369.1	20 2	146.4			<a href="#">Additional information 91.</a>
	4515.5	<4	0			
4605.8	1884.6	43	2721.1			
	2447.8	19	2157.90			
	2718.4	15	1887.31			
	3375.3	23	1230.33			
	4459.1	5	146.4			
4609.7	1888.5	29	2721.1			
	3379.2	41	1230.33			
	4463.0	30	146.4			
4638.9	4177.6	63 4	461.0			
	4492.2	37 4	146.4			
4695.7	2537.7	100	2157.90			
	2808.3	<4	1887.31			
	3465.2	<4	1230.33			
	4029.9	<5	665.5			
	4234.4	<4	461.0			
	4695.4	<2	0			
4717.4	2106.3	8 2	2611.05			

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03** (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Comments
4717.4	2536.2	20 3	2181.10	
	2559.4	7 3	2157.90	
	2830.0	<2	1887.31	
	3486.9	<3	1230.33	
	4051.6	<3	665.5	
	4256.1	<3	461.0	
	4570.7	62 2	146.4	
4824.5	1192.7	4 1	3631.8	
	1224.2	25 6	3600.27	
	2643.3	3 1	2181.10	
	3594.0	<7	1230.33	
	4363.2	<2	461.0	
	4677.8	72 10	146.4	
	4824.1	<2	0	
4941.9	x @	30		
	2330.8	23 10	2611.05	
	2361.4	24 10	2580.4	
	4941.5	67 9	0	
4957.3	3069.8	<2	1887.31	
	3726.8	52 4	1230.33	
	4291.5	<3	665.5	
	4496.0	<3	461.0	
	4810.5	49 4	146.4	
	4956.9	<2	0	
4995.6	x @	30		
	2814.4	70 10	2181.10	
5020?	2862 &	100	2157.90	
5171.6	5024.8	100	146.4	
5386.8	1786.5	100	3600.27	
	4156.2	<2	1230.33	
	4720.9	<2	665.5	
	4925.4	<4	461.0	
	5240.0	<3	146.4	
	5386.3	<3	0	
5540.8	1940.5	64 5	3600.27	
	1995.7	36 6	3545.07	
	4874.9	<6	665.5	
	5079.4	<3	461.0	
	5393.9	<5	146.4	
	5540.3	<4	0	
5576.9	1437.1	0.2	4139.8	
	1976.6	12.1# 28	3600.27	$I_\gamma$ : other: 16.
	2031.8	42.2#	3545.07	$I_\gamma$ : other: 42.
	2447.7	0.8# 8	3129.13	
	2855.7	9.5# 10	2721.1	$I_\gamma$ : other: 8.9.
	2965.7	0.3	2611.05	
	2996.4	0.3# 3	2580.4	
	3201.0	1.3# 5	2375.7	$I_\gamma$ : other: 0.4.
	3689.4	2.3# 4	1887.31	$I_\gamma$ : other: 2.0.
	4346.3	4.3# 6	1230.33	$I_\gamma$ : other: 4.2.
	4911.0	<0.3	665.5	
	5115.5	<0.6	461.0	
	5430.0	26.1# 23	146.4	$I_\gamma$ : other: 26.
	5576.4	<0.1	0	

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03** (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Comments
5635.7	996.8	0.3	4638.9	
	1218.3	0.3	4417.4	
	1843.9	2.6 <sup>#</sup> 5	3791.7	$I_\gamma$ : other: 1.7.
	1861.8	0.7	3773.84	
	1975.2	0.1 <sup>#</sup> 1	3660.0	
	1989.3	0.1 <sup>#</sup> 1	3646.3	
	2003.9	0.1 <sup>#</sup> 1	3631.8	
	2506.5	2.7 <sup>#</sup> 3	3129.13	$I_\gamma$ : other: 2.8.
	2914.5	0.7 <sup>#</sup> 2	2721.1	$I_\gamma$ : other: 0.5.
	3024.5	0.1 <sup>#</sup> 1	2611.05	
	3055.2	8.4 <sup>#</sup> 5	2580.4	$I_\gamma$ : other: 10. Mult.: D $\Delta J=1$ $\gamma$ (1983Wa27). $A_2=-0.13$ 6, $A_4=+0.05$ 7 (1983Wa27).
	3259.8	0.1 <sup>#</sup> 1	2375.7	
	3454.4	0.2 <sup>#</sup> 2	2181.10	
	3477.6	0.4 <sup>#</sup> 2	2157.90	
	3748.2	1.2 <sup>#</sup> 2	1887.31	$I_\gamma$ : other: 1.3.
	4405.1	0.4 <sup>#</sup> 3	1230.33	$I_\gamma$ : other: 0.4.
	4969.7	10.6 <sup>#</sup> 7	665.5	$I_\gamma$ : other: 11.
	5174.3	1.5 <sup>#</sup> 5	461.0	$I_\gamma$ : other: 2.0.
	5488.8	0.2 <sup>#</sup> 2	146.4	$I_\gamma$ : other: < 0.3.
	5635.2	69.1 <sup>#</sup>	0	$I_\gamma$ : other: 69. Mult.: (D) $\Delta J=(0)$ $\gamma$ (1983Wa27). $A_2=+0.27$ 3, $A_4=+0.05$ 4 (1983Wa27).
5672.9	1255.5	0.3	4417.4	
	1318.6	0.5	4354.3	
	1732.8	1.3	3940.1	
	1881.1	2.1 <sup>#</sup> 21	3791.7	$I_\gamma$ : other: 1.4.
	1899.0	1.5 <sup>#</sup> 15	3773.84	$I_\gamma$ : other: 0.4.
	2013.1	1.1 <sup>#</sup> 11	3660.0	
	2026.8	1.0 <sup>#</sup> 10	3646.3	
	2041.0	1.3 <sup>#</sup> 13	3631.8	
	2072.6	1.7 <sup>#</sup> 17	3600.27	
	2289.5	0.4 <sup>#</sup> 4	3383.3	
	2543.7	1.8	3129.13	
	2951.7	1.2 <sup>#</sup> 12	2721.1	
	3061.7	0.5 <sup>#</sup> 5	2611.05	
	3092.3	7.3 <sup>#</sup> 16	2580.4	$I_\gamma$ : other: 4.9.
	3297.0	1.0 <sup>#</sup> 10	2375.7	
	3491.3	1.0 <sup>#</sup> 10	2181.10	
	3514.8	5.6 <sup>#</sup> 15	2157.90	$I_\gamma$ : other: 7.4.
	3785.4	1.4 <sup>#</sup> 14	1887.31	$I_\gamma$ : other: 1.3.
	5007.0	4.1 <sup>#</sup> 22	665.5	$I_\gamma$ : other: 6.1.
	5211.5	1.2 <sup>#</sup> 12	461.0	$I_\gamma$ : other: < 0.4.
	5526.0	0.4 <sup>#</sup> 4	146.4	$I_\gamma$ : other: < 0.3.
	5672.3	63.4 <sup>#</sup>	0	$I_\gamma$ : other: 74.
5763.2	1823.0	1.2	3940.1	

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$^{33}\text{S}(\text{p},\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03 (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$
5763.2	2379.8	9.3	3383.3
	2634.0	0.8	3129.13
	3605.1	54	2157.90
	3875.7	0.7	1887.31
	5097.3	<1.3	665.5
	5301.8	1.6	461.0
	5616.3	8.4	146.4
	5762.7	24	0
5785.5	2011.6	0.4	3773.84
	2402.1	26	3383.3
	2451.4	0.6	3334.0
	3064.3	0.3	2721.1
	3174.3	1.4	2611.05
	3604.2	1.5	2181.10
	3627.4	16	2157.90
	3898.0	0.8	1887.31
	4554.8	3.0	1230.33
	5119.6	<0.3	665.5
	5324.1	<0.6	461.0
	5638.6	50	146.4
	5785.0	<0.3	0
5805.9	1200.1	2.9	4605.8
	1658.1	1.0	4147.8
	1822.3	0.6	3983.5
	2205.6	0.5	3600.27
	2260.7	0.4	3545.07
	3225.3	18	2580.4
	3430.0	1.2	2375.7
	3918.3	0.4	1887.31
	4575.2	4.1	1230.33
	5140.0	18	665.5
	5344.4	31	461.0
	5659.0	20	146.4
	5805.4	1.9	0
5852.8	1705.0	9.2	4147.8
	1869.2	1.4	3983.5
	2078.9	0.2	3773.84
	2252.4	4.2	3600.27
	2307.6	6.6	3545.07
	2469.4	1.8	3383.3
	3131.5	3.8	2721.1
	3241.6	0.3	2611.05
	3671.5	1.2	2181.10
	3694.7	4.2	2157.90
	3965.2	3.1	1887.31
	4622.1	14	1230.33
	5186.9	<0.5	665.5
	5391.3	<0.5	461.0
	5705.9	50	146.4
	5852.3	<0.2	0
5897.1	1291.3	1.7	4605.8
	2351.9	1.7	3545.07
	2513.7	0.4	3383.3
	2563.0	0.3	3334.0
	3175.8	1.7	2721.1
	3316.5	0.8	2580.4
	4009.5	3.7	1887.31

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03** (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	Comments
5897.1	4666.4	14	1230.33		
	5231.2	11	665.5		
	5435.6	34	461.0		
	5750.2	29	146.4		
	5896.6	1.7	0		
5940.8	1245.1	0.6	4695.7		
	2557.4	4.7 2	3383.3		
	2811.5	0.2 1	3129.13		
	3329.6	0.5 1	2611.05		
	3360.2	1.1 2	2580.4		
	3564.9	0.5 1	2375.7		
	3759.5	1.2 2	2181.10		
	3782.7	70.9 7	2157.90		Additional information 92.
	4053.2	0.8 2	1887.31		
	4710.1	0.2 1	1230.33		
	5274.9	0.7 2	665.5		
	5479.3	14.4 3	461.0		
	5793.9	4.4 2	146.4		
	5940.2	0.4 1	0		
6030.0	2646.6	4.2	3383.3		
	3871.9	<0.3	2157.90		
	4142.4	<0.6	1887.31		
	4799.3	<0.5	1230.33		
	5364.0	<0.5	665.5		
	5568.5	<0.8	461.0		
	5883.1	5.8	146.4		
	6029.4	90	0		
6088.91	2297.1	0.3	3791.7		
	2315.0	0.5	3773.84		
	3367.6	4.2	2721.1		
	3508.3	0.3	2580.4		
	3930.8	<0.3	2157.90		
	4201.3	2.3	1887.31		
	4858.2	<0.6	1230.33		
	5423.0	<1.0	665.5		
	5627.4	2.4	461.0		
	5942.0	<0.3	146.4		
	6088.3	90	0		Additional information 93.
6136.2	1718.8	<1	4417.4		
	2152.6	<1	3983.5		
	2752.8	0.9 2	3383.3		
	3414.9	1.1 3	2721.1		
	3525.0	2.1 5	2611.05		
	3555.6	0.9 2	2580.4		
	3954.9	1.0 3	2181.10		
	3978.1	6.2 6	2157.90		
	4905.5	22 2	1230.33	D	Mult.: D, $\Delta J=1$ $\gamma$ (1983Wa27). Additional information 94.
	5470.2	56 6	665.5	D	Mult.: D, $\Delta J=0$ $\gamma$ (1983Wa27). $A_2=+0.28$ 5, $A_4=-0.01$ 6 (1983Wa27).
	5674.7	0.3	461.0		
	5989.2	10.5 11	146.4		
6141.7	1625.9	1.1 3	4515.8		
	1724.3	0.9 4	4417.4		
	1787.3	1.5 4	4354.3		
	2349.9	0.5	3791.7		
	2367.8	2.1 5	3773.84		

Continued on next page (footnotes at end of table)

$^{33}\text{S}(p,\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
6141.7	2596.5	0.5 3	3545.07			
	2758.3	<0.5	3383.3			
	3420.4	5.6 6	2721.1			
	3561.1	1.1 3	2580.4			
	3983.5	0.5	2157.90			
	4911.0	2 1	1230.33			
	5475.7	<0.2	665.5			
	5680.2	<0.1	461.0			
	5994.7	<0.3	146.4			
	6141.1	86 9	0			<a href="#">Additional information 95.</a>
6169.1	1653.3	1.5 8	4515.8			
	2029.2	<1	4139.8			
	2092.7	5 1	4076.3	D(+Q)	+0.03 5	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1971Hy02</a> ). $\delta$ : from <a href="#">1971Hy02</a> (or>7). $A_2=-0.12$ 5 ( <a href="#">1971Hy02</a> ).
	2185.5	34 3	3983.5	D(+Q)	-0.03 3	Mult.: D(+Q), $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : weighted average of -0.02 +5-4 ( <a href="#">1977Da03</a> ) and -0.05 6 ( <a href="#">1971Hy02</a> , or +1.3 2). $A_2=+0.27$ 3, $A_4=+0.01$ 3 (weighted average of values from <a href="#">1983Wa27</a> and <a href="#">1977Da03</a> ). <a href="#">Additional information 96.</a>
	2568.7	7.8 8	3600.27			
	2623.9	4.9 10	3545.07	D(+Q)	-0.05 +19-14	Mult.: D(+Q), $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.25$ 5, $A_4=+0.01$ 5 ( <a href="#">1977Da03</a> ). <a href="#">Additional information 97.</a>
	3447.8	7.6 8	2721.1			
	3557.9	2.5 6	2611.05			<a href="#">Additional information 98.</a>
	3987.7	4.9 12	2181.10			<a href="#">Additional information 99.</a>
	4010.9	0.6 2	2157.90			
	4281.5	2.6 7	1887.31			<a href="#">Additional information 100.</a>
	4938.4	3.6 9	1230.33	D(+Q)	0.00 1	Mult.: D $\Delta J=1$ $\gamma$ ( <a href="#">1971Hy02</a> ). $\delta$ : from <a href="#">1971Hy02</a> . $A_2=-0.24$ 10 ( <a href="#">1971Hy02</a> ).
	5503.1	<0.2	665.5			
	5707.6	<0.3	461.0			
	6022.1	27 3	146.4	D(+Q)	-0.02 3	Mult.: D(+Q), $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : weighted average of -0.03 5 ( <a href="#">1977Da03</a> ) and -0.02 3 ( <a href="#">1971Hy02</a> ). $A_2=+0.264$ 24, $A_4=-0.01$ 3 (weighted average of values from <a href="#">1983Wa27</a> and <a href="#">1977Da03</a> ). <a href="#">Additional information 101.</a>
6181.1	6168.5	<0.3	0			
	1855.1	5.1 5	4325.91			
	2216.9	1.2 3	3964.1			
	2797.7	2.6 7	3383.3			
	2847.0	2.7 7	3334.0			
	3051.8	0.4 1	3129.13			
	3459.8	0.5 1	2721.1			
	3569.8	3.8 10	2611.05			
	3600.5	8.0 8	2580.4			
	3805.2		2375.7			
	3999.7	0.6 2	2181.10			
	4022.9	3.9 10	2157.90			
	4293.5	4.1 10	1887.31			
	4950.0	10.3 10	1230.33			<a href="#">Additional information 102.</a>
	5515.1	43 4	665.5			<a href="#">Additional information 103.</a>

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03 (continued)** $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
6181.1	5719.6 6034.1	4.5 11 9.5 10	461.0 146.4	(D)		Mult.: (D) $\Delta J=1$ $\gamma$ (1969Gr29). Additional information 104.
6207.1	6180.5 1382.6 2130.7 2223.5 2560.7 2575.2 2606.7	0.8 0.7 2 8.8 9 4.8 13 0.5 3 9.4 9 48 5	0 4824.5 4076.3 3983.5 3646.3 3631.8 3600.27			Mult.: $\Delta J=0$ $\gamma$ (1971Hy02); depending on $A_4$ $\Delta J=2,1$ are not excluded. $\delta$ : -0.03 5 (1971Hy02). $A_2=+0.31$ 1 (1971Hy02). Mult.: D(+Q) $\Delta J=1$ $\gamma$ (1971Hy02). $\delta$ : from 1971Hy02. $A_2=-0.22$ 2 (1971Hy02).
	2661.9	23 2	3545.07	D(+Q)	0.00 2	Additional information 105.
	3831.2 4025.7 4319.5 5541.1 5745.6 6060.1 6206.5	2.1 5 2.9 7 0.2 <0.1 <1.1 0.7 2 <0.1	2375.7 2181.10 1887.31 665.5 461.0 146.4 0			
6219.2	1501.8 1893.2 2572.8 2587.3 2885.1 3607.9 3638.6 4037.8 4988.5	39 4 1.5 8 7.0 7 1.0 5 3.0 15 2 1 4.5 23 18 2 11 1	4717.4 4325.91 3646.3 3631.8 3334.0 2611.05 2580.4 2181.10 1230.33			
6228.5	6072.3 1589.6 1712.7 1811.0 1874.1	13 1 1.5 4 11 1 2.8 7 9.3 9	146.4 4638.9 4515.8 4417.4 4354.3	D		Additional information 106. Additional information 107. Additional information 108. Mult.: D $\Delta J=1$ $\gamma$ (1971Hy02). Additional information 109.
	1902.5 2088.3 2454.6	0.9 3 5.5 6 17 2	4325.91 4139.8 3773.84	D(+Q)	+0.03 5	Additional information 110. Mult.: D(+Q) $\Delta J=1$ $\gamma$ (1971Hy02). $\delta$ : from 1971Hy02. Additional information 111.
	3099.2 3507.2 4070.3 5562.5 5767.1 6081.5 6227.9	1 43 4 4.5 11 <0.2 2.1 5 <0.2 1.9 5	3129.13 2721.1 2157.90 665.5 461.0 146.4 0			$A_2=+0.01$ 5 (1971Hy02). Additional information 112.
6266.5	3545.2 4085.1 4108.3 4378.9 5035.8 5600.5 5805.0	3.1 10 2.5 56 13 6.4 16 3.7 16 3 <1.0	2721.1 2181.10 2157.90 1887.31 1230.33 665.5 461.0			

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$^{33}\text{S}(\text{p},\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03 (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	Comments
6266.5	6119.5	31	146.4		
	6265.9	<1.1	0		
6273.1	1826.4	0.2	4446.6		
	2196.7	0.6 2	4076.3		
	2308.9	0.8 2	3964.1		
	2939.0	0.5	3334.0		
	3661.8	7.4 7	2611.05		
	3897.2	64 6	2375.7		Additional information 113.
	4091.7	15 2	2181.10		Additional information 114.
	4114.9	0.9 3	2157.90		
	4385.5	6.7 7	1887.31		Additional information 115.
	5042.4	0.5 3	1230.33		
	5607.1	<0.1	665.5		
	5811.6	<0.1	461.0		
	6126.1	4.0 10	146.4		
	6272.5	<0.1	0		
6322.3	1716.5	1.4 4	4605.8		
	1967.9	1.0 3	4354.3		
	2245.9	3 1	4076.3		
	2690.4	1.0 5	3631.8		
	2777.1	4.1 10	3545.07		
	2938.9	0.5 3	3383.3		
	3601.0	5.3 5	2721.1		
	3711.0	1.2 8	2611.05		
	3741.7	8.8 9	2580.4	D	Mult.: D $\Delta J=1$ $\gamma$ (1983Wa27). Additional information 116.
	3946.4		2375.7		
	4140.9	0.9 3	2181.10		
	4164.1		2157.90		
	4434.7	0.9 3	1887.31		
	5091.6	1.9 5	1230.33		
	5656.3	18 2	665.5		
	5860.8	8.0 8	461.0		
	6175.3	47 5	146.4		Additional information 117.
	6321.7	<0.3	0		
6361.3	2977.9	31 3	3383.3		
	4203.1	44 4	2157.90		
	5130.6	11 1	1230.33		
	5899.8	6.5 7	461.0		
	6214.3	7.5 8	146.4		
6369.8	1412.5	1.0 5	4957.3		
	1730.9	0.8 2	4638.9		
	1853.9	1.2 3	4515.8		
	2015.4	2.3 6	4354.3		
	2386.2	0.5 1	3983.5		
	2405.6	0.5 1	3964.1		
	2824.6	2.1 5	3545.07		
	2986.4	0.6 2	3383.3		
	3035.7	0.7	3334.0		
	3240.5	0.8 2	3129.13		
	3648.5	6.0 6	2721.1		
	3758.5	0.9 2	2611.05		
	3789.3	7.0 7	2580.4		
	3993.8		2375.7		
	4188.4	2.7 7	2181.10		
	4211.6	2.4 6	2157.90		
	4482.2	1.0 3	1887.31		

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$^{33}\text{S}(\text{p},\gamma)$ :resonances **1983Wa27,1977Da02,1977Da03 (continued)** $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Comments
6369.8	5139.1	3.0 8	1230.33	
	5703.8	31 3	665.5	Additional information 118.
	5908.2	8.1 8	461.0	Additional information 119.
	6222.8	14 1	146.4	Additional information 120.
	6369.2	15 1	0	Additional information 121.
6382.4	1772.7	19 2	4609.7	
	1776.6	14 1	4605.8	
	2306.0	2.5 13	4076.3	
	2398.8	2 1	3983.5	
	2782.0	8.0 8	3600.27	
	2837.2	3.5 18	3545.07	
	3048.3	2.5 13	3334.0	
	3661.1	1.0 5	2721.1	
	3771.1	4 2	2611.05	
	4006.4	2.5 13	2375.7	
	5716.4	2 1	665.5	
	6235.4	39 4	146.4	
6399.7	2799.3	3 2	3600.27	
	3016.3	32 3	3383.3	
	3678.4	2 1	2721.1	
	4023.7	3 2	2375.7	
	5168.9	5.0 5	1230.33	
	6252.7	55 6	146.4	
6441.5	2365.1	2 1	4076.3	
	3058.1	7.0 7	3383.3	
	4283.3	73 7	2157.90	
	5775.5	4 2	665.5	
	5979.9	6.0 6	461.0	
	6294.5	8.0 8	146.4	
6450.5	1840.7	<2	4609.7	
	1844.6	4.0 10	4605.8	
	1989.0	3.3	4461.4	
	2003.8	3.5 9	4446.6	
	2310.6	1.7 4	4139.8	
	2818.6	4.6 12	3631.8	
	2850.1	18 2	3600.27	Mult.: Q $\gamma$ (1983Wa27). $A_2=+0.46$ 10, $A_4=-0.18$ 12 (1983Wa27).
	2905.3	3.9 10	3545.07	
	3116.3	0.5	3334.0	
	3839.2	13 1	2611.05	
	4269.1	1.6 4	2181.10	
	4292.3	<0.2	2157.90	
	5784.5	<0.5	665.5	
	5988.9	<0.4	461.0	
	6303.5	48 5	146.4	Additional information 122.
	6449.8	<0.8	0	
6479.2	2124.8	17 2	4354.3	
	2705.2	<2	3773.84	
	3898.6	6.0 6	2580.4	
	5813.2	12 1	665.5	
	6017.6	65 7	461.0	
6488.3	2548.1	10 1	3940.1	
	3359.0	0.9	3129.13	
	4330.1	60 6	2157.90	Additional information 123.
	5822.3	1.6 4	665.5	
	6026.7	8.0 8	461.0	
	6341.3	<0.5	146.4	

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$^{33}\text{S}(\text{p},\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments	
6488.3	6487.6	21 2	0				
6527.5	2927.1	<3	3600.27				
	3144.0	59.8 11	3383.3				
	3193.3	1.3 4	3334.0				
	4369.3	7.4 6	2157.90				
	4639.9	5.2 5	1887.31				
	5861.5	12.6 10	665.5				
	6065.9	3.7 5	461.0				
	6380.5	10 8	146.4				
	6547.8	1376.2	1.3	5171.6			
		3164.3	0.8	3383.3			
3967.2		5.3 5	2580.4				
5317.0		13 1	1230.33				
5881.8		<0.3	665.5				
6086.2		<0.4	461.0				
6400.8		81 8	146.4				
6547.1		<0.4	0				
6576.1		4200.1	1.8	2375.7			
		4417.9	93	2157.90			
	5910.0	<0.6	665.5				
	6429.0	5.2	146.4				
	6575.4	<0.6	0				
6583.6	3038.4	25 3	3545.07				
	4425.4	10 1	2157.90				
	5917.5	10 1	665.5				
	6122.0	47 5	461.0				
	6582.9	8.0 8	0				
6626.2	1239.4	3.9	5386.8				
	1908.7	4.1	4717.4				
	2486.3	2.4	4139.8				
	2549.8	11 1	4076.3				
	2994.3	3.6	3631.8				
	3025.8	24 2	3600.27				
	3081.0	9.4 9	3545.07				
	3292.0	6.8	3334.0				
	4014.9	3.0	2611.05				
	4444.8	9.0	2181.10				
	4468.0	10	2157.90				
	5395.4	2.7	1230.33				
	5960.1	<0.5	665.5				
	6164.6	20 2	461.0				
	6479.1	14 1	146.4				
6640.91	2314.9	0.5 3	4325.91				
	2564.5	41 4	4076.3	D+Q	-0.14 3	Mult.: D+Q $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.31$ 2, $A_4=+0.03$ 2 ( <a href="#">1977Da03</a> ). <a href="#">Additional information 124.</a>	
	2657.3	2.4 6	3983.5				
	2994.5	0.5 3	3646.3				
	3009.0	0.5 3	3631.8				
	3040.5	3.9 10	3600.27	D+Q	-0.12 3	Mult.: D+Q $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.32$ 3, $A_4=+0.08$ 3 ( <a href="#">1977Da03</a> ).	
	3095.7	17 2	3545.07	D(+Q)	+0.04 2	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.25$ 2, $A_4=0.00$ 2 ( <a href="#">1977Da03</a> ). <a href="#">Additional information 125.</a>	

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$^{33}\text{S}(\text{p},\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
6640.91	4029.6	4.9 12	2611.05	D(+Q)	+0.02 +1-2	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.27$ 3, $A_4=-0.01$ 3 ( <a href="#">1977Da03</a> ). Mult.: D+Q $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.30$ 3, $A_4=+0.06$ 3 ( <a href="#">1977Da03</a> ).
	4264.9	5.5 6	2375.7	D+Q	-0.14 4	
	4459.5	0.6 1	2181.10			
	5974.9	<0.3	665.5			
	6179.3	<0.2	461.0			
	6493.8	24 2	146.4	D(+Q)	+0.02 +1-2	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da13</a> . $A_2=-0.28$ 2, $A_4=+0.02$ 2 ( <a href="#">1977Da03</a> ). <a href="#">Additional information 126</a> .
	6640.2	<0.4	0			
6695.0	1870.4	16 2	4824.5			
	1999.2	4 2	4695.7			
	3048.6	10 1	3646.3			
	3094.6	15 2	3600.27			
	4083.7	23 2	2611.05			
	4319.0	32 3	2375.7			
6702.8	2626.4	2 1	4076.3			
	3102.4	4 2	3600.27			
	3157.6	3 2	3545.07			
	3368.6	2 1	3334.0			
	4326.8	5 1	2375.7			
	6555.7	84 8	146.4			
6720.1	2110.3	15 2	4609.7			
	2114.2	11 1	4605.8			
	2736.5	4 2	3983.5			
	3336.6	4.5 23	3383.3			
	4832.4	5.5 6	1887.31			
	5489.3	12 1	1230.33			
	6573.0	48 5	146.4			
6724.2	1899.6	24 2	4824.5			
	2028.4	4.5 11	4695.7			
	2760.0	1.2	3964.1			
	3077.8	7.6 7	3646.3			
	3340.7	0.4	3383.3			
	4112.9	19 2	2611.05			
	4348.2	25 2	2375.7			
	4542.8	1.7 4	2181.10			
	4566.0	2.5 6	2157.90			
	6058.1	<0.3	665.5			
	6262.6	<0.5	461.0			
	6577.1	16 2	146.4			
	6723.5	<0.2	0			
6738.4	3609.1	2.2 6	3129.13			
	4580.2	38 4	2157.90			
	4850.7	1.3	1887.31			
	5507.6	4.7 12	1230.33			
	6072.3	15 1	665.5			
	6276.8	11 1	461.0			
	6591.3	30 3	146.4			
	6737.7	<0.6	0			
6790.8	4903.1	5 1	1887.31			
	6124.7	<3.0	665.5			
	6329.2	<4.0	461.0			

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03 (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Comments
6790.8	6643.7	<6.0	146.4	
	6790.1	98 10	0	
6798.4	2834.3	1.0 5	3964.1	
	3414.9	0.5 3	3383.3	
	4187.1	2.0 5	2611.05	
	4422.8	1.0 5	2375.7	
	4640.2	0.5 1	2157.90	
	4910.7	3.8 10	1887.31	
	6132.3	<0.2	665.5	
	6336.8	<0.3	461.0	
	6651.3	92 9	146.4	Additional information 127.
	6797.7	<0.4	0	
6807.9	3424.4	9.0 9	3383.3	
	4227.2	12 1	2580.4	
	4649.7	8.0 8	2157.90	
	6141.8	71 7	665.5	
6829.8	3284.6	3.8	3545.07	
	3446.3	8.1 8	3383.3	
	4671.6	55 6	2157.90	
	5599.0	<0.6	1230.33	
	6163.7	4.6 11	665.5	
	6368.2	14 1	461.0	
	6682.7	17 2	146.4	
	6829.1	<0.7	0	
6842.7	2232.9	1.1	4609.7	
	2236.8	1.9 5	4605.8	
	2326.8	5.3 5	4515.8	
	2488.3	8.5 8	4354.3	
	2694.8	5.5	4147.8	
	2702.8	2.3 6	4139.8	
	2859.1	9.1 9	3983.5	
	3068.7	1.0	3773.84	
	3459.2	3.7 9	3383.3	
	3508.5	1.9 5	3334.0	
	3713.4	1.5	3129.13	
	4231.4	2.5 6	2611.05	
	4262.0	8.2 8	2580.4	
	4661.3	1.1	2181.10	
	4684.5	5.4 5	2157.90	
	4955.0	6.5 7	1887.31	
	5611.9	13 1	1230.33	
	6176.6	7.1 7	665.5	
	6381.1	18 2	461.0	
	6695.6	2.3 6	146.4	
	6842.0	<0.3	0	
6853.0	1857.3	1.0 2	4995.6	
	2157.2	1.0 2	4695.7	
	2498.6	1.0 5	4354.3	
	3307.8	2.0	3545.07	
	3723.7	3.1 8	3129.13	
	4272.3	3.3 8	2580.4	
	4965.3	23 2	1887.31	
	5622.2	13 1	1230.33	
	6186.9	6.5 7	665.5	
	6391.4	40 4	461.0	
	6705.9	4.0 10	146.4	
	6852.3	4.8 12	0	

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
6871.0	1330.2	5.3 5	5540.8	Q		Mult.: Q $\Delta J=2$ $\gamma$ ( <a href="#">1977Da03</a> ). $A_2=+0.49$ 9, $A_4=-0.17$ 9 ( <a href="#">1977Da03</a> ).
	1484.2	2.2 5	5386.8			
	1699.4	11 1	5171.6	D(+Q)	+0.02 3	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.24$ 4, $A_4=+0.02$ 4 ( <a href="#">1977Da03</a> ).
	2424.3	28 3	4446.6	D(+Q)	+0.05 +1-4	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.19$ 3, $A_4=0.00$ 3 ( <a href="#">1977Da03</a> ).
	2794.6	2.6	4076.3			
	3239.0	45 5	3631.8	D(+Q)	+0.04 7	Mult.: D(+Q) $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.41$ 3, $A_4=+0.05$ 4 ( <a href="#">1977Da03</a> ).
	4495.0	7.3 7	2375.7	D(+Q)	+0.04 +3-5	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.21$ 7, $A_4=-0.06$ 7 ( <a href="#">1977Da03</a> ).
	4712.7	<0.4	2157.90			
	6204.9	<0.6	665.5			
	6409.4	<0.7	461.0			
	6723.9	<0.6	146.4			
	6870.3	<0.6	0			
6887.9	1930.5	1.0 3	4957.3			
	2170.4	2.8 7	4717.4			
	2278.1	1.0 5	4609.7			
	2282.0	1.1 3	4605.8			
	3504.4	1.7 4	3383.3			
	4706.5	2.0 5	2181.10			
	4729.6	84 8	2157.90	D+Q	-0.52 +3-2	Mult.: D+Q, $\Delta J=1$ G. $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.13$ 2, $A_4=+0.01$ 3 ( <a href="#">1977Da03</a> ).
	5000.2	1.2 3	1887.31			
	6221.8	<0.3	665.5			
	6426.2	<0.3	461.0			
	6740.8	5.9 6	146.4			
	6887.2	<0.4	0			
6901.7	3518.2	16 2	3383.3			
	4743.4	75 8	2157.90			
	5670.9	0.6	1230.33			
	6235.6	<0.2	665.5			
	6440.0	0.9	461.0			
	6754.6	2.1 5	146.4			
	6900.9	6.7 7	0			
6917.9	1377.1	0.3	5540.8			
	3271.4	1.4 3	3646.3			
	3285.9	2.1 5	3631.8			
	3372.7	0.5	3545.07			
	3583.7	1.5 4	3334.0			
	4306.6	2.5 6	2611.05			
	4541.9	25 3	2375.7	D		Mult.: D $\Delta J=0$ $\gamma$ ( <a href="#">1983Wa27</a> ). $A_2=+0.50$ 4, $A_4=+0.04$ 5 ( <a href="#">1983Wa27</a> ).
	4736.4	5.3 5	2181.10			
	6251.8	<0.1	665.5			
	6456.2	<0.2	461.0			
	6770.8	62 6	146.4			<a href="#">Additional information 128.</a>
	6917.1	<0.4	0			
6931.5	2214.0	4.1 10	4717.4			
	2321.7	22 2	4609.7			

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
6931.5	2325.6	19 2	4605.8			
	2415.6	1.4 4	4515.8			
	2470.0	2.0	4461.4			
	2577.1	2.0 5	4354.3			
	2947.9	3.7 9	3983.5			
	3331.1	1.5 4	3600.27			
	3386.2	3.8 9	3545.07			
	3548.0	13 1	3383.3			
	4210.1	2.9 7	2721.1			
	4350.8	3.1 8	2580.4			
	4773.2	3.1 8	2157.90			
	5043.8	2 1	1887.31			
	6265.4	7.0 7	665.5			
	6469.8	<2	461.0			
	6784.4	13 1	146.4			
	6930.7	<1.5	0			
6977.4	3593.9	7.5 8	3383.3			
	4819.1	67 7	2157.90			
	5746.5	5.5 6	1230.33			
	6830.3	20 2	146.4			
6986.8	2380.9&	<2	4605.8			
	3003.2	7.5 8	3983.5			
	3386.3	7.5 8	3600.27			
	3441.5	8.0 8	3545.07			
	4265.4	4.5 23	2721.1			
	4828.5	41 4	2157.90			
	5755.9	24 2	1230.33			
	6839.7	7.5 8	146.4			
7051.5	2094.1	11 1	4957.3			
	3506.2	5 1	3545.07			
	3668.0	10 1	3383.3			
	4893.2	26 3	2157.90			
	6385.4	20 2	665.5			
	6589.8	28 3	461.0			
7059.0	2063.3	1.4 4	4995.6			
	2117.0	1.1 3	4941.9			
	2363.2	0.2	4695.7			
	2449.2	0.5	4609.7			
	2733.0	0.5 1	4325.91			
	3285.0	0.1	3773.84			
	3398.8	0.9 2	3660.0			
	3929.6	2.8 7	3129.13			
	4337.6	0.9 2	2721.1			
	4447.6	0.7	2611.05			
	4478.3	0.7 2	2580.4			
	4877.5	1.2 3	2181.10			
	4900.7	0.5 1	2157.90			
	5171.3	4.6 11	1887.31			
	5828.1	3.2 8	1230.33			
	6392.9	24 2	665.5			<a href="#">Additional information 129.</a>
	6597.3	58 6	461.0			<a href="#">Additional information 130.</a>
	6911.8	0.5	146.4			
	7058.2	<0.2	0			
7078.92	2473.0	1.7	4605.8			
	2752.9	0.6	4325.91			
	3002.5	1.0 5	4076.3			
	3095.3	16 2	3983.5	D(+D)	0.00 +6-4	Mult.: D(+Q) $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ).

Continued on next page (footnotes at end of table)

$^{33}\text{S}(\text{p},\gamma)$ :resonances [1983Wa27](#),[1977Da02](#),[1977Da03](#) (continued) $\gamma(^{34}\text{Cl})$  (continued)

$E_i(\text{level})$	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	$E_f$	Mult.	$\delta$	Comments
7078.92	3478.5	16 2	3600.27	D(+Q)	0.00 3	$\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.28$ 3, $A_4=+0.01$ 3 ( <a href="#">1977Da03</a> ). Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ).
	3533.7	15 2	3545.07	D(+Q)	-0.07 +7-4	$\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.09$ 3, $A_4=+0.01$ 3 ( <a href="#">1977Da03</a> ). Mult.: D(+Q) $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ).
	3744.7	<1	3334.0			$\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.24$ 3, $A_4=+0.04$ 4 ( <a href="#">1977Da03</a> ).
	4357.5	11 1	2721.1	D(+Q)	-0.03 +2-3	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : or -3.5 5, both values from <a href="#">1977Da03</a> . $A_2=-0.26$ 3, $A_4=0.00$ 3 ( <a href="#">1977Da03</a> ).
	4897.4	1.7 4	2181.10			
	5191.2	2.7 7	1887.31			
	5848.1	28 3	1230.33	D(+Q)	-0.04 +4-2	Mult.: D(+Q) $\Delta J=1$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=-0.25$ 3, $A_4=+0.02$ 3 ( <a href="#">1977Da03</a> ).
	6412.8	<0.6	665.5			
	6617.2	<0.6	461.0			
	6931.8	8.5 9	146.4	D(+Q)	-0.05 7	Mult.: D(+Q) $\Delta J=0$ $\gamma$ ( <a href="#">1977Da03</a> ). $\delta$ : from <a href="#">1977Da03</a> . $A_2=+0.24$ 4, $A_4=0.00$ 5 ( <a href="#">1977Da03</a> ).
7675.8	7078.1	<0.8	0			
	5517.4		2157.90	(D+Q)	0.12 8	all data from <a href="#">1992Ka39</a> . <a href="#">Additional information 131</a> .
	7528.5		146.4	D+Q	0.32 25	all data from <a href="#">1992Ka39</a> . <a href="#">Additional information 132</a> .
8305.5	x	25				
	8158.0	75	146.4	(D+Q)	0.27 18	all data from <a href="#">1992Ka39</a> . <a href="#">Additional information 133</a> .

<sup>†</sup> Deduced by evaluators from differences of initial and final levels.

<sup>‡</sup> Branching ratios are from [1983Wa27](#) and [1977Da02](#), unless noted otherwise. For  $\gamma$  rays originating from the bound levels the weighted average is given if the two branching ratios are in agreement, else the unweighted average with uncertainty covering both values is given. For  $\gamma$  rays originating from resonances the unweighted average is given with uncertainty of 10% of the value if the branching ratio is greater than 5%, and with uncertainty of 25% if the branching ratio is lower than 5%. For branching ratios measured only by [1977Da02](#) the uncertainty is 10% or 50% for values greater than 5% or lower than 5%, respectively). The branching ratios measured only by [1983Wa27](#) are given with the reported uncertainties (when given).

# From [2011Fr04](#).

@ Gamma branching not observed ([1983Wa27](#)).

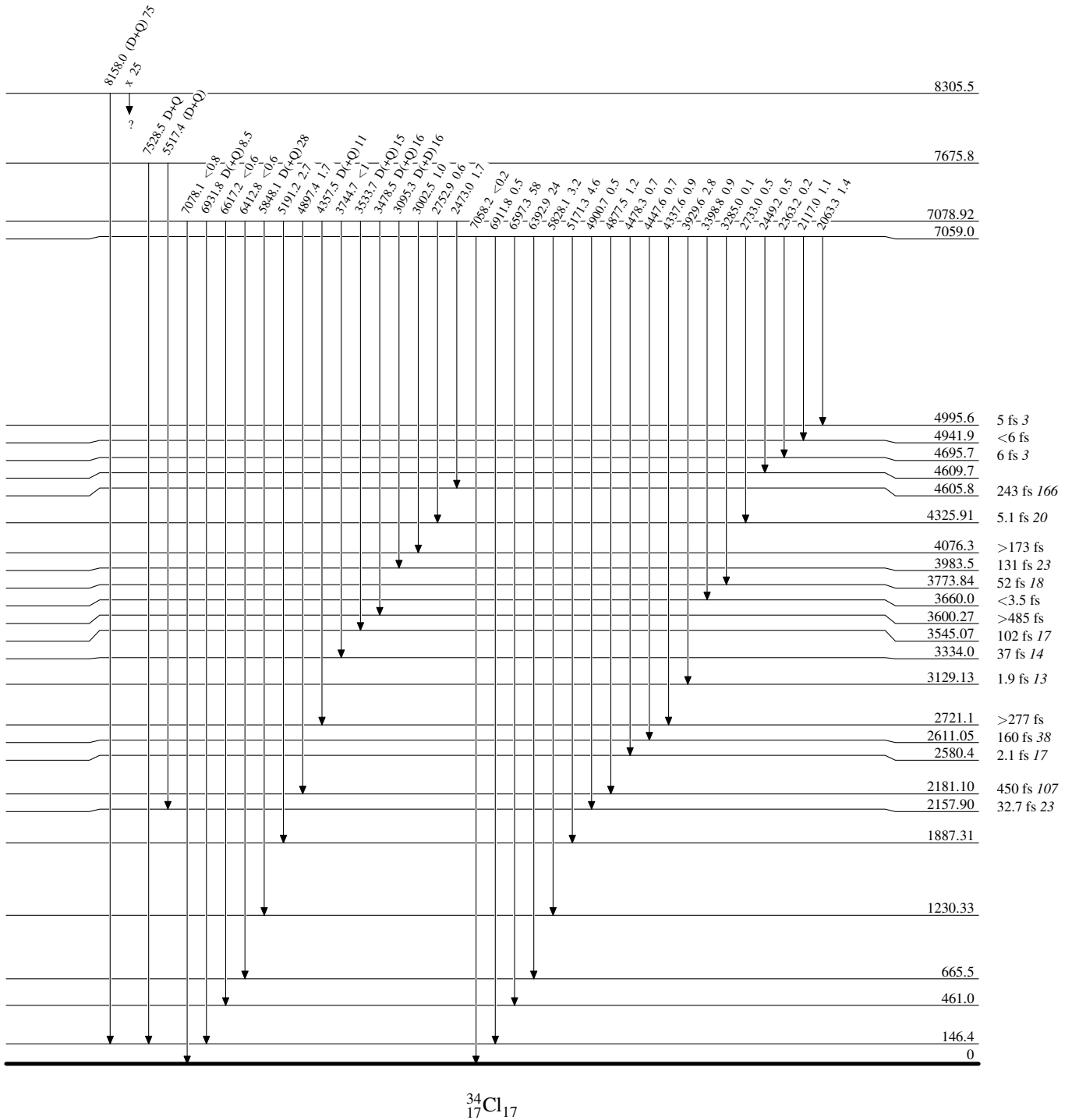
& Placement of transition in the level scheme is uncertain.



$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme

Intensities: % photon branching from each level



$^{34}_{17}\text{Cl}_{17}$

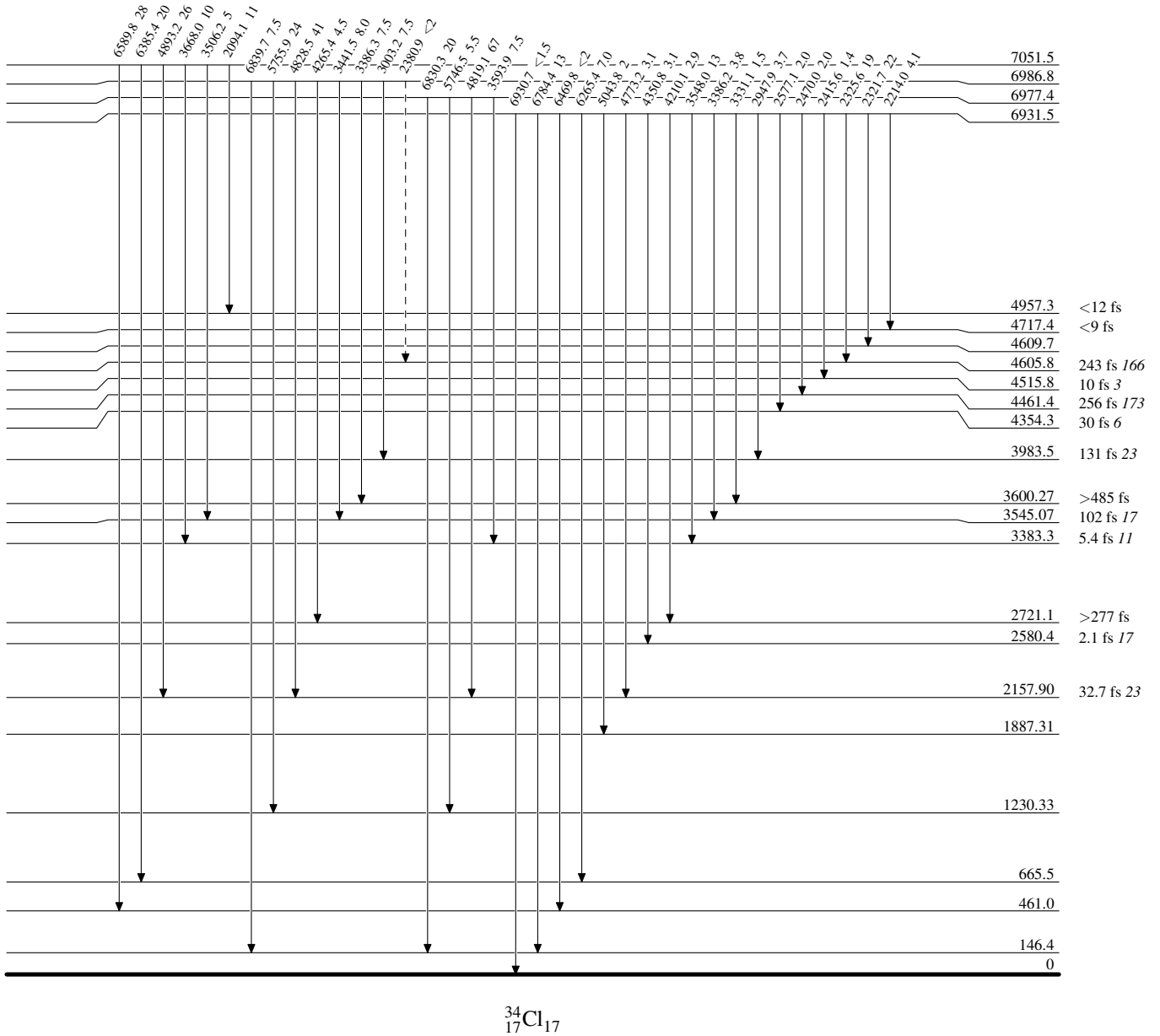
$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

-----►  $\gamma$  Decay (Uncertain)

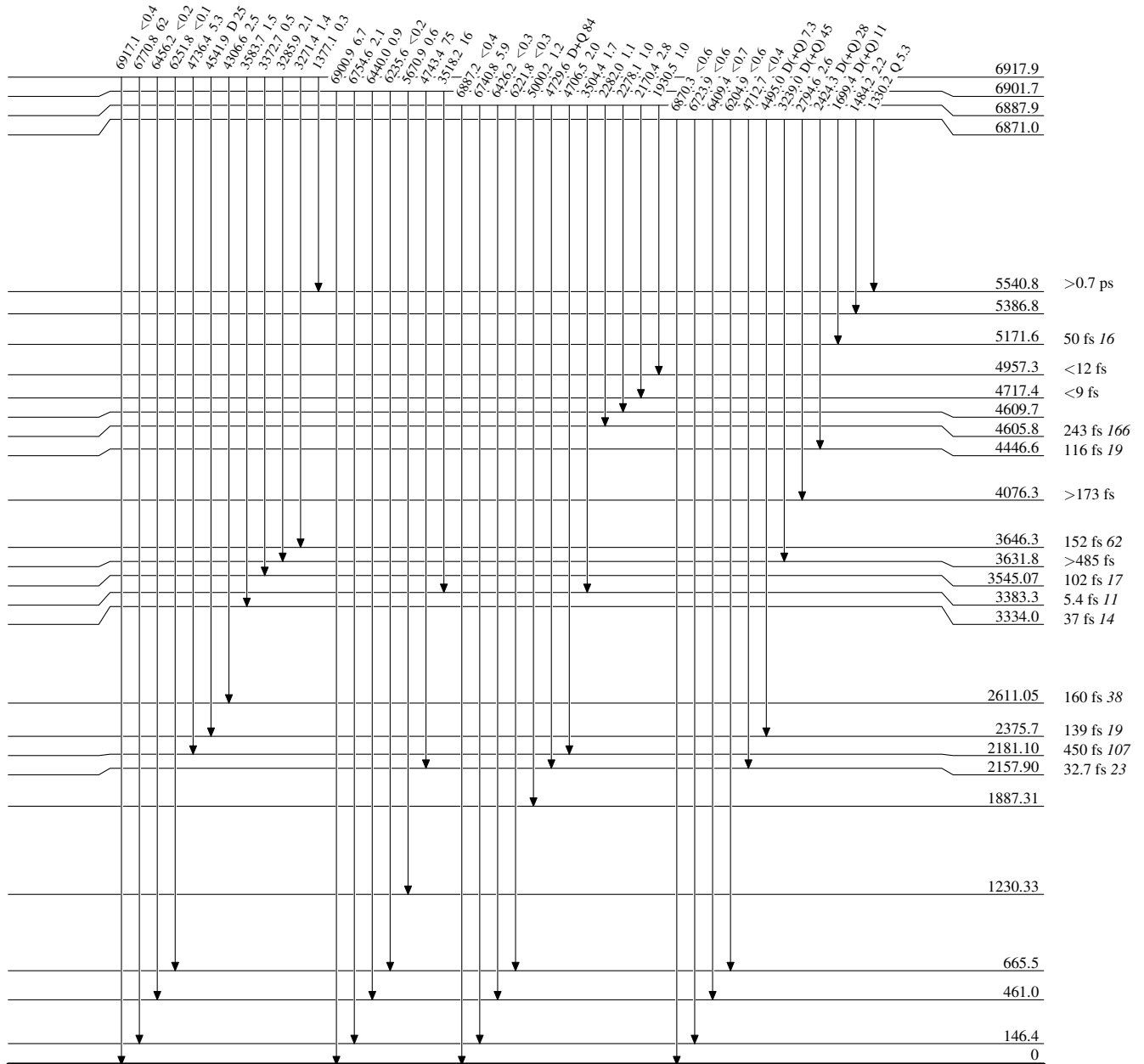


$^{34}_{17}\text{Cl}_{17}$

$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

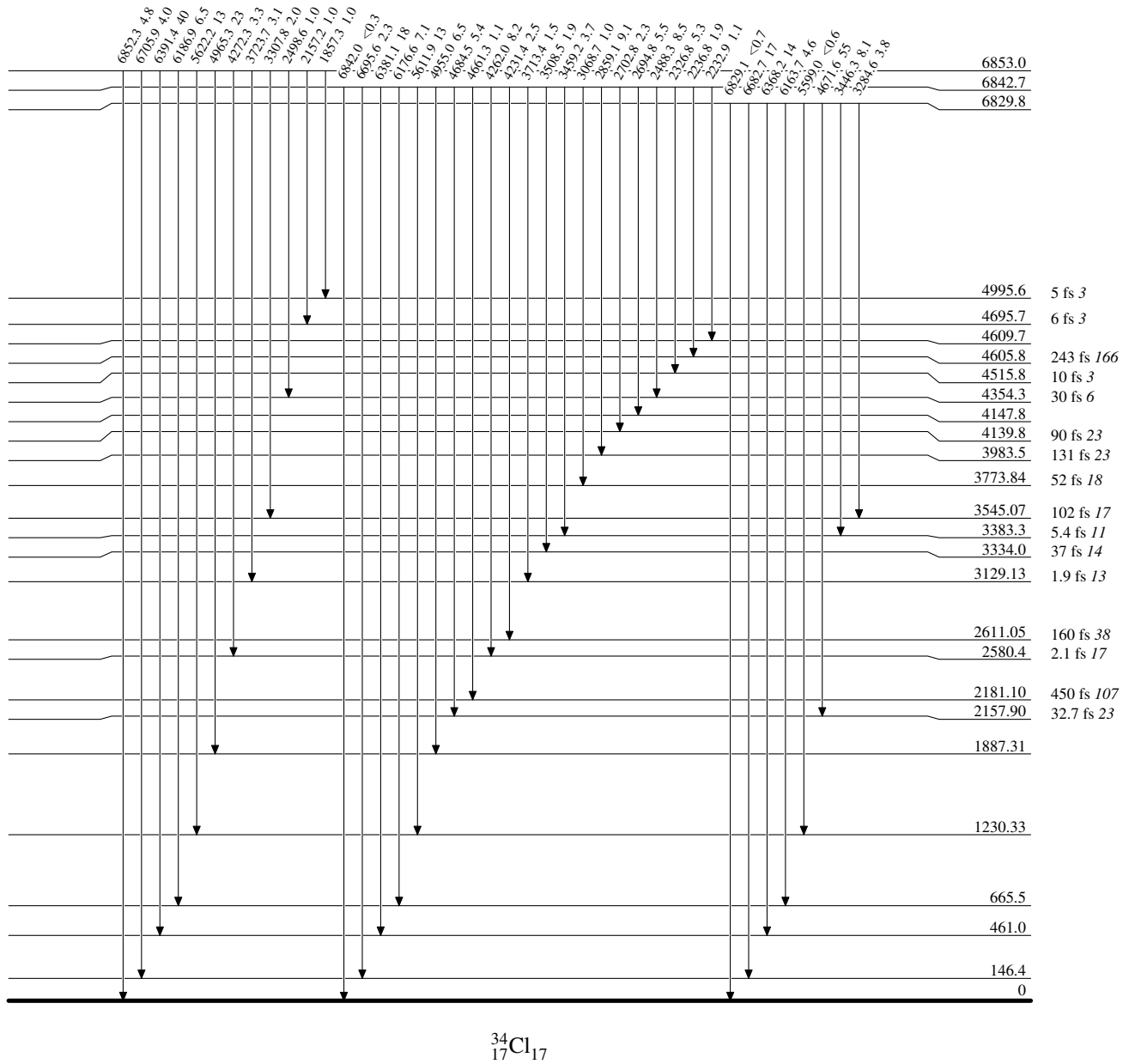
Intensities: % photon branching from each level



$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

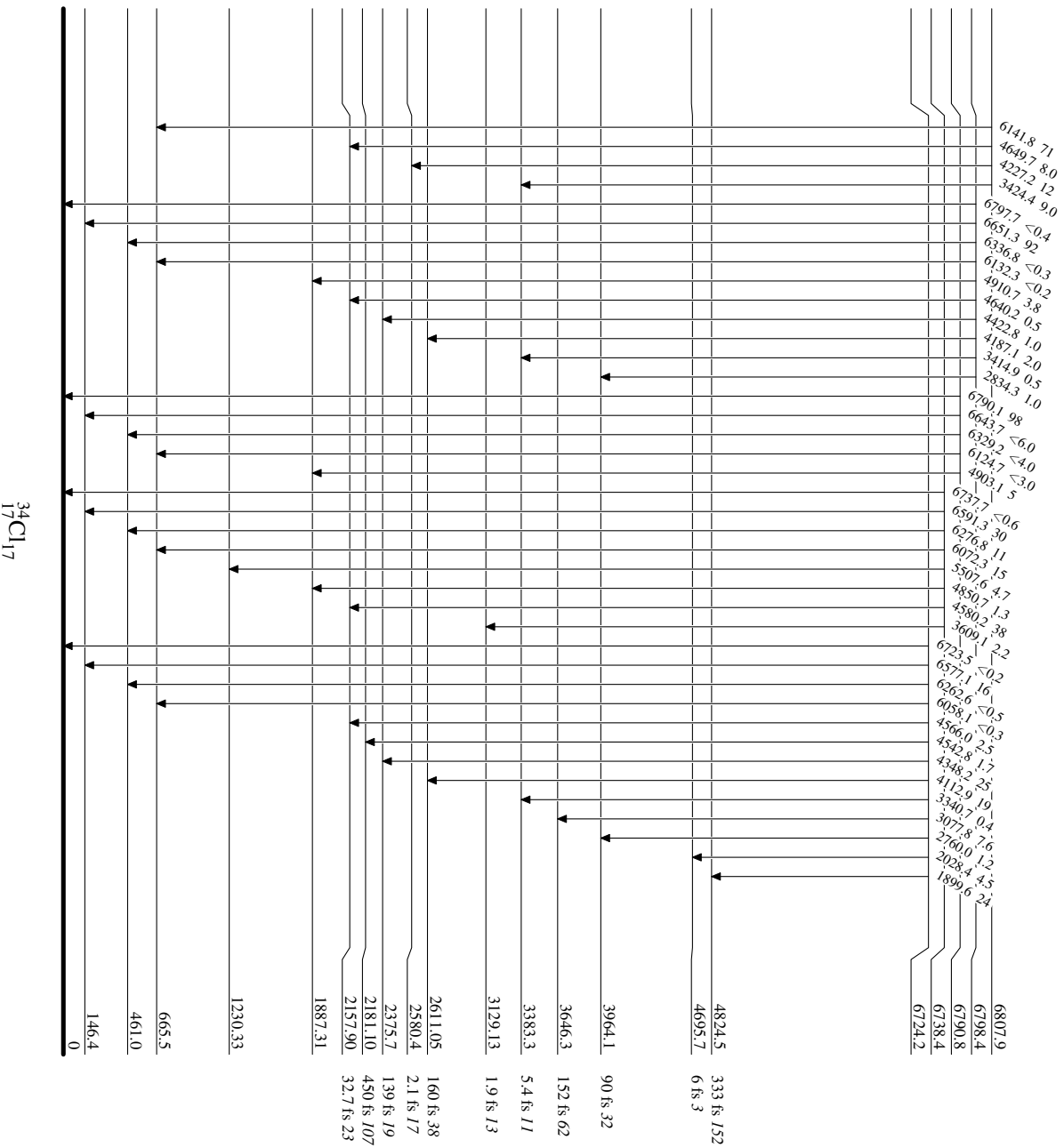


$^{34}_{17}\text{Cl}_{17}$

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

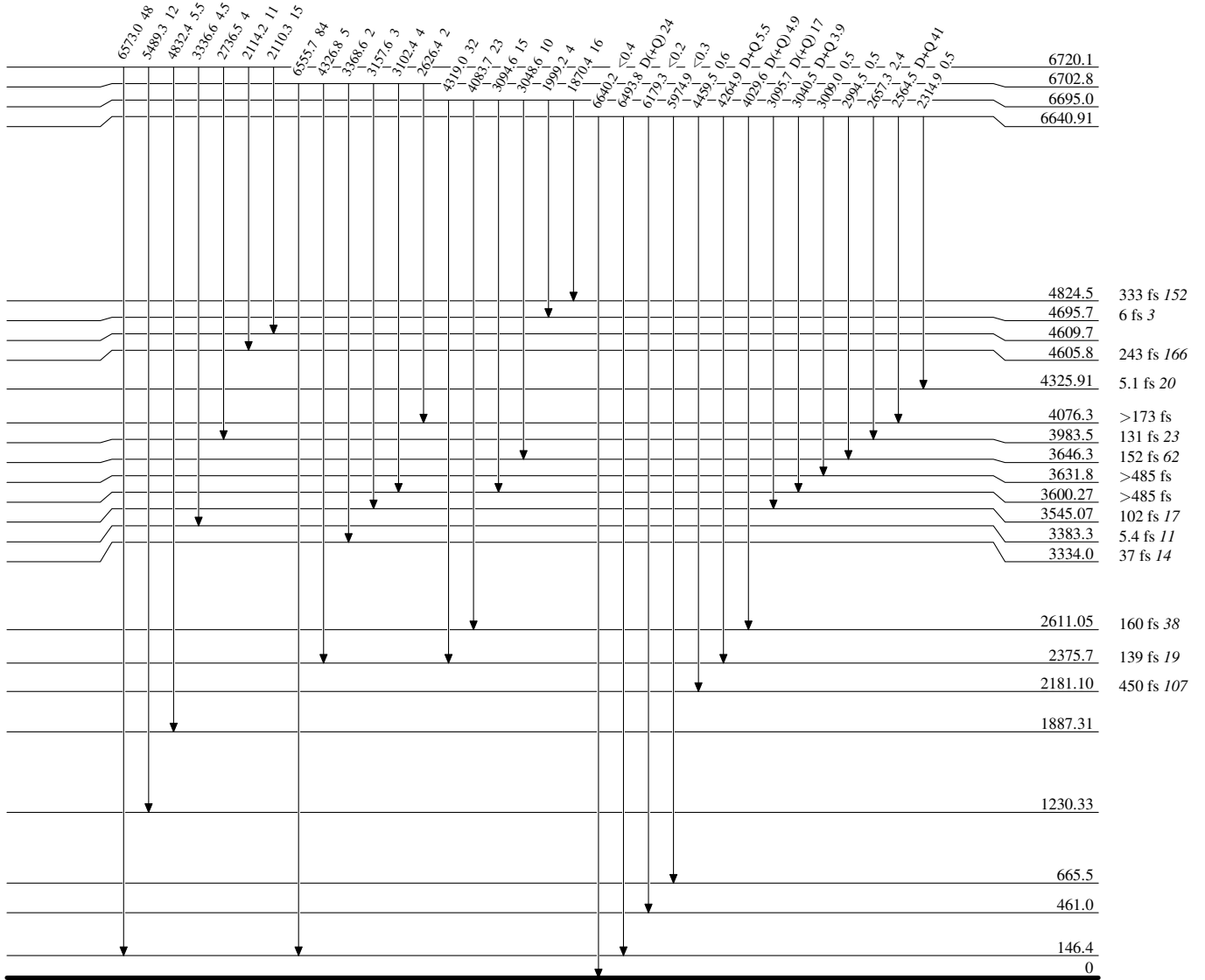
Intensities: % photon branching from each level



$^{33}\text{S}(\text{p},\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

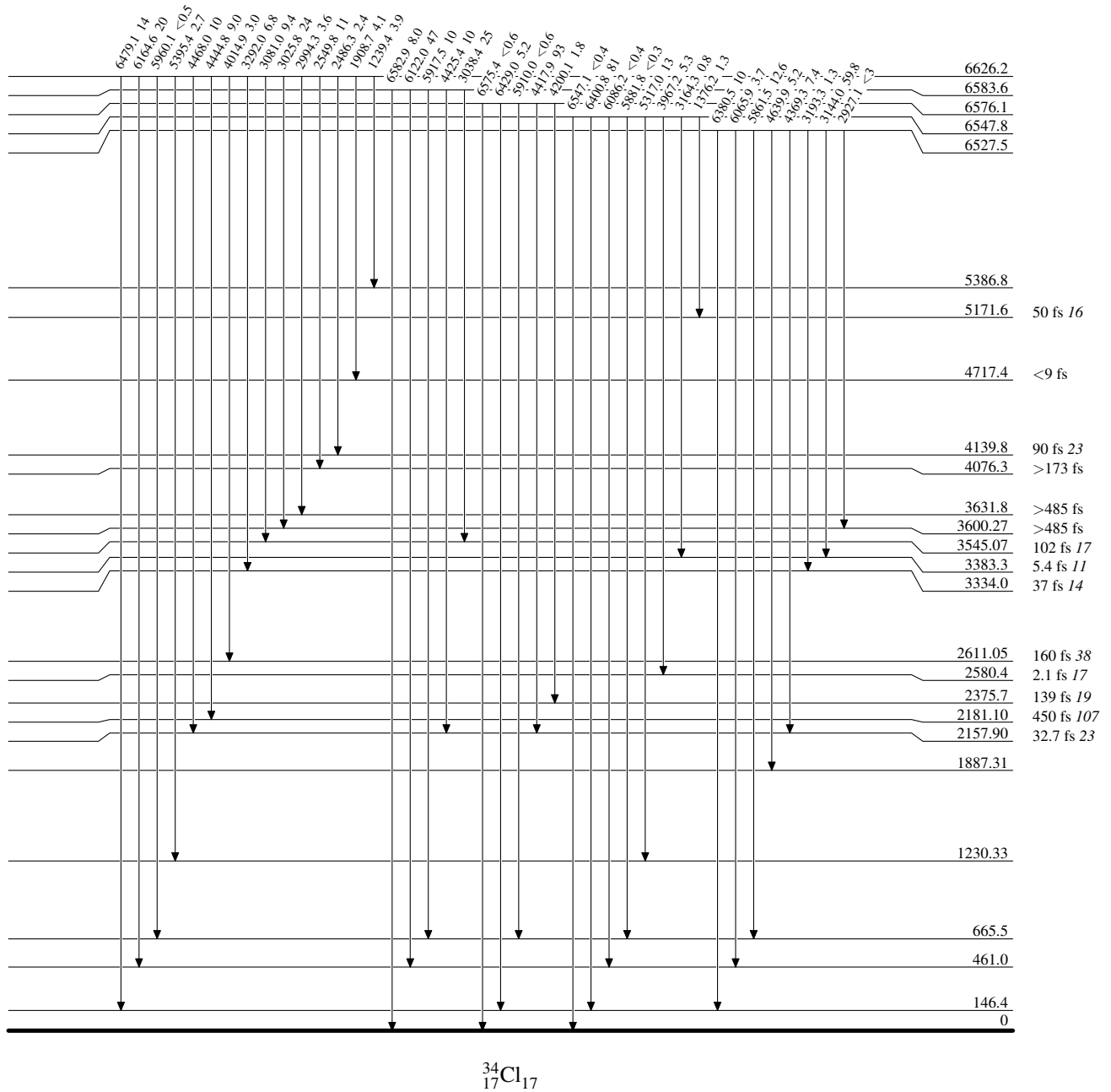


$^{34}_{17}\text{Cl}_{17}$

$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

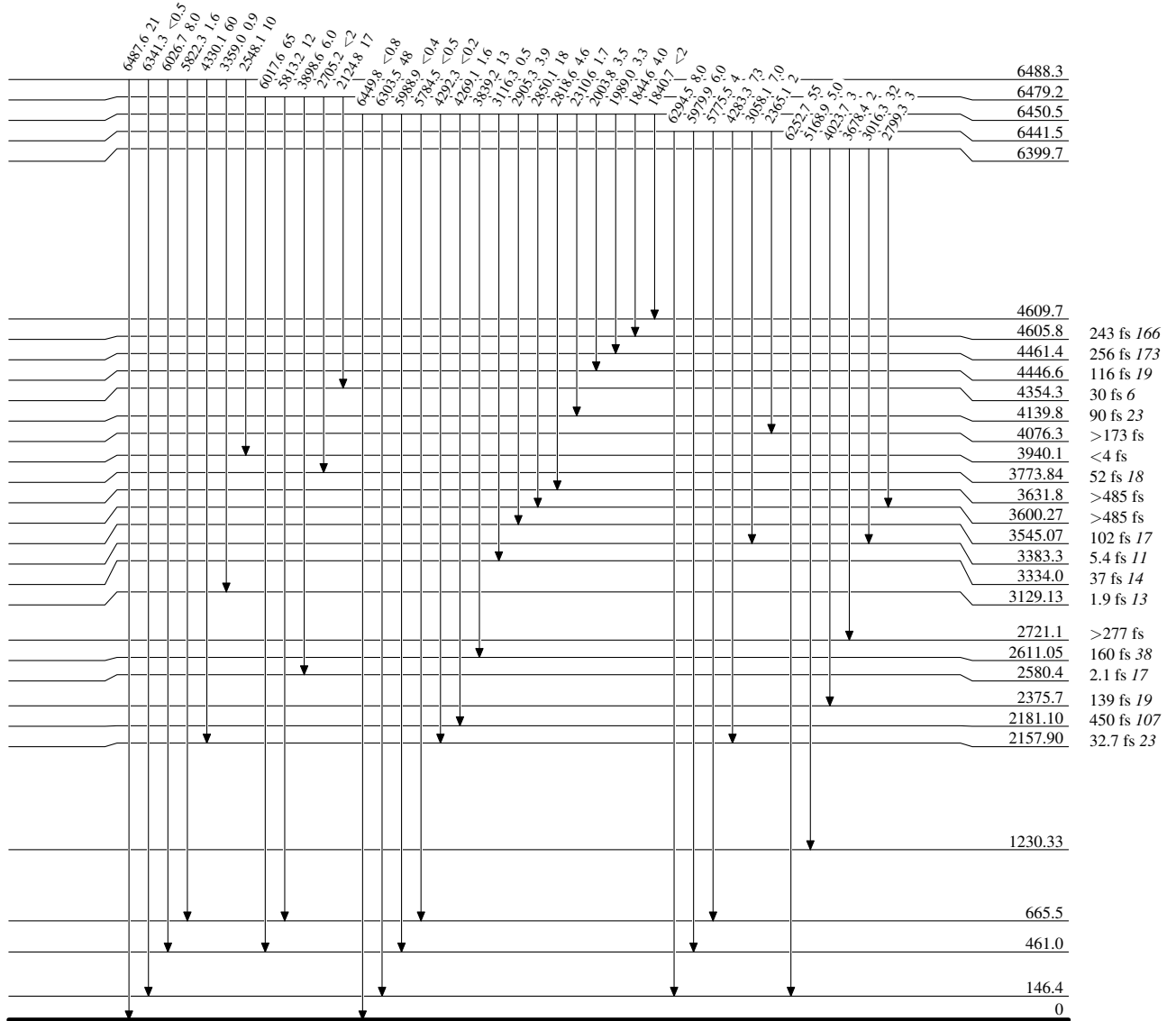
Intensities: % photon branching from each level



$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level



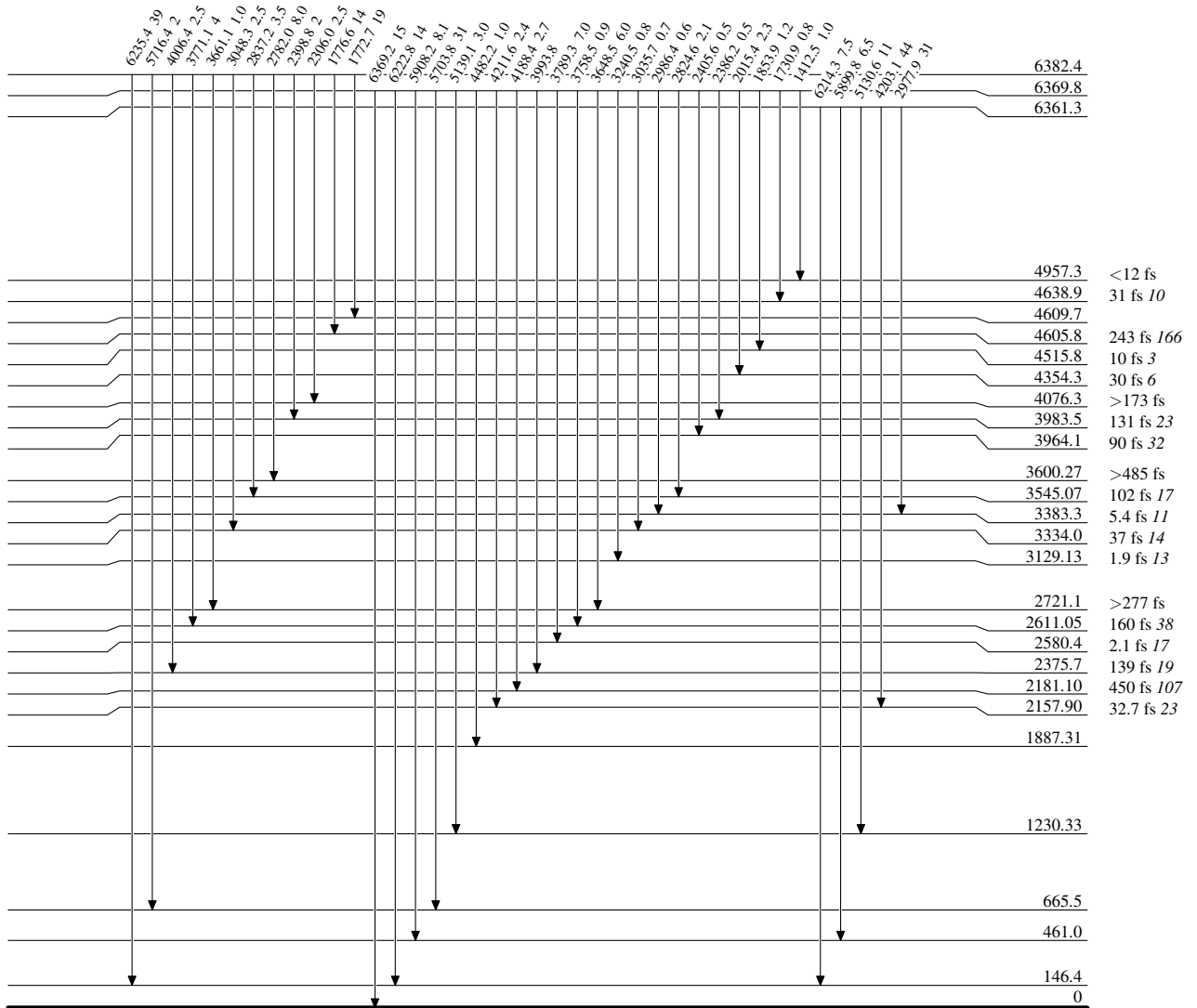
$^{34}_{17}\text{Cl}_{17}$



<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

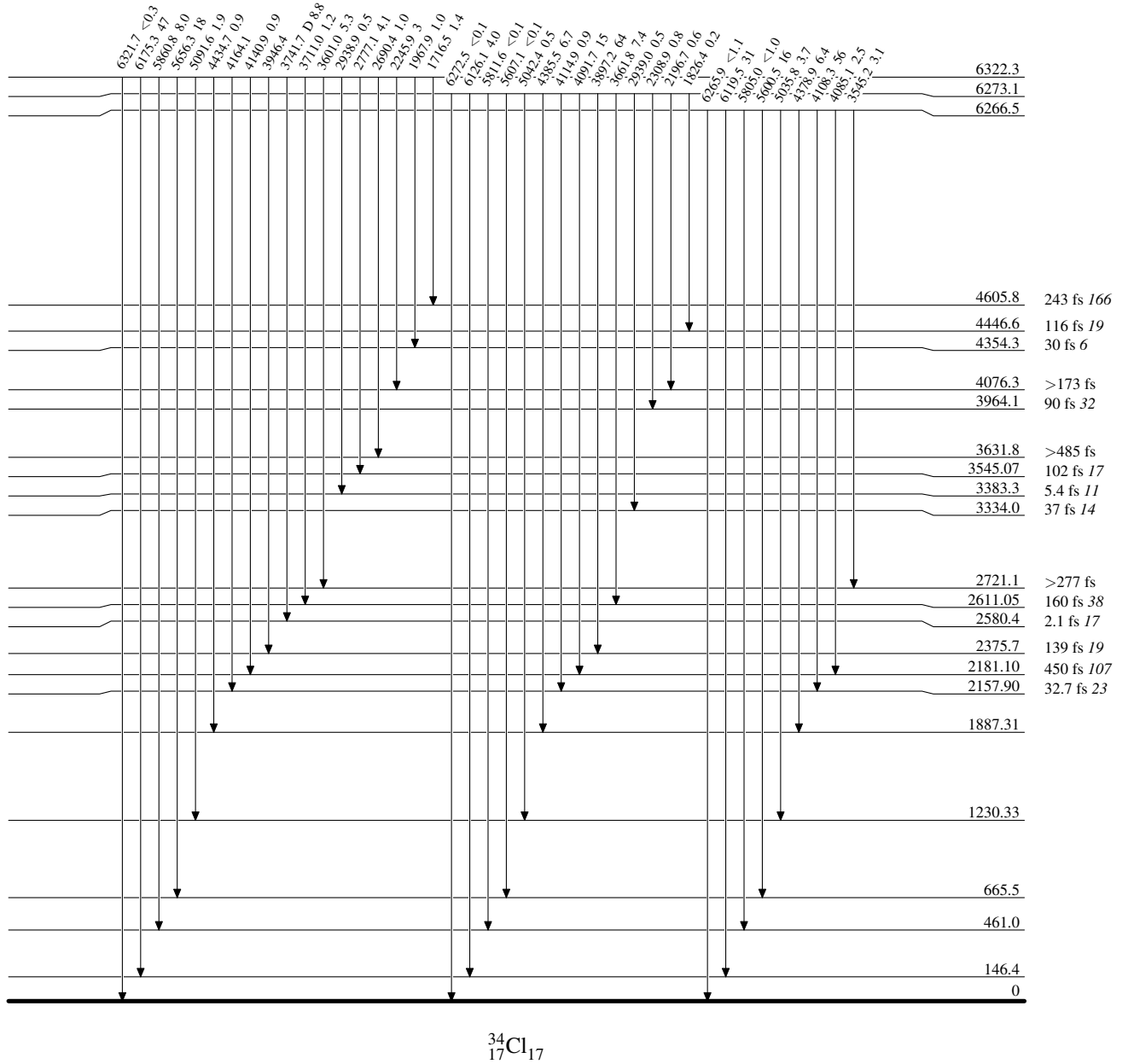


<sup>34</sup>Cl<sub>17</sub>

$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

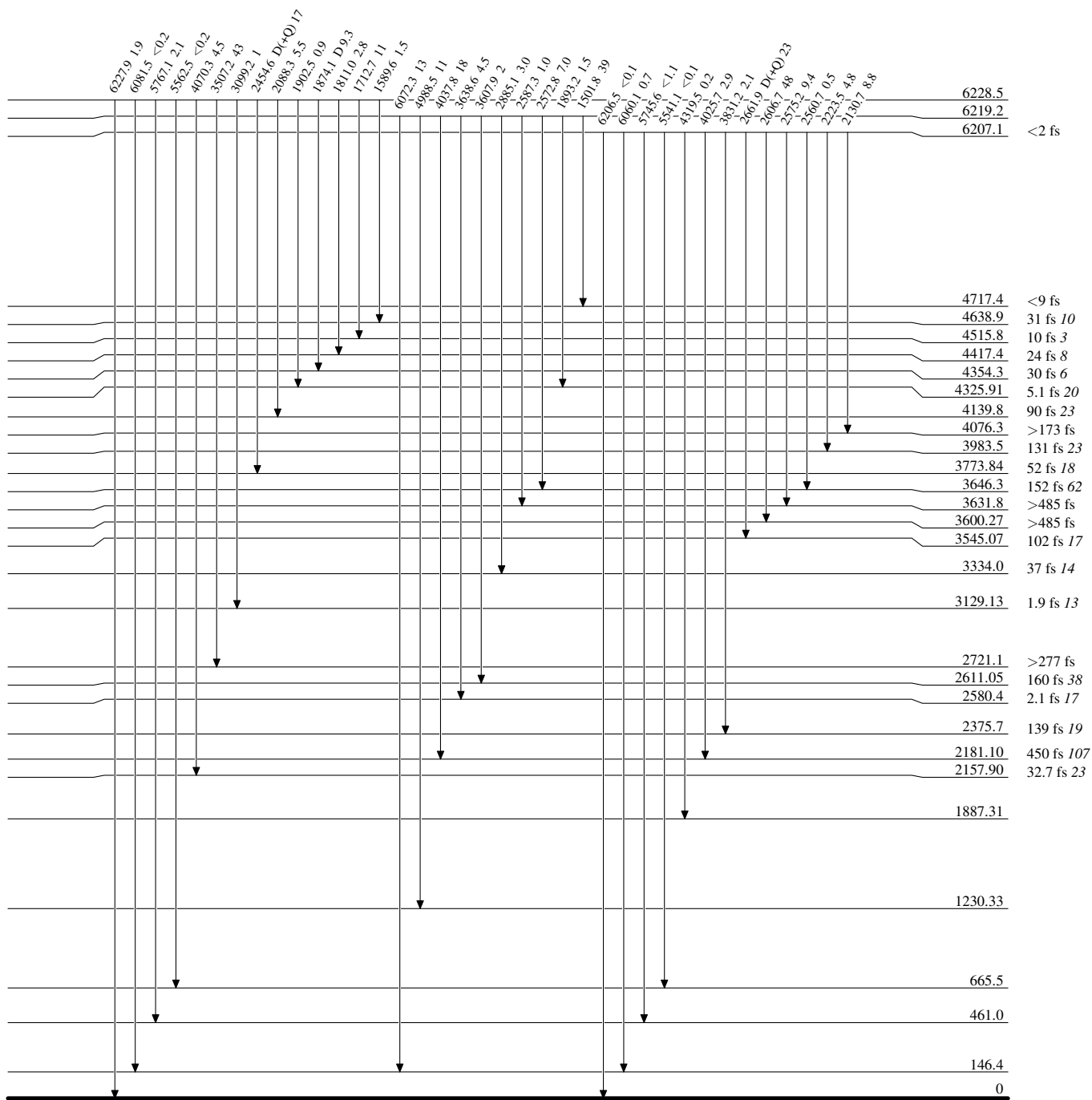
Intensities: % photon branching from each level



$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

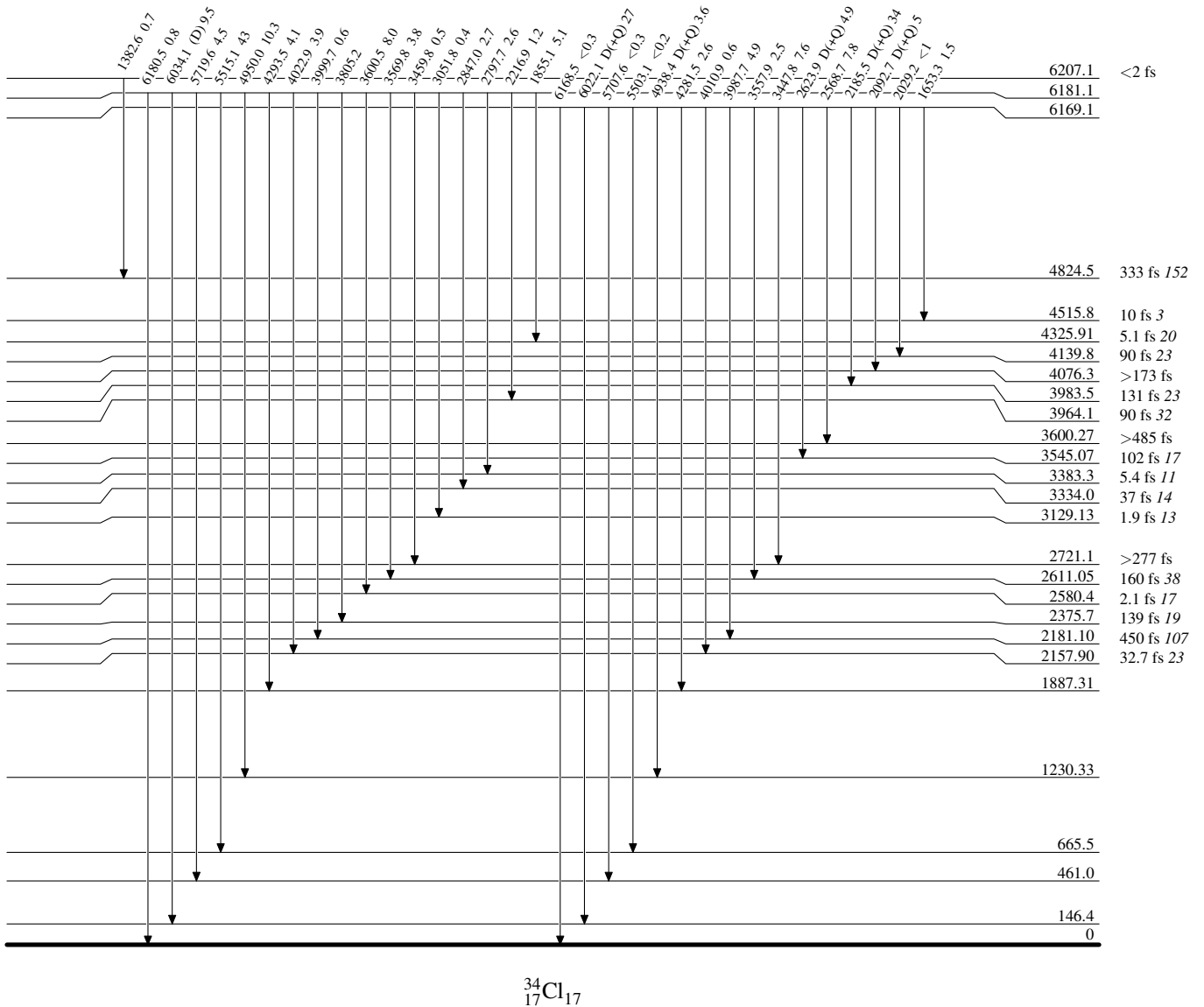


$^{34}_{17}\text{Cl}_{17}$

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

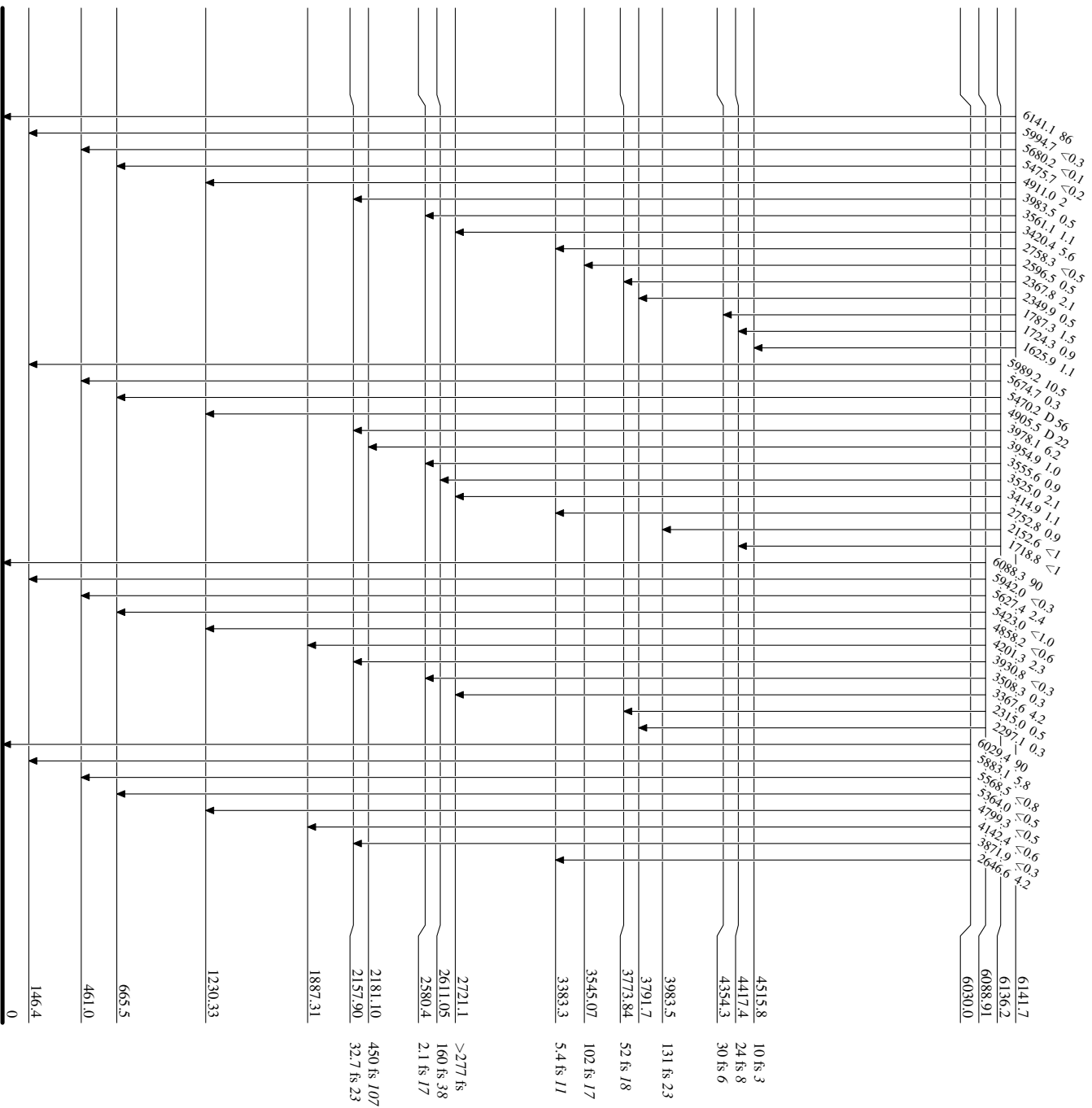


<sup>34</sup>Cl<sub>17</sub>

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

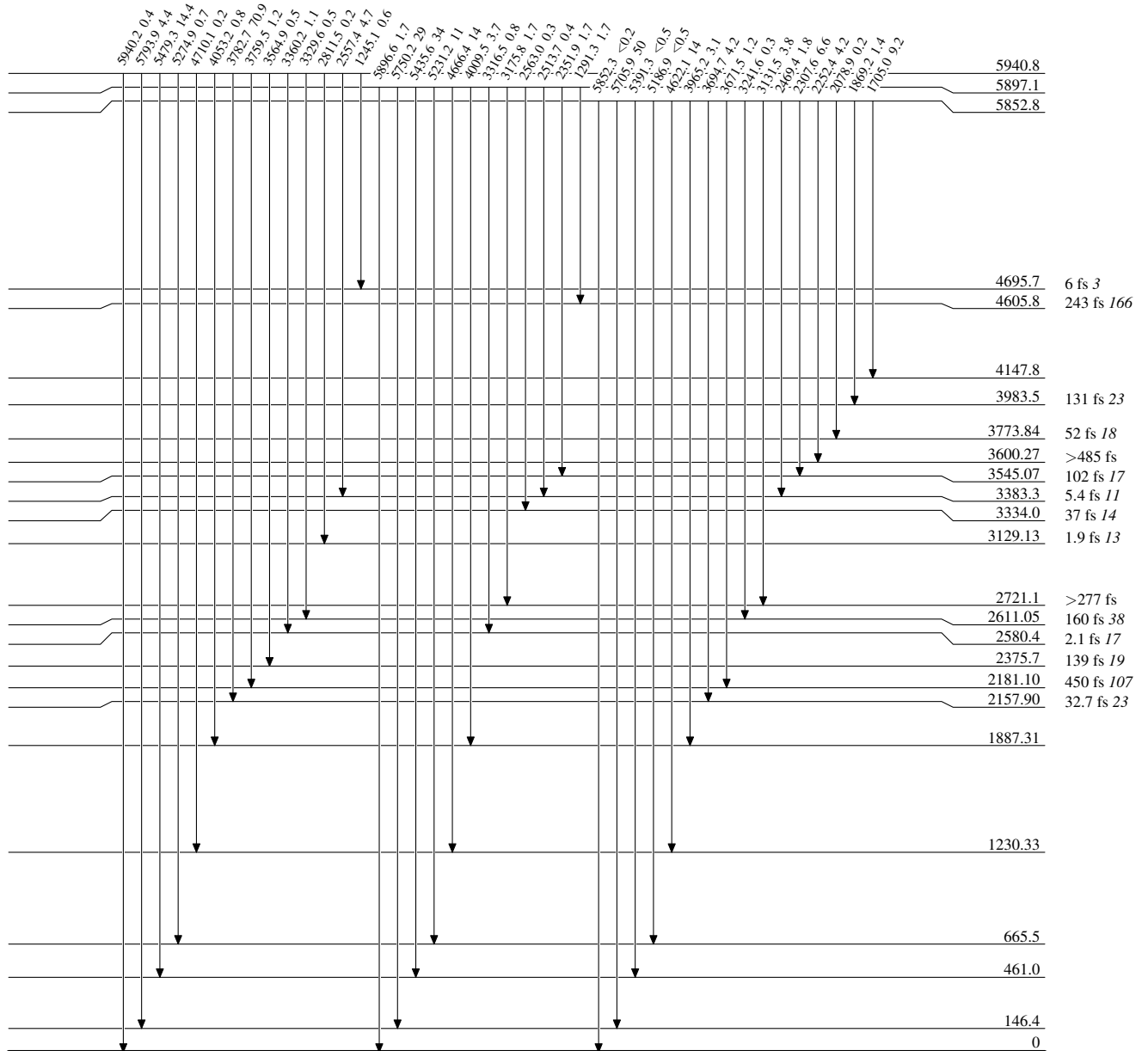


<sup>34</sup>Cl<sub>I7</sub>

$^{33}\text{S}(\text{p},\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

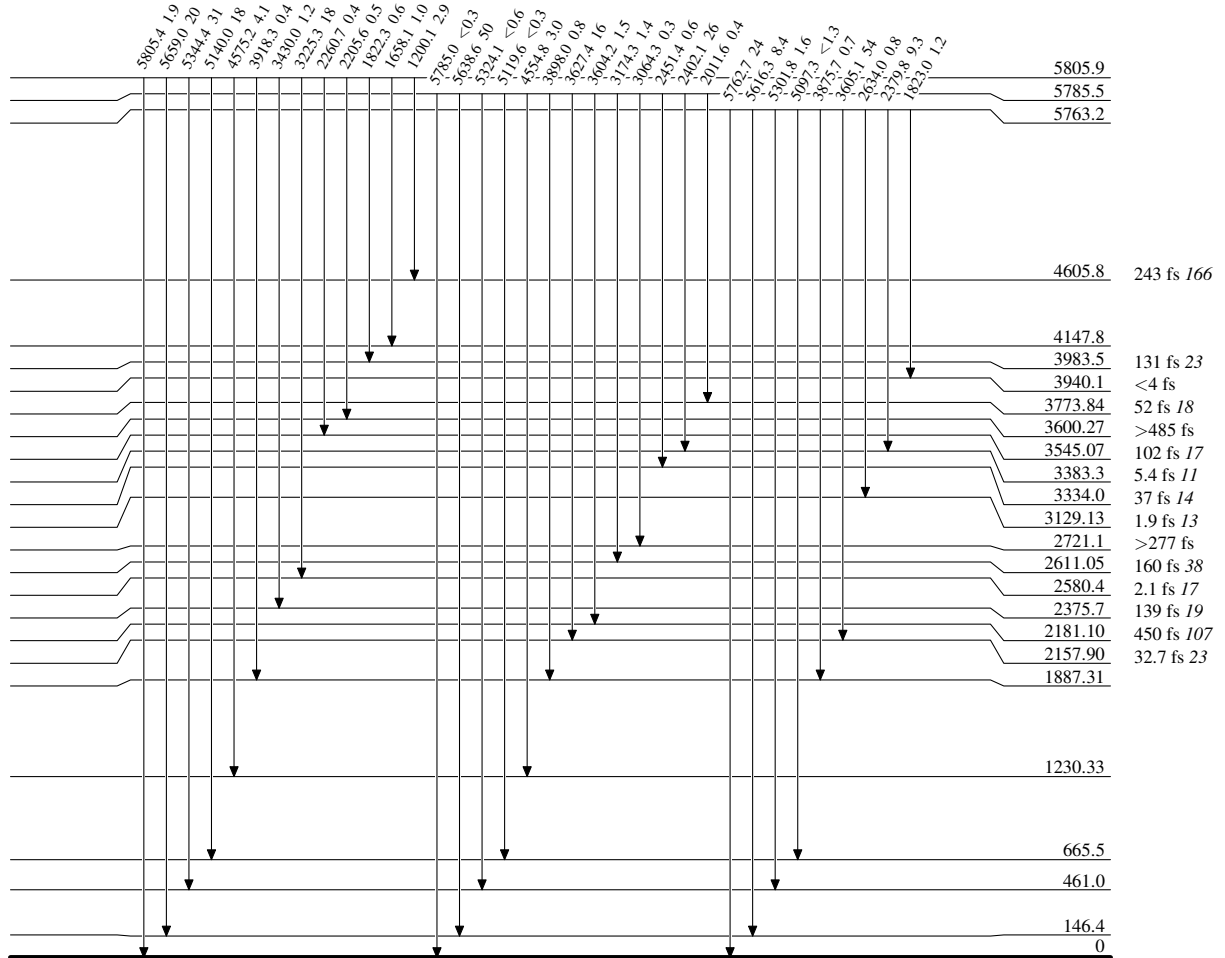


$^{34}_{17}\text{Cl}_{17}$

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

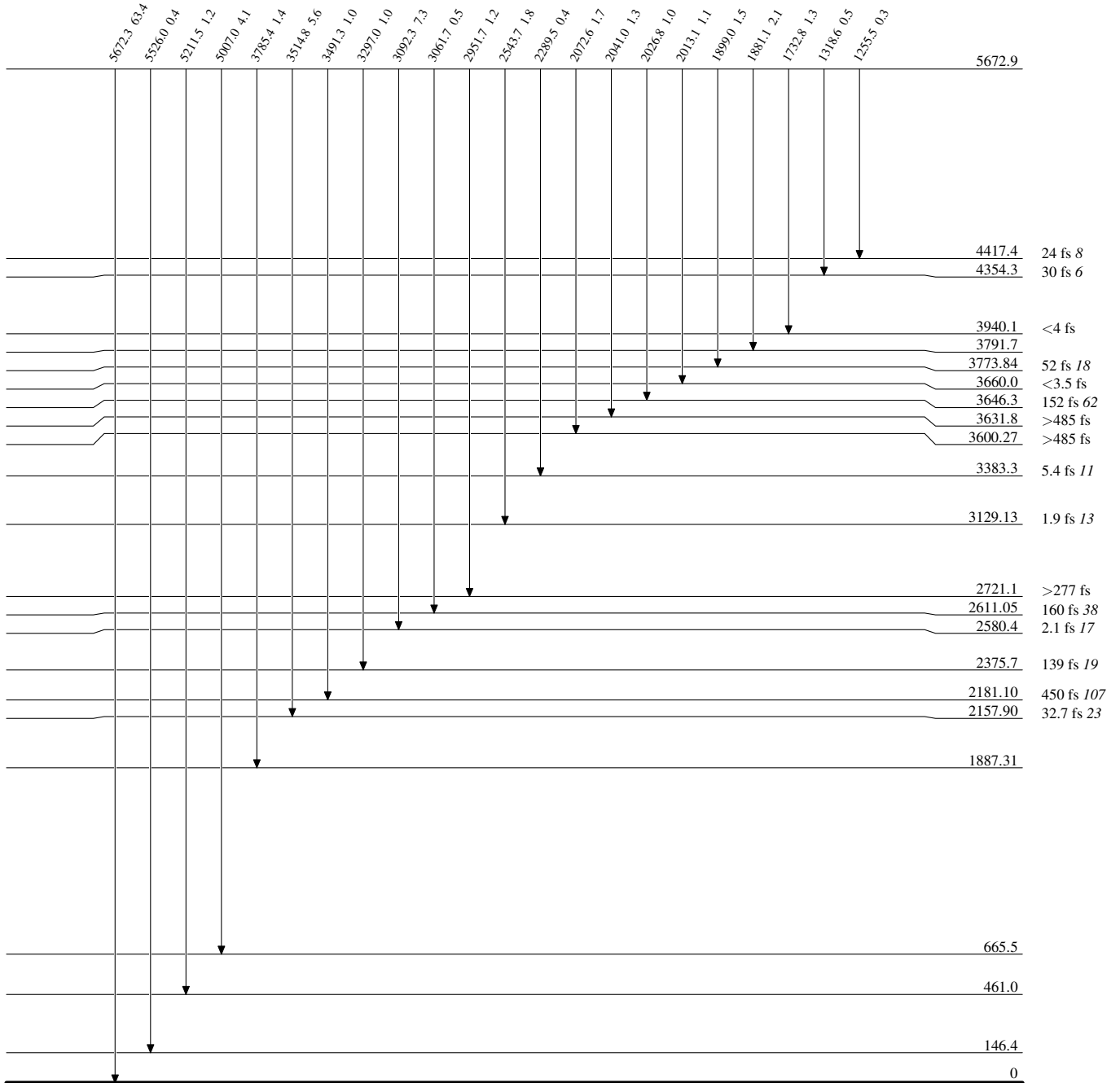


<sup>34</sup>Cl<sub>17</sub>

$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level



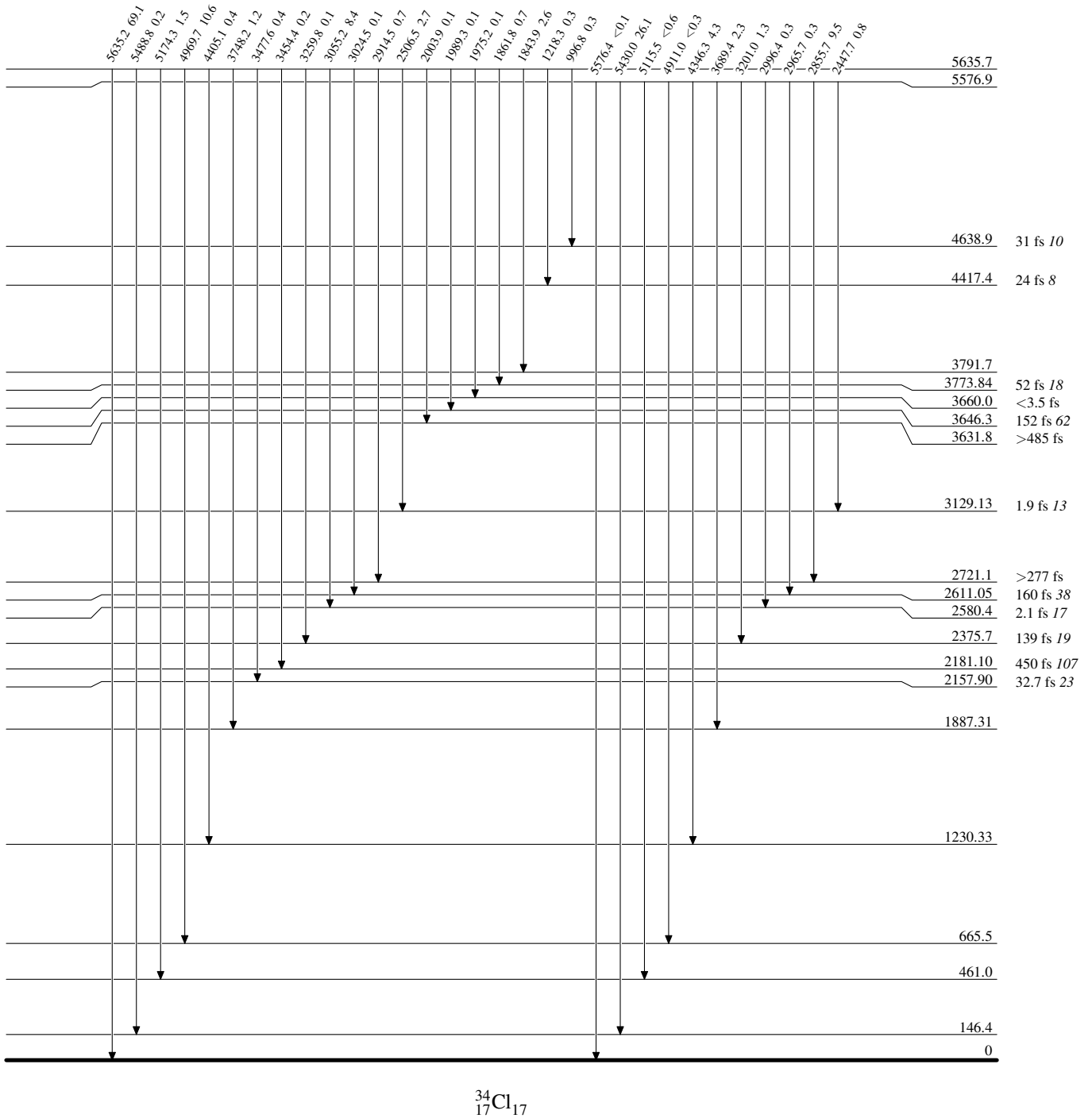
$^{34}_{17}\text{Cl}_{17}$



$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

## Level Scheme (continued)

Intensities: % photon branching from each level

 $^{34}_{17}\text{Cl}_{17}$

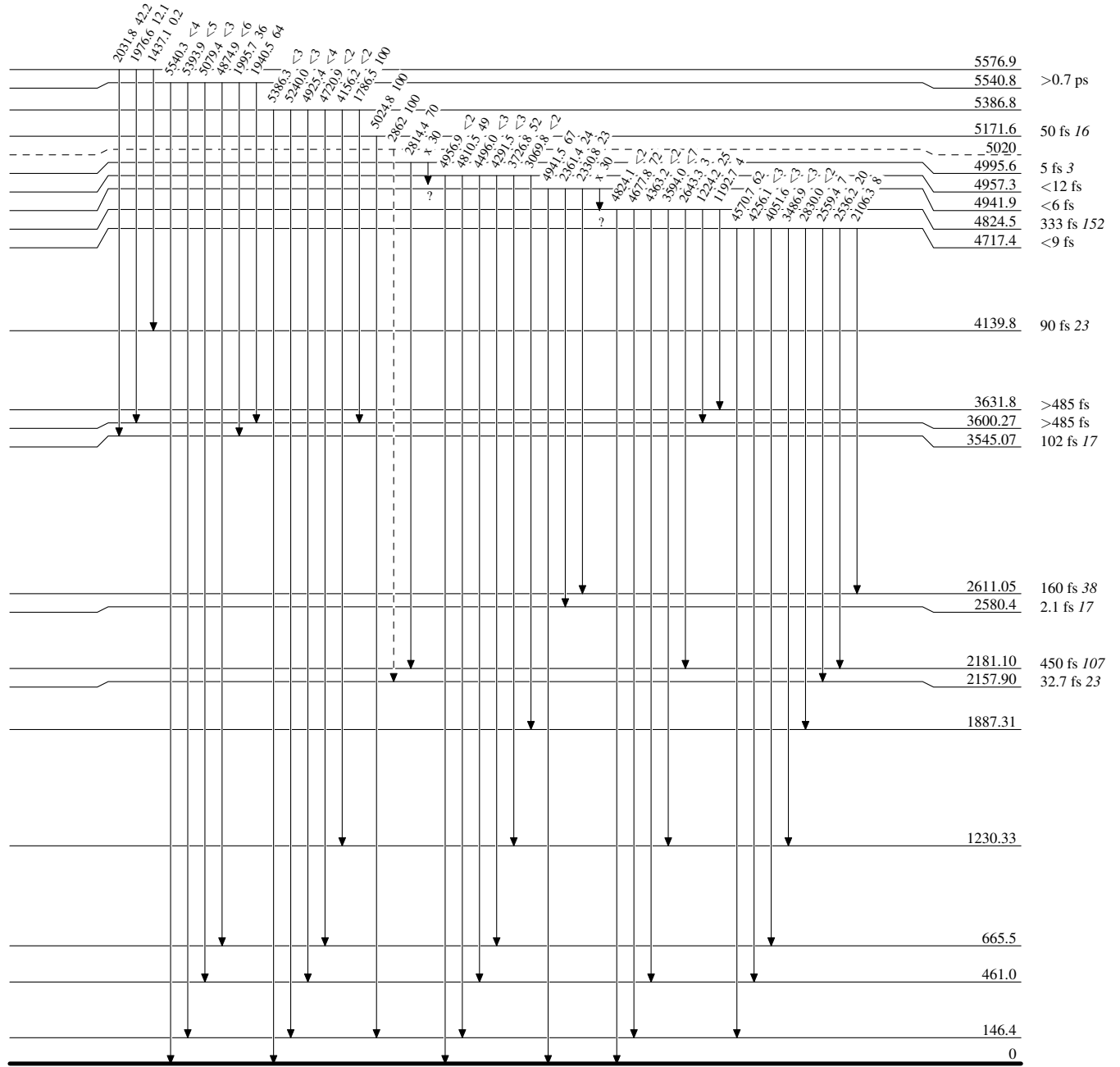
$^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

-----►  $\gamma$  Decay (Uncertain)

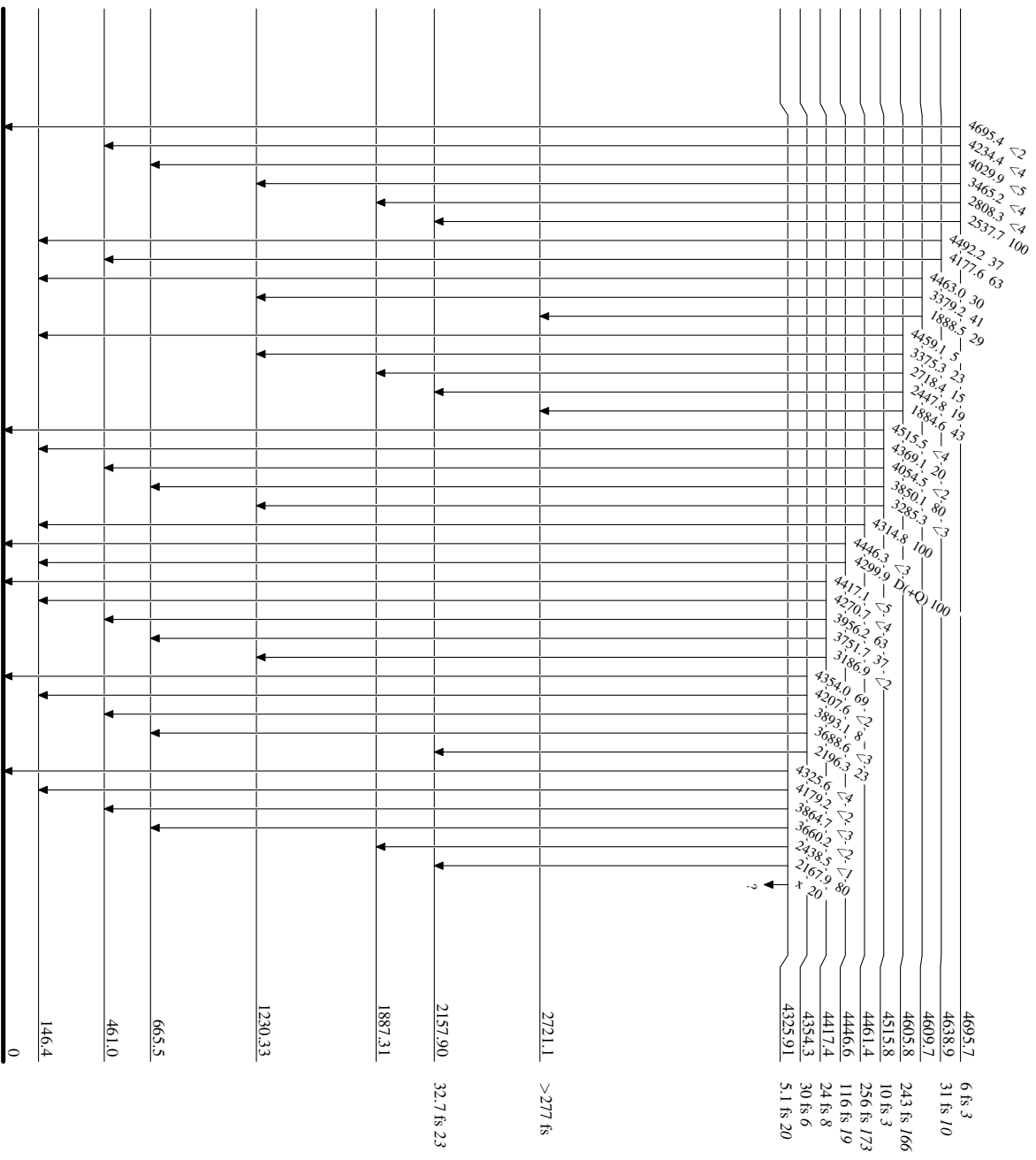


$^{34}_{17}\text{Cl}_{17}$

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

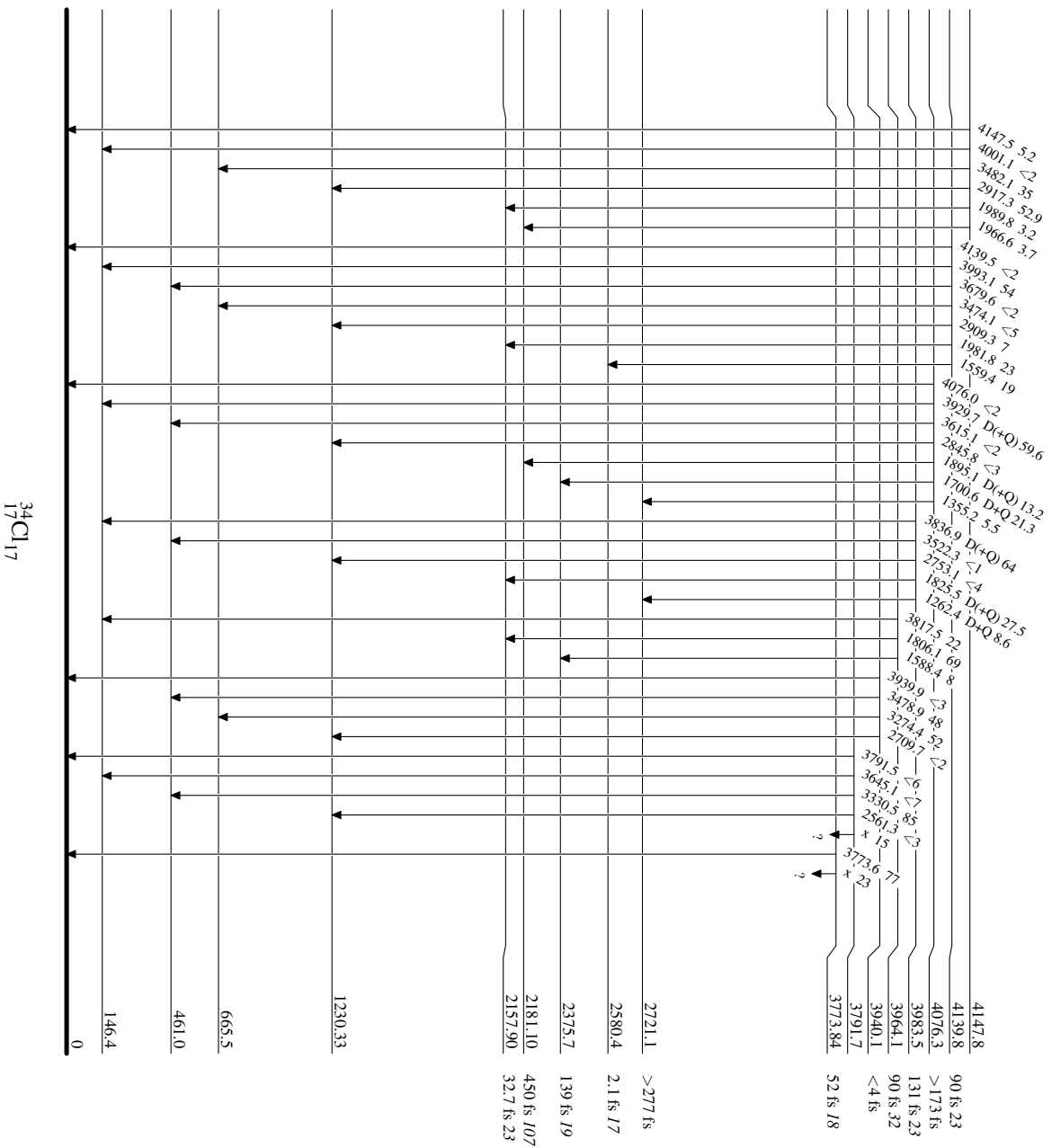


<sup>34</sup>Cl<sub>17</sub>

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (Continued)

Intensities: % photon branching from each level

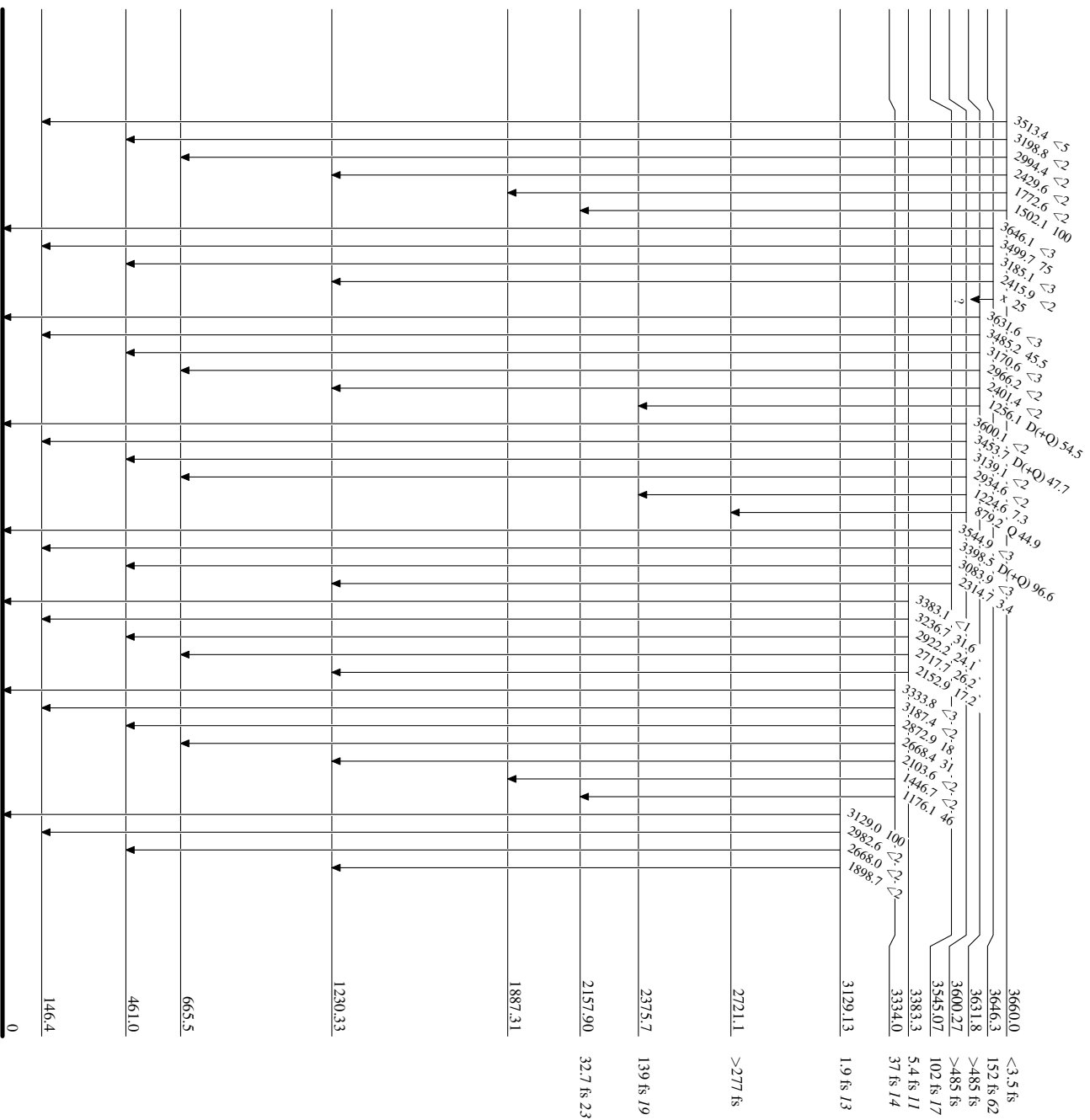


<sup>34</sup>Cl<sub>17</sub>

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

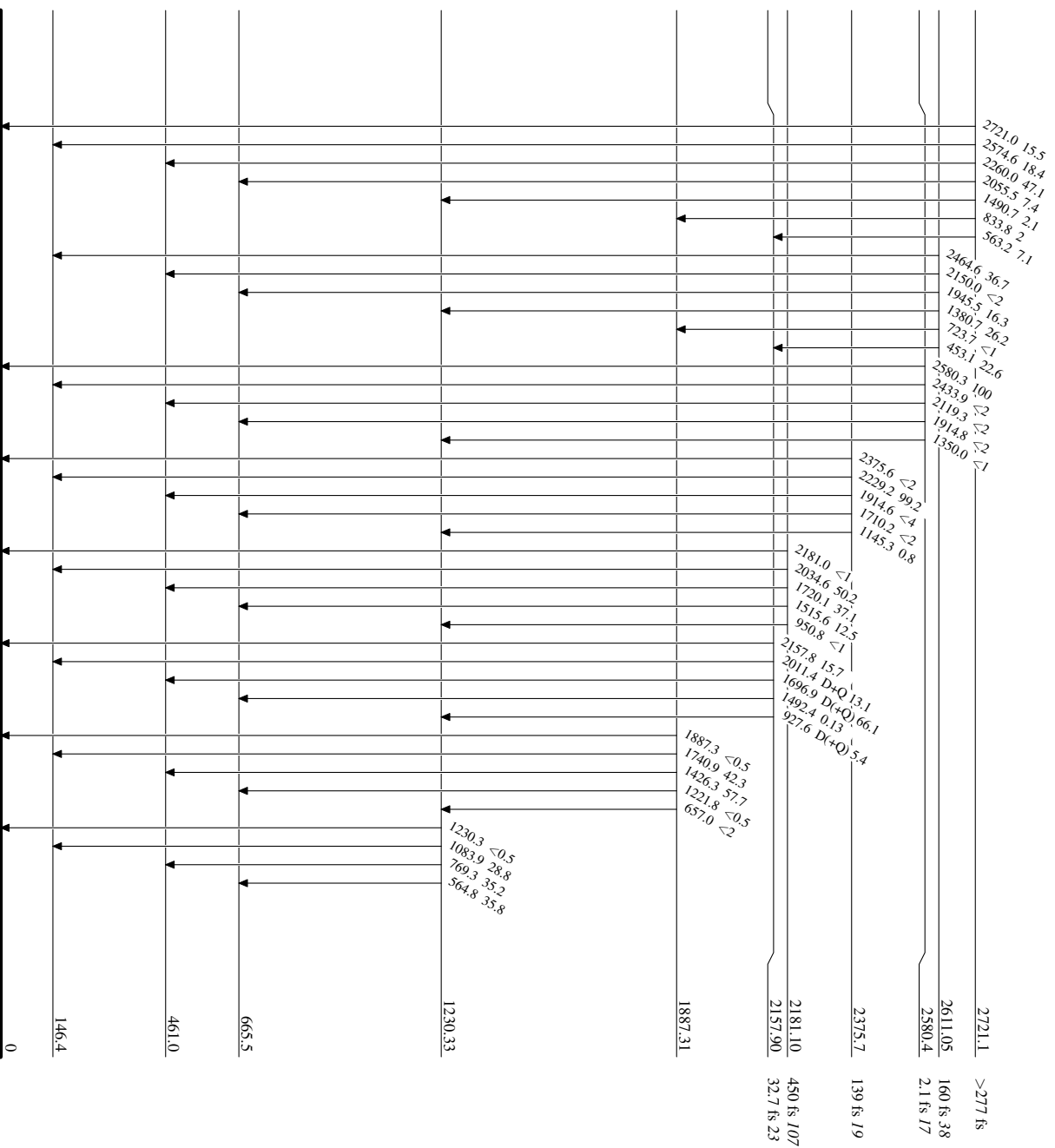


<sup>34</sup>Cl<sub>17</sub>

<sup>33</sup>S(p,γ):resonances 1983Wa27,1977Da02,1977Da03

Level Scheme (continued)

Intensities: % photon branching from each level

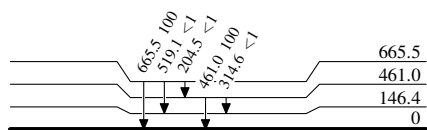


<sup>34</sup>Cl<sub>17</sub>

${}^{33}\text{S}(p,\gamma)$ :resonances 1983Wa27,1977Da02,1977Da03

## Level Scheme (continued)

Intensities: % photon branching from each level

 ${}^{34}_{17}\text{Cl}_{17}$