^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 184, 29 (2022)	24-Jun-2022

1975De31: protons from 1.1 MV Cockroft-Walton and 3MV Van de Graaff accelerators at Potchefstrom University South Africa. Enriched SiO_2 targets (81% ^{30}Si). Measured Eγ and Iγ using Ge detectors (FWHM=4 keV at 1 MeV, 9 keV at 8 MeV), 1 keV beam energy spread. Lifetimes through DSAM, angular distributions. Uncertainties in lifetimes include a 25% systematic uncertainty estimated in slowing-down theory.

1967Wi10: E=2 MeV protons from Van de Graaff accelerator at the Aerospace Research Laboratory (ARL) Ohio. Natural and enriched targets of metallic Si (78.4% ^{30}Si). NaI and Ge detectors (FWHM=20 keV). Measured Eγ, Iγ, $\gamma(\theta)$, γ linear polarization, $\gamma\gamma(\theta)$. Other papers by the same group: 1966Ha20, 1964Ha03, 1964Ha27, 1963Ha25, 1962Ha33, 1961Ha29. Note that the older papers cover different energy ranges, have used NaI detectors and were performed primarily at the University of Kansas.

1968Wo01: E=3 MeV protons from Van de Graaff accelerator at Utrecht Fysisch Laboratorium der Rijksuniversiteit. Ge(Li) γ detector (FWHM= 6 keV at 1 MeV, 18 keV at 8 MeV). Enriched targets (68% ^{30}Si). Measured Eγ, Iγ, lifetimes through DSAM, mixing ratios. Others from the same group: 1959Ku79, 1969Wo01, 1968En03, 1966Va08, 1966Va07, 1964Va11, 1964Va09. Notably, 1966Va08 report direction-polarization correlation measurements E(p)=1.94, 2.11 MeV.

1969Wi02: E=5 MeV protons from Van-de-Graaff accelerator at Southern Universities Nuclear Institute South Africa. Enriched Si targets (96% ^{30}Si). Measured Eγ and angular distributions using NaI detectors. Other paper using the same apparatus to investigate level widths in ^{31}P: 1968Ho06.

1967Bo12,1968Bo13: E=2.0-3.0 MeV protons from the 3-MeV Van de Graaff accelerator of the Atomic Energy Board, South Africa. Measured γ yields, Eγ, Iγ, $\gamma\gamma$-coin in 1967Bo12; measured γ yields, $\gamma\gamma(\theta)$ in 1968Bo13.

2020De26: E=0.2-0.9 MeV protons from the JN Van de Graaff electrostatic accelerator at TUNL. Target was ^{30}Si implanted into a tantalum backing. γ rays were detected with a HPGe detector surrounded with a 16-segment NaI(Tl) annulus. Measured Eγ, Iγ, $\gamma\gamma$-coin, γ yields. Deduced resonance energies, strengths.

2009Ka37 (also 2008Ka47): E=1.4-2.7 MeV; measured Eγ, Iγ, $\gamma(\theta)$, excitation function; deduced resonance strength, magnetic dipole resonance strengths for ground and first excited states. Total of ten resonances studied, their γ deexcitation modes and strengths. Total strength of magnetic-dipole resonance on g.s. of ^{31}P=10.7 MeVμ_n^2 *22*.

2005Vo24 (also 2006Vo19): E=4 MeV protons from the ESU-4 electrostatic accelerator of the Kharkov Institute of Physics and Technology. Enriched ^{30}Si target. Measured Eγ, $\gamma(\theta)$ using Ge detectors for E=750-840, 1475-1520 keV resonances; E=1750-1905 in 2006Vo19. Others from the same group: 2004Vo22, 2002Vo17, 2001Ka69, 1998Ka52.

1979Ri01: E=0.50, 0.62, 0.78, 0.94, 0.98 MeV from the Helsinki University 2.5-MV Van de Graaff accelerator. Measured γ yields, Eγ, $\gamma(\theta)$.

1964Tu01: E=10 MeV protons from synchrotron of the Physico-Technical Institute of the Ukranian Academy of Sciences. γ-rays detected with photographic emulsion at 90 degrees to the beam and analyzed via microscope to determine excitation function.

1961Va15: E=1 MeV proton from the 4-MeV Physico-Technical Institute electrostatic generator. Measured Eγ, Iγ, $\gamma(\theta)$ with a scintillation γ-spectrometer.

1958Br98: E=11 MeV protons from the Nuclear Physics Research Laboratory of University of Liverpool. Thin ^{30}Si target mounted on a gold backing. NaI detectors for Eγ, $\gamma\gamma$, angular distributions and correlations.

1980Ca16, 1977CaZD (Thesis): (p,γ), (pol p,γ) E=5-28 MeV. Measured $\sigma(\theta)$, Ay(θ); deduced giant quadrupole resonance (GQR).

1991Fe01: (pol p,γ) E=20-36 MeV. Measured $\sigma(\theta)$, Ay(θ); deduced giant quadrupole resonance (GQR).

Others: 2019Ka53, 1984KoZL, 1979Pa16, 1970WoZW, 1962Tu03, 1961Ba03, 1960En06.

^{31}P Levels

E(level)[†]	J$^\pi$	T or Γ[a]	Comments
0.0	1/2$^+$		J$^\pi$: from Adopted Levels.
1266.13 *12*	3/2$^+$	0.36 ps *12*	J$^\pi$: spin from $\gamma\gamma(\theta)$ in 1958Br98, 1963Ha25; parity from 1266γ M1+E2 to 1/2$^+$. T or Γ: average τ=514 fs *178* from 390 fs *170* (1975De31), 770 fs *244* (1968Wo01).
2233.8 *3*	5/2$^+$	0.27 ps *7*	J$^\pi$: spin from $\gamma\gamma(\theta)$ in 1958Br98, 1963Ha25; parity from 2233.8γ E2 to 1/2$^+$. T or Γ: average τ=388 fs *110* from 340 fs *125* (1975De31), 425 fs *110* (1968Wo01).
3134.3 *4*	1/2$^+$	7.1 fs *31*	J$^\pi$: from γ(θ,pol) of 4649γ from 7782,3/2$^-$ resonance level in 1964Va09; 1/2 from $\gamma\gamma(\theta)$ in

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^\pi$	T or Γ[a]	Comments
			1963Ha25 and 1966Va08. Other: 3/2 from $\gamma\gamma(\theta)$ in 1958Br98 is inconsistent.
			T or Γ: average τ=10.2 fs *45* from 14 fs *6* (1975De31), 8.0 fs *45* (1968Wo01).
3295.0 *2*	5/2$^+$	73 fs *24*	J$^\pi$: polarization measurements show even parity (1967Wi10); J=5/2 from $\gamma\gamma(\theta)$ in 1958Br98, 1963Ha25, 1966Ha20, 1966Va08.
			T or Γ: average τ=105 fs *35* from 78 fs *35* (1975De31), 135 fs *37* (1968Wo01).
3414.6 *3*	7/2$^+$	201 fs *62*	J$^\pi$: polarization measurements show even parity (1967Wi10); spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11, 1966Va08.
			T or Γ: average τ=290 fs *90* from 445 fs *180* (1975De31), 300 fs *90* (1968Wo01), 230 fs *100* (1968En03).
3506.1 *6*	3/2$^+$	8.3 fs *42*	J$^\pi$: polarization measurements show even parity (1967Wi10); spin from $\gamma\gamma(\theta)$ in 1958Br98, 1963Ha25, 1966Ha20, 1966Va08.
			T or Γ: from τ=12 fs *6* (1975De31). Other: τ=13 fs *8* (1968Wo01).
4190.9 *10*	5/2$^+$	4.9 fs *21*	J$^\pi$: spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1958Br98, 1963Ha25; parity from 2924.6γ M1+E2 to 3/2$^+$.
			T or Γ: from τ=7 fs *3* (1975De31). Other: τ<23 fs (1968Wo01).
4260.4 *10*	3/2$^+$	10.4 fs *42*	J$^\pi$: spin from $\gamma\gamma(\theta)$ in 1963Ha25; π=+ from $\gamma(\theta$,pol) in 1967Wa10.
			T or Γ: from τ=15.0 fs *6* (1968Wo01).
4431.2 *4*	7/2$^-$	0.31 ps *13*	J$^\pi$: from primary 4482γ(lin pol) in 1964Ha27.
			T or Γ: average of τ=453 fs *179* from 410 fs *140* (1975De31), 1200 fs *583* (1968Wo01).
4592.5 *10*	3/2	12.5 fs *49*	J$^\pi$: from $\gamma\gamma(\theta)$ in 1966Ha20. See comment for 4634 level.
			T or Γ: average τ=18 fs *7* from 16 fs *6* (1975De31), 44 fs *22* (1968Wo01).
4634.2 *8*	(5/2,7/2)	85 fs *27*	J$^\pi$: from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1969Wo01. 3/2 from $\gamma\gamma(\theta)$ data of 1966Ha20 is most likely for 4592 level probably due to misidentification of γ rays because of poor resolution in γ-ray spectrum.
			T or Γ: average τ=122 fs *39* from 145 fs *40* (1975De31), 100 fs *39* (1968Wo01).
4783.4 *11*	5/2$^+$	6.9 fs *28*	J$^\pi$: spin from $\gamma\gamma(\theta)$ in 1967Wi10; parity from 4783.4γ E2 to 1/2$^+$.
			T or Γ: average τ=10 fs *4* from 10 fs *4* (1975De31), 14 fs *12* (1968Wo01).
5014.9 *10*	(1/2,3/2)	37 fs *12*	J$^\pi$: (1/2,3/2,5/2) from $\gamma\gamma(\theta)$ in 1963Ha25, 5/2 excluded by strong primary transitions from 1/2$^-$ resonance and 5015$\gamma(\theta)$ (1969Wo01).
			T or Γ: average τ=54 fs *17* from 45 fs *17* (1975De31), 67 fs *20* (1968Wo01).
5015.2 *8*	(1/2,3/2)	7.6 fs *51*	J$^\pi$: ≥5/2 excluded by strong primary transitions from 1/2$^-$ resonance and 5015$\gamma(\theta)$ (1969Wo01).
			T or Γ: average τ=10.9 fs *74* from 12 fs *8* (1975De31), 10.0 fs *74* (1968Wo01).
5116.0 *15*		<42 fs	E(level): other: 5116 *2* (1968Wo01).
			T or Γ: τ<60 fs (1975De31).
5256.8 *15*			E(level): other: 5253 *2* (1968Wo01).
5342.9 *15*		58 fs *21*	E(level): other: 5344 *2* (1968Wo01).
			T or Γ: from τ=84 fs *30* (1975De31).
5530.0 *15*		<7 fs	E(level): other: 5529 *2* (1968Wo01).
			T or Γ: from τ<10 fs (1975De31). Other: <37 fs (1969Wo01).
5558.9 *16*	3/2	<17 fs	E(level): other: 5557 *2* (1968Wo01).
			J$^\pi$: 3/2,5/2,7/2 from primary $\gamma(\theta)$ from J=5/2 resonance at 8910, 5/2 and 7/2 ruled out based on primary γ's from 1/2$^+$ resonances in (p,γ) (1969Wo01).
			T or Γ: from τ<25 fs (1969Wo01).
5672.4 *10*	5/2	25.0 fs *56*	E(level): from 1968Wo01. Other: 5672.1 *20* (1975De31).
			J$^\pi$: from primary $\gamma(\theta)$ from J=5/2 resonance at 8910, 4405$\gamma(\theta)$ and 3438$\gamma(\theta)$ (1969Wo01).
			T or Γ: average τ=36 fs *8* from 35 fs *8* (1975De31), 45 fs *20* (1969Wo01).
5773.5 *16*		22 fs *9*	E(level): other: 5773 *3* (1968Wo01).
			T or Γ: from τ=32 fs *13* (1975De31).
5891.9 *20*	+	26 fs *8*	E(level): other: 5892 *2* (1968Wo01).
			T or Γ: average τ=38 fs *12* from 36 fs *12* (1975De31), 80 fs *63* (1968En03).
5987.9 *14*			E(level): other: 5288 *2* (1968Wo01).
6046.4 *26*			
6078.8 *20*			
6103 *3*			E(level): seen only from γ decay of E(p)=1331 resonance (1968Wo01).

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^\pi$	T or Γ[a]	S$_{p\gamma}$(eV)[b]	Comments
6233.4 *15*				E(level): other: 6232 *3* (1968Wo01).
6336.6 *15*				
6380.8 *20*		<7 fs		E(level): other: 6381 *3* (1968Wo01). T or Γ: from τ<10 fs (1975De31).
6399.0 *10*	7/2	49 fs *24*		E(level): from 1968Wo01. Other: 6399.3 *20* (1975De31). J$^\pi$: from primary $\gamma(\theta)$ from J=7/2 resonance at 8224, 1968$\gamma(\theta)$ and and γ's to 5/2$^+$ and 7/2$^-$ level (1969Wo01). T or Γ: from τ=70 fs *35* (1968Wo01).
6454.7 *20*				
6460.8 *16*				
6496.1 *13*				E(level): other: 6495 *3* (1968Wo01).
6501.8 *20*				
6594.3 *20*				E(level): other: 6594 *2* (1968Wo01).
6610.4 *12*				E(level): other: 6610 *2* (1968Wo01).
6824.2 *20*				
6841.9 *15*				E(level): other: 6843 *2* (1968Wo01).
6909.6 *16*				E(level): other: 6908 *3* (1968Wo01).
6931.4 *20*	(5/2,7/2)	<28 fs		E(level): other: 6932 *3* (1968Wo01). J$^\pi$: from 4697.2$\gamma(\theta)$ and γ to 7/2$^-$ (1969Wo01). T or Γ: from τ<40 fs (1968Wo01).
7079.9 *19*				
7084.0 *17*				
7117.9 *27*				
7141.1 *18*				E(level): other: 7139 *3* (1968Wo01).
7214.3 *20*				
7313.7 *16*				
7687.2? *20*				
7717.0 *3*	(3/2$^-$,5/2$^-$)		2.28×10^{-4} *25*	E(level): from 2020De26 based on Eγ data, corresponding to E(p)(lab)=434.6 *3*. J$^\pi$: proposed in 2020De26 based on γ-decay patterns. S$_{p\gamma}$(eV): from 2020De26.
7781.5 *2*	3/2$^-$		0.376 *28*	E(level): from 2020De26 based on Eγ data, corresponding to E(p)(lab)=501.1 *2*. J$^\pi$: π=− from γ(pol) in 1966Va08; 3/2 from $\gamma(\theta)$ (1958Br98,1966Va08). E(p)(lab)=498.3 *10* (1959Ku79). S$_{p\gamma}$(eV): from 2020De26. Others: 0.33 eV *5* (1979Ri01), 0.18 eV (1966Va08).
7898.2 *3*	1/2	54 eV *14*	3.44 *24*	E(level): from 2020De26 based on Eγ data, corresponding to E(p)(lab)=621.7 *3*. J$^\pi$: from isotropic $\gamma(\theta)$ (1958Br98). E(p)(lab)=619.6 *12* (1959Ku79). S$_{p\gamma}$(eV): weighted average of 3.10 *26* (1958Sm95), 3.22 eV *24* (1963Ha25), 3.4 *8* (1968Ho06), 3.93 *40* (1969Ly03), 3.88 *27* (1979Pa16). Other: 5.0 *3* (1979Ri01) is discrepant. Γ=54 eV *14*, unweighted average of 68 eV *9* (1968Ho06), 40 eV *7* (1958Sm95). Γ$_{\gamma 0}$=1.54 eV *12*, weighted average of 1.6 eV *2* (1968Ho06), 1.52 eV *12* (1958Sm95).
7944.6 *10*				E(p)(lab)=669.8 *10* (1959Ku79).
8031.2 *9*	5/2		0.20	Γ$_\gamma$≥0.033 EV (2005Vo24). J$^\pi$: from $\gamma(\theta)$ in 1958Br98. S$_{p\gamma}$(eV): from 2005Vo24. E(p)(lab)=759.3 *9* (1959Ku79).
8047.7 *10*	3/2		1.2 *2*	J$^\pi$: from $\gamma(\theta)$ in 1958Br98. Γ$_\gamma$≥0.25 eV (2005Vo24).

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^\pi$	T or Γ[a]	$S_{p\gamma}$(eV)[b]	Comments
				$S_{p\gamma}$(eV): from 1979Ri01. Other: 1.0 eV (2005Vo24). E(p)(lab)=776.4 *10* (1959Ku79).
8103.6 *13*	5/2		0.31 *9*	J$^\pi$: from $\gamma(\theta)$ in 1958Br98. $\Gamma_\gamma \geq 0.073$ eV (2005Vo24). $S_{p\gamma}$(eV): from 1969Wo01. Other: 0.44 eV (2005Vo24). E(p)(lab)=834.2 *13* (1959Ku79).
8207.9 *10*	3/2	2.6 eV *2*	1.4 *4*	Γ=2.6 eV *2* (1968Ho06), $\Gamma_{\gamma 0}$=1.4 eV *1* (1968Ho06). J$^\pi$: from $\gamma(\theta)$ in 1958Br98. E(p)(lab)=942 *1* (1968Wo01). Other: 955 (1958Br98). $S_{p\gamma}$(eV): from 1969Wo01. Other: 2.0 *3* (1979Ri01).
8224.4 *10*	7/2		0.23 *7*	J$^\pi$: from $\gamma(\theta)$ in 1969Wo01. $S_{p\gamma}$(eV): from 1969Wo01. E(p)(lab)=959 *1* (1968Wo01).
8242.7 *10*	5/2		1.1 *3*	J$^\pi$: from $\gamma(\theta)$ in 1969Wo01. $S_{p\gamma}$(eV): from 1969Wo01. E(p)(lab)=978 *1* (1968Wo01).
8247.6 *10*			1.3 *4*	$S_{p\gamma}$(eV): from 1969Wo01. Other: 2.0 *3* (1979Ri01). E(p)(lab)=983 *1* (1968Wo01).
8264	3/2			E(level): resonance reported in 1958Br98 only. J$^\pi$: from $\gamma(\theta)$ in 1958Br98. E(p)(lab)=1000 (1958Br98).
8355.6 *6*	5/2[@]		0.17[c] *6*	J$^\pi$: also from $\gamma(\theta)$ in 1961Va15. E(p)(lab)=1094.7 *6* (1964Va11).
8433.9 *7*	7/2		0.36 *6*	J$^\pi$: from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11. E(p)(lab)=1175.6 *7* (1964Va11). Other: 1177 *20* (1961Ba03). $S_{p\gamma}$(eV): weighted average of 0.38 eV *6* (1963Ha25), 0.29 eV *10* (1964Va11).
8461.0 *7*	5/2$^+$		1.24 *12*	J$^\pi$: polarization measurements establish even parity (1967Wi10); spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11, 1961Va15. E(p)(lab)=1203.6 *7* (1964Va11). Other: 1204 *20* (1961Ba03). $S_{p\gamma}$(eV): weighted average of 1.26 eV *12* (1963Ha25), 1.1 eV *3* (1964Va11).
8470.4 *7*	5/2[@]		0.080[c] *24*	E(p)(lab)=1213.3 *7* (1964Va11).
8543.6 *8*	1/2[@]		0.23[c] *7*	E(p)(lab)=1289.0 *8* (1964Va11).
8552.2 *8*	1/2[@]	0.7 keV *4*	0.9[c] *3*	1/2$^+$ spin assignment in 1964Va11 to this level is perhaps in error. Γ=0.7 keV *4* (1964Va11). E(p)(lab)=1297.9 *8* (1964Va11).
8555.4 *8*	3/2[@]		0.70[c] *21*	E(p)(lab)=1301.2 *8* (1964Va11). Other: 1302 *20* (1961Ba03).
8575.6 *8*	5/2$^+$		2.00 *18*	E(p)(lab)=1322.1 *8* (1964Va11). Other: 1322 *20* (1961Ba03). J$^\pi$: spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11, 1961Va15; parity from $\gamma(\theta$,pol) in 1967Wi10. $S_{p\gamma}$(eV): weighted average of 2.04 eV *18* (1963Ha25), 1.6 eV *6* (1964Va11).
8584.2 *8*	5/2[@]		0.22[c] *8*	E(p)(lab)=1330.9 *8* (1964Va11).
8601.0 *8*			0.080[c] *24*	E(p)(lab)=1348.3 *8* (1964Va11).
8641.2 *8*	5/2		3.04 *30*	E(p)(lab)=1389.9 *8* (1964Va11). Other: 1393 *20* (1961Ba03). J$^\pi$: spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va111, 1961Va15. $S_{p\gamma}$(eV): weighted average of 3.12 eV *30* (1963Ha25), 2.5 eV *8* (1964Va11).
8649.5 *8*	3/2		2.48 *24*	E(p)(lab)=1398.4 *8* (1964Va11). J$^\pi$: spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11, 1961Va15. $S_{p\gamma}$(eV): weighted average of 2.44 eV *24* (1963Ha25), 3.1 eV *10* (1964Va11).
8729.1 *9*	3/2		3.9 *5*	E(p)(lab)=1480.7 *9* (1964Va11). J$^\pi$: spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11. $S_{p\gamma}$(eV): weighted average of 4.0 eV *5* (1963Ha25), 3.4 eV *11* (1964Va11).
8730.5 *9*	3/2		2.8 *5*	E(p)(lab)=1482.2 *9* (1964Va11). Other: 1483 *20* (1961Ba03). J$^\pi$: spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11, 1961Va15. $S_{p\gamma}$(eV): weighted average of 4.8 eV *9* (2009Ka37), 2.52 eV *36* (1963Ha25), 2.3 eV *8* (1964Va11). Other: 8.0 eV for E(p)=1480+1482 doublet (2005Vo24).

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^\pi$	T or Γ[a]	$S_{p\gamma}$(eV)[b]	Comments
8738.0 *9*	3/2		1.92 *20*	J$^\pi$: spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25, 1964Va11. Γ_γ=0.5 eV *2* (2005Vo24). E(p)(lab)=1489.9 *9* (1964Va11). $S_{p\gamma}$(eV): weighted average of 2.0 eV *2* (2009Ka37), 1.92 eV *20* (1963Ha25), 2.0 eV *6* (2005Vo24), 1.4 eV *5* (1964Va11).
8754.5 *10*			0.050[c] *15*	E(p)(lab)=1507 *1* (2005Vo24). Other: 1506.7 *9* (1964Va11), very weak. $S_{p\gamma}$(eV): other: 0.07 eV(2005Vo24).
8757.3 *9*	5/2$^+$		3.25 *30*	Γ_γ=0.72 eV (2005Vo24). J$^\pi$: even parity from γ(lin pol) (1967Wi10); spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1963Ha25. E(p)(lab)=1509.9 *9* (1964Va11). Other: 1507 *20* (1961Ba03). $S_{p\gamma}$(eV): weighted average of 3.36 eV *30* (1963Ha25), 2.5 eV *8* (1964Va11). Other: 3.5 eV (2005Vo24).
8763.3 *9*	(1/2,3/2)	1.5 keV *4*	0.60[c] *18*	J$^\pi$: from $\gamma(\theta)$ in 1961Va15. T or Γ: from 1964Va11. Γ from 1964Va11. Γ_γ=0.4 EV (2005Vo24). E(p)(lab)=1516.1 *9* (1964Va11). $S_{p\gamma}$(eV): other: 0.8 eV (2005Vo24).
8840.0 *10*	7/2[#]		0.3[c] *1*	E(p)(lab)=1595.3 *10* (1966Va07). Other: 1591 *20* (1961Ba03).
8902.9 *10*	1/2[#]	0.11 keV *5*	0.6 *2*	E(p)(lab)=1660.4 *10* (1966Va07). Other: 1662 *20* (1961Ba03). Γ from 1966Va07. $S_{p\gamma}$(eV): from 1966Va07.
8909.7 *10*	5/2[#]		0.6 *2*	E(p)(lab)=1667.4 *10* (1966Va07). $S_{p\gamma}$(eV): from 1966Va07.
8935.8 *10*	3/2[#]		1.7 *5*	E(p)(lab)=1694.4 *10* (1966Va07). Other: 1693 *20* (1961Ba03). $S_{p\gamma}$(eV): from 1966Va07.
8985.9 *10*	3/2[#]		0.3 *1*	E(p)(lab)=1746.1 *10* (1966Va07). γ only seen by 1968Wo01 and they state 40% of the γ branching is unknown. $S_{p\gamma}$(eV): from 1966Va07.
9009.1 *10*	5/2[#]	0.10 keV *5*	2.6 *2*	Γ_γ=0.47 eV *14* (2004Vo22). E(p)(lab)=1770.1 *10* (1966Va07). Other: 1768 *20* (1961Ba03). Γ from 1966Va07. $S_{p\gamma}$(eV): weighted average of 2.6 eV *2* (2009Ka37), 2.8 eV *8* (2004Vo22), 2.0 eV *6* (1966Va07).
9046.1 *11*	3/2[#]	9.0 keV *10*	3.5 *9*	Γ_γ=1.10 eV *11* (2004Vo22). E(p)(lab)=1808.4 *11* (1966Va07). Other: 1811 *20* (1961Ba03). Γ from 1966Va07. $S_{p\gamma}$(eV): weighted average of 4.4 eV *13* (2004Vo22), 3.1 eV *9* (1966Va07).
9052.7 *11*	(5/2)$^+$		0.7 *2*	J$^\pi$: from Adopted Levels. J=9/2 proposed by 1966Va07 based on Mult(6868γ)=Q, ΔJ=2 deduced from 6818γ-2234$\gamma(\theta)$ which, however, could be also consistent with ΔJ=0. J=9/2 assignment is inconsistent with observed transitions to 3/2$^+$ levels. E(p)(lab)=1815.2 *11* (1966Va07). $S_{p\gamma}$(eV): from 1966Va07. Other: 1.0 eV (2004Vo22).
9067.1 *11*	5/2[#]	<26 fs	2.8 *5*	Γ_γ=0.57 eV *18* (2004Vo22). E(p)(lab)=1830.1 *11* (1966Va07). Other: 1828 *20* (1961Ba03). T or Γ: from τ<37 fs (1969Wo01). $S_{p\gamma}$(eV): weighted average of 2.9 eV *5* (2009Ka37),3.4 eV *10* (2004Vo22), 2.4 eV *7* (1966Va07).
9113.4 *6*	7/2[#]		0.74 *19*	Γ_γ=0.12 eV *12* (2004Vo22).

Continued on next page (footnotes at end of table)

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^{\pi}$	T or Γ[a]	S$_{p\gamma}$(eV)[b]	Comments
				E(p)(lab)=1877.9 *6* (1975De31). Others: 1876.0 *15* (1967Bo12), 1875.6 *11* (1966Va07), 1874 *20* (1961Ba03) . S$_{p\gamma}$(eV): weighted average of 0.63 eV *19* (1975De31), 1.2 eV *6* (1967Bo12), and 0.9 eV *3* (1966Va07). Other: 0.88 eV (2004Vo22).
9115.5 *6*	5/2[#]		4.5 *6*	Γ_{γ}=0.83 eV *26* (2004Vo22). E(p)(lab)=1880.1 *6* (1975De31). Others: 1878.0 *15* (1967Bo12), 1878.3 *11* (1966Va07). S$_{p\gamma}$(eV): weighted average of 5.4 eV *6* (2009Ka37), 3.4 eV *11* (1975De31), 4.8 eV *14* (2004Vo22), 4.0 eV *20* (1967Bo12), 3.1 eV *9* (1966Va07).
9128.5 *6*	5/2[#]		0.54 *13*	Γ_{γ}=0.10 eV *7* (2004Vo22). E(p)(lab)=1893.5 *6* (1975De31). Others: 1893.0 *15* (1967Bo12), 1891.6 *12* (1966Va07), 1890 *20* (1961Ba03). S$_{p\gamma}$(eV): weighted average of 0.42 eV *13* (1975De31), 0.59 eV *17* (2004Vo22), 0.70 eV *35* (1967Bo12), 0.7 eV *2* (1966Va07).
9130.9 *6*	5/2[#]		1.1 *3*	Γ_{γ}=0.23 eV *12* (2004Vo22). E(p)(lab)=1896.0 *6* (1975De31). Others: 1895.0 *15* (1967Bo12), 1895.2 *12* (1966Va07). S$_{p\gamma}$(eV): weighted average of 1.0 eV *3* (1975De31), 1.4 eV *4* (2004Vo22), 1.1 eV *6* (1967Bo12), and 1.1 eV *3* (1966Va07).
9154.2 *6*	7/2[#]		0.59 *15*	E(p)(lab)=1920.1 *6* (1975De31). Others: 1918.0 *15* (1967Bo12), 1918.2 *12* (1966Va07), 1917 *20* (1961Ba03). S$_{p\gamma}$(eV): weighted average of 0.51 eV *15* (1975De31), 0.70 eV *35* (1967Bo12), 0.7 eV *2* (1966Va07).
9156.2 *6*	3/2[#]		1.5 *4*	E(p)(lab)=1922.2 *6* (1975De31). Others: 1921.0 *15* (1967Bo12), 1920.4 *12* (1966Va07). S$_{p\gamma}$(eV): weighted average of 1.2 eV *4* (1975De31), 3.0 eV *15*, and 1.9 eV *6* (1966Va07).
9176.0 *6*	3/2[#]	0.12 keV *5*	1.06 *28*	E(p)(lab)=1942.6 *6* (1975De31). Others: 1939.0 *16* (1967Bo12), 1941.6 *12* (1966Va07), 1939 *20* (1961Ba03). Γ from 1966Va07. S$_{p\gamma}$(eV): weighted average of 0.94 eV *28* (1975De31), 1.3 eV *4* (1966Va07).
9206.1 *6*	7/2[#]		0.48 *4*	E(p)(lab)=1973.7 *6* (1975De31). Others: 1972.0 *16* (1967Bo12), 1971.7 *12* (1966Va07), 1970 *20* (1961Ba03). S$_{p\gamma}$(eV): weighted average of 0.48 eV *4* (1975De31), 0.70 eV *35* (1967Bo12), and 0.50 eV *15* (1966Va07).
9226.3 *6*	1/2[#]	3.1 keV *4*	0.72 *20*	E(p)(lab)=1994.6 *6* (1975De31). Others: 1994.0 *16* (1967Bo12), 1992.0 *12* (1966Va07), 1990 *20* (1961Ba03). Γ from 1966Va07. S$_{p\gamma}$(eV): weighted average of 0.66 eV *20* (1975De31), 0.70 eV *35* (1967Bo12), and 0.80 eV *24* (1966Va07).
9240.7 *7*	3/2[‡]		1.5 *4*	E(p)(lab)=2009.5 *7* (1975De31). Others: 2007.0 *16* (1967Bo12), 2004 *20* (1961Ba03). S$_{p\gamma}$(eV): weighted average of 1.4 eV *4* (1975De31), 3.0 eV *15* (1967Bo12).
9252.9 *7*			0.77 *25*	E(p)(lab)=2022.1 *7* (1975De31). Others: 2021.0 *16* (1967Bo12), 2019 *20* (1961Ba03). S$_{p\gamma}$(eV): weighted average of 0.73 eV *25* (1975De31), 0.90 eV *45* (1967Bo12).
9255.9 *7*			0.73 *23*	E(p)(lab)=2025.2 *7* (1975De31), 2024.0 *16* (1967Bo12). S$_{p\gamma}$(eV): weighted average of 0.70 eV *23* (1975De31), 0.8 eV *4* (1967Bo12).
9290.8 *7*	3/2	10.1 keV *8*	1.1 *3*	Γ from 1988Va06. Other: 4.5 keV *14* (1967Bo12). J$^{\pi}$: from $\gamma(\theta)$ (1975De31). E(p)(lab)=2061.3 *7* (1975De31). Others: 2060.0 *16* (1967Bo12), 2057 *20* (1961Ba03). S$_{p\gamma}$(eV): weighted average of 1.1 eV *3* (1975De31), 1.0 eV *5* (1967Bo12).
9319.5 *8*	3/2[‡]		0.55 *16*	E(p)(lab)=2091.0 *8* (1975De31). Others: 2090.0 *17* (1967Bo12), 2087 *20*

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^{\pi}$	T or Γ[a]	S$_{p\gamma}$(eV)[b]	Comments
				(1961Ba03).
				S$_{p\gamma}$(eV): weighted average of 0.52 eV *16* (1975De31), 0.70 eV *35* (1967Bo12).
9358.1 *8*			0.25 *15*	E(p)(lab)=2130.9 *8* (1975De31). Others: 2130.0 *17* (1967Bo12), 2129 *20* (1961Ba03).
				S$_{p\gamma}$(eV): unweighted average of 0.39 eV *13* (1975De31), 0.10 eV *5* (1967Bo12).
9360.8 *8*			0.93 *30*	E(p)(lab)=2133.7 *8* (1975De31), 2133.0 *17* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 1.1 eV *3* (1975De31), 0.70 eV *35* (1967Bo12).
9399.7 *8*			0.37 *11*	E(p)(lab)=2173.9 *8* (1975De31), 2173.0 *17* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 0.35 eV *11* (1975De31), 0.50 eV *25* (1967Bo12).
9412.4 *8*	7/2^{-}		10.2 *16*	Γ_{γ}=1.63 eV *25*, Γ_{p}=500 eV *80* (2002Vo17).
				B(M1)=98 *15* (2005Vo24).
				J$^{\pi}$: from 4982γ(lin pol) in 1964Ha27.
				E(p)(lab)=2187.0 *8* (1975De31). Others: 2086.0 *17* (1967Bo12), 2183 *20* (1961Ba03).
				S$_{p\gamma}$(eV): weighted average of 8.7 eV *16* (2009Ka37), 9.4 eV *31* (1975De31), 13.0 eV *20* (2002Vo17), 6 eV (1964Ha03), 11 eV *3* (1969Wo01), 8.5 eV *43* (1967Bo12).
9436.2? *18*			0.4	E(p)(lab)=2211.0 *18* (1967Bo12).
9440.8 *9*	3/2[‡]		1.7 *3*	E(p)(lab)=2216.3 *9* (1975De31). Others: 2215.0 *18* (1967Bo12), 2215 *20* (1961Ba03).
				S$_{p\gamma}$(eV): weighted average of 1.9 eV *2* (2009Ka37), 1.1 eV *3* (1975De31), 2.3 eV *12* (1967Bo12).
9448.9 *9*	5/2[‡]		2.1 *6*	E(p)(lab)=2224.7 *9* (1975De31), 2223.0 *18* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 2.0 eV *6* (1975De31), 2.8 eV *14* (1967Bo12).
9476.9 *9*			0.27 *8*	E(p)(lab)=2253.7 *9* (1975De31), 2254.0 *18* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 0.25 eV *8* (1975De31), 0.4 eV *2* (1967Bo12).
9524.6 *9*	3/2^{+}[‡]		1.3 *6*	J$^{\pi}$: parity from 5333.2γ M1+E2 to 5/2^{+}.
				E(p)(lab)=2303.0 *9* (1975De31). Others: 2302.0 *18* (1967Bo12), 2300 *20* (1961Ba03).
				S$_{p\gamma}$(eV): weighted average of 1.2 eV *4* (1975De31), 4.3 eV *22* (1967Bo12).
9536.4 *10*	5/2[‡]		1.2 *3*	E(level): unresolved doublet (1975De31).
				E(p)(lab)=2315.2 *10* (1975De31). Others: 2315.0 *19* (1967Bo12), 2311 *20* (1961Ba03).
				S$_{p\gamma}$(eV): weighted average of 1.1 eV *3* (1975De31), 1.6 eV *8* (1967Bo12).
9570.5 *10*	3/2[‡]		3.0 *7*	E(p)(lab)=2350.4 *10* (1975De31), 2352.0 *19* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 3.9 eV *8* (2009Ka37), 2.2 eV *7* (1975De31), 6.3 eV *32* (1967Bo12).
9577.8 *10*	7/2[‡]		1.1 *3*	E(p)(lab)=2357.9 *10* (1975De31), 2358.0 *19* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 1.0 eV *3* (1975De31), 1.4 eV *7* (1967Bo12).
9585.0 *10*	3/2	3.1 keV *9*	2.6 *2*	Γ from 1967Bo12.
				J$^{\pi}$: spin from $\gamma(\theta)$ (1975De31).
				E(p)(lab)=2365.4 *10* (1975De31), 2364.0 *19* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 2.6 eV *2* (2009Ka37), 2.9 eV *9* (1975De31), 2.9 eV *15* (1967Bo12).
9593.8 *10*	3/2[‡]		1.2 *3*	E(p)(lab)=2374.5 *10* (1975De31), 2375.0 *19* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 1.1 eV *3* (1975De31), 1.7 eV *9* (1967Bo12).
9598.5 *10*	3/2		0.20 *6*	J$^{\pi}$: from $\gamma(\theta)$ (1975De31).
				E(p)(lab)=2379.3 *10* (1975De31), 2379.0 *19* (1967Bo12).
				S$_{p\gamma}$(eV): weighted average of 0.18 eV *6* (1975De31), 0.4 eV *2* (1967Bo12).
9611.9 *10*			0.43 *21*	E(level): 1975De31 claim this resonance must be a doublet due to $\gamma(\theta)$ data of 9610.3γ and 8344.6γ (excluding J≤5/2) inconsistent with 3230.9γ to 3/2^{+} (excluding J≥7/2).

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^{\pi}$	T or Γ[a]	$S_{p\gamma}$(eV)[b]	Comments
				E(p)(lab)=2393.2 *10* (1975De31), 2392.0 *19* (1967Bo12). $S_{p\gamma}$(eV): weighted average of 0.75 eV *23* (1975De31), 0.30 eV *15* (1967Bo12).
9720.5 *10*	1/2[‡]		7.3 *5*	E(level): unresolved doublet (1975De31). $S_{p\gamma}$(eV): weighted average of 7.4 eV *3* (2009Ka37), 4.4 eV *17* (1975De31), 4.3 eV *22* (1967Bo12). E(p)(lab)=2505.4 *10* (1975De31). Others: 2504.0 *20* (1967Bo12), 2510 *20* (1961Ba03).
9756.5 *20*	5/2[‡]		3.8[d] *19*	E(p)(lab)=2542.0 *20* (1967Bo12).
9760.4 *20*	5/2[‡]		10[d] *5*	E(p)(lab)=2546.0 *20* (1967Bo12).
9765.2 *20*	3/2[‡]		2[d] *1*	E(p)(lab)=2551.0 *20* (1967Bo12). Other: 2552 *20* (1961Ba03).
9816.5 *20*			0.70[d] *35*	E(p)(lab)=2604.0 *21* (1967Bo12).
9819.4 *20*			1.8[d] *9*	E(p)(lab)=2607.0 *21* (1967Bo12). Other: 2616 *20* (1961Ba03).
9840.7 *20*			0.6[d] *3*	E(p)(lab)=2629.0 *21* (1967Bo12).
9843.6 *20*	3/2[‡]		7.1[d] *36*	E(p)(lab)=2632.0 *21* (1967Bo12).
9852.3 *20*	(7/2)[‡]		1.2[d] *6*	E(p)(lab)=2641.0 *21* (1967Bo12). Other: 2643 *20* (1961Ba03).
9865.8 *20*	7/2[‡]		2.3[d] *12*	E(p)(lab)=2655.0 *21* (1967Bo12).
9867.8 *20*	3/2[‡]		2.3[d] *12*	E(p)(lab)=2657.0 *21* (1967Bo12). Other: 2668 *20* (1961Ba03).
9907.5 *21*	(1/2,3/2,5/2)		10[d] *5*	E(level): Doublet with E=9908.5 resolved by a difference of 0.3 *1* in energy in 1968Bo13, however the intensity of γ-rays from the levels was not separated. J$^{\pi}$: 9/2 for E=9907.5 from 6492γ-2148$\gamma(\theta)$ and 3/2 for 9908.5 from 9905.8$\gamma(\theta)$ imply this resonance is a doublet (1968Bo13). E(p)(lab)=2698.0 *22* and 2699.0 *22* (1967Bo12).
9925.8 *21*	3/2[‡]		1.4[d] *7*	This level is exceptional in that it decays with equal intensity to all levels with excitation energy less than 5 MeV, except for the level at 4.64 MeV (1968Bo13). E(p)(lab)=2717.0 *22* (1967Bo12). Other: 2716 *20* (1961Ba03).
9941.3 *21*			1.2[d] *6*	E(p)(lab)=2733.0 *22* (1967Bo12). Other: 2730 *20* (1961Ba03).
9946.2 *21*			0.50[d] *25*	E(p)(lab)=2738.0 *22* (1967Bo12).
9963.6 *21*		5.1 keV *15*	1.2[d] *6*	Γ from 1967Bo12. E(p)(lab)=2756.0 *22* (1967Bo12). Other: 2753 *20* (1961Ba03).
9976.2 *21*		4.2 keV *13*	1.0[d] *5*	Γ from 1967Bo12. E(p)(lab)=2769.0 *22* (1967Bo12).
9988.7 *21*				E(p)(lab)=2782.0 *22* (1967Bo12).
9999.4 *21*		5.3 keV *16*	2.4[d] *12*	Γ from 1967Bo12. E(p)(lab)=2793.0 *22* (1967Bo12).
10017.8 *21*			1.1[d] *6*	E(p)(lab)=2812.0 *22* (1967Bo12).
10019.7 *22*	5/2[‡]		7.0[d] *35*	E(p)(lab)=2814.0 *23* (1967Bo12). Other: 2828 *20* (1961Ba03).
10046.8 *22*	5/2[‡]		8.7[d] *44*	E(p)(lab)=2842.0 *23* (1967Bo12). Other: 2856 *20* (1961Ba03).
10075.8 *22*			0.8[d] *4*	E(p)(lab)=2872.0 *23* (1967Bo12).
10089.4 *22*			3.9[d] *20*	E(p)(lab)=2886.0 *23* (1967Bo12). Other: 2883 *20* (1961Ba03).
10092.3 *22*			2.8[d] *14*	E(p)(lab)=2889.0 *23* (1967Bo12).
10099.1 *22*			4.3[d] *22*	E(p)(lab)=2896.0 *23* (1967Bo12). Other: 2901 *20* (1961Ba03).
10116.5 *22*		2.9 keV *9*	1.1[d] *6*	Γ from 1967Bo12. E(p)(lab)=2914.0 *23* (1967Bo12). Other: 2910 *20* (1961Ba03).
10128? *20*				E(p)(lab)=2926 *20* (1961Ba03).
10144.5 *23*			2.4[d] *12*	E(p)(lab)=2943.0 *24* (1967Bo12).
10153.3 *23*		3.2 keV *10*	0.8[d] *4*	Γ from 1967Bo12.

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	Jπ	T or Γ[a]	$S_{p\gamma}$(eV)[b]	Comments
				E(p)(lab)=2952.0 *24* (1967Bo12). Other: 2952 *20* (1961Ba03).
10193.0 *23*	3/2[‡]		6.3[d] *32*	Jπ: also from γ(θ) in 1969Wi02. E(p)(lab)=2993.0 *24* (1967Bo12), 2995 *3* (1969Wi02).
10207.5 *23*			4 *2*	E(p)(lab)=3008.0 *24* (1967Bo12). Other: 3006 *20* (1961Ba03). Resonance Strength≈4 eV *2* (1967Bo12).
10210.4 *23*	3/2[&]		5.9 *30*	E(p)(lab)=3011.0 *24* (1967Bo12). Other: 3011 *3* (1969Wi02). Resonance Strength≈5.9 eV 30 (1967Bo12).
10212 *3*	7/2[&]			E(p)(lab)=3013 *3* (1969Wi02).
10225 *1*	7/2[‡]		2.9[d] *15*	E(p)(lab)=3027.0 *24* (1968Bo13), 3027 *3* (1969Wi02) for probable doublet. Other: 3022 *20* (1961Ba03).
10232 *3*	5/2[&]			E(p)(lab)=3034 *3* (1969Wi02).
10267 *3*	3/2[&]			E(p)(lab)=3070 *3* (1969Wi02).
10271 *3*	3/2[&]			E(p)(lab)=3074 *3* (1969Wi02).
10288 *3*	5/2[&]			E(p)(lab)=3091 *3* (1969Wi02). Other: 3088 *20* (1961Ba03).
10304 *3*	3/2[&]			E(p)(lab)=3108 *3* (1969Wi02).
10335 *3*	3/2[&]			E(p)(lab)=3140 *3* (1969Wi02). Other: 3154 *20* (1961Ba03).
10385 *3*	5/2[&]			E(p)(lab)=3191 *3* (1969Wi02).
10401 *3*	5/2[&]			E(p)(lab)=3208 *3* (1969Wi02). Other: 3204 *20* (1961Ba03).
10425 *3*	(1/2,3/2)[&]			E(p)(lab)=3233 *3* (1969Wi02). Other: 3223 *20* (1961Ba03).
10455 *3*				E(p)(lab)=3264 *3* (1969Wi02). Other: 326*720* (1961Ba03).
10483 *3*	5/2[&]			E(p)(lab)=3293 *3* (1969Wi02).
10485 *3*	3/2[&]			E(p)(lab)=3295 *3* (1969Wi02).
10487 *3*	3/2[&]			E(p)(lab)=3297 *3* (1969Wi02).
10503 *3*		16 keV		E(p)(lab)=3313 *3* (1969Wi02). Other: 3307 *20* (1961Ba03).
10512				E(p)(lab)=3323 *20* (1961Ba03). Other: 3323 (1964Tu01).
10537 *3*	3/2[&]			E(p)(lab)=3349 *3* (1969Wi02). Other: 3348 *20* (1961Ba03).
10564 *3*	3/2[&]			E(p)(lab)=3377 *3* (1969Wi02).
10607 *3*	3/2[&]			E(p)(lab)=3422 *3* (1969Wi02).
10620 *3*				E(p)(lab)=3435 *3* (1969Wi02). Other: 3434 *20* (1961Ba03).
10629 *3*				E(p)(lab)=3445 *3* (1969Wi02).
10645 *3*	3/2[&]			E(p)(lab)=3461 *3* (1969Wi02). Other: 3453 *20* (1961Ba03).
10650 *3*	5/2[&]			E(p)(lab)=3466 *3* (1969Wi02). Other: 3467 *20* (1961Ba03).
10659 *3*	3/2[&]	24 keV		E(p)(lab)=3476 *3* (1969Wi02).
10672 *3*	5/2[&]			E(p)(lab)=3489 *3* (1969Wi02).
10698 *3*	3/2[&]			E(p)(lab)=3516 *3* (1969Wi02). Other: 3500 *20* (1961Ba03).
10703 *3*	3/2[&]			E(p)(lab)=3521 *3* (1969Wi02).
10706 *3*	3/2[&]			E(p)(lab)=3524 *3* (1969Wi02). Other: 3525 *20* (1961Ba03).
10717 *3*				E(p)(lab)=3535 *3* (1969Wi02).
10758 *3*				E(p)(lab)=3578 *3* (1969Wi02). Other: 3558 *20* (1961Ba03).
10774 *3*	3/2[&]			E(p)(lab)=3594 *3* (1969Wi02).
10792 *3*				E(p)(lab)=3613 *3* (1969Wi02). Other: 3606 *20* (1961Ba03).
10801 *3*	3/2[&]			E(p)(lab)=3622 *3* (1969Wi02).
10818 *3*	3/2[&]			E(p)(lab)=3640 *3* (1969Wi02). Other: 3634 *20* (1961Ba03).
10834 *3*	3/2[&]			E(p)(lab)=3656 *3* (1969Wi02). Other: 3667 *20* (1961Ba03).
10846 *3*	(1/2,3/2)[&]			E(p)(lab)=3669 *3* (1969Wi02). Other: 3677 *20* (1961Ba03). E(level): likely a doublet (1969Wi02).
10857 *3*				E(p)(lab)=3680 *3* (1969Wi02). Other: 3689 *20* (1961Ba03).
10882 *3*	3/2[&]			E(p)(lab)=3706 *3* (1969Wi02). Other: 3714 *20* (1961Ba03).

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^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

^{31}P Levels (continued)

E(level)[†]	J$^{\pi}$	Comments
10907 *3*		E(p)(lab)=3732 *3* (1969Wi02). Other: 3740 *20* (1961Ba03). E(level): likely a doublet (1969Wi02).
10936 *3*		E(p)(lab)=3762 *3* (1969Wi02). E(level): likely a doublet (1969Wi02).
10948 *3*	3/2[&]	E(p)(lab)=3774 *3* (1969Wi02). Other: 3772 *20* (1961Ba03).
10980 *3*		E(p)(lab)=3807 *3* (1969Wi02). Other: 3820 *20* (1961Ba03).
11018 *20*		E(p)(lab)=3846 *20* (1961Ba03).
11041 *20*		E(p)(lab)=3869 *20* (1961Ba03).
11075 *3*	3/2[&]	E(p)(lab)=3905 *3* (1969Wi02). Other: 3886 *20* (1961Ba03).
11080 *3*		E(p)(lab)=3911 *3* (1969Wi02). Other: 3920 *20* (1961Ba03).
11119 *3*		E(p)(lab)=3951 *3* (1969Wi02).
11135 *3*	3/2[&]	E(p)(lab)=3967 *3* (1969Wi02).
11152 *3*		E(p)(lab)=3985 *3* (1969Wi02). Other: 3980 *20* (1961Ba03).
11172 *3*	5/2[&]	E(p)(lab)=4006 *3* (1969Wi02). Other: 4012 *20* (1961Ba03).
11221 *20*		E(p)(lab)=4055 *20* (1961Ba03).
11255 *20*		E(p)(lab)=4090 *20* (1961Ba03).
11274 *20*		E(p)(lab)=4110 *20* (1961Ba03).
11285 *20*		E(p)(lab)=4121 *20* (1961Ba03).
11306 *20*		E(p)(lab)=4143 *20* (1961Ba03).
11334 *20*		E(p)(lab)=4172 *20* (1961Ba03).
11345 *20*		E(p)(lab)=4184 *20* (1961Ba03).
11363 *20*		E(p)(lab)=4202 *20* (1961Ba03).
11392 *20*		E(p)(lab)=4232 *20* (1961Ba03).

[†] Values for levels from 5116 to 7687 keV are from primary γ transitions measured primarily by 1975De31 at 55° (where p2(cos(θ)) coefficient is nearly zero) with corrections applied for recoil and Doppler effect. Higher level energies are determined from E(p)(cm)+ S(p), where S(p)=7296.553 *22* (2021Wa16) and E(p)(cm) deduced from listed E(p)(lab) values. The source of level energies below 5116 keV is from 1968Wo01, unless otherwise noted in comments.

[‡] Spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1968Bo13.

[#] Spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1966Va07.

[@] Spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1964Va11.

[&] Spin from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ in 1969Wi02.

[a] Lifetimes from DSAM. Values are weighted averages of the data given in comments. Uncertainties from 1968Wo01 do not include the systematic uncertainty in the slowing-down theory as stated by the authors and the evaluators have added a 25% uncertainty for that in quadrature, the same as estimated in 1975De31.

[b] Resonance strength $S_{p\gamma}=(2J+1)\Gamma_p\Gamma_\gamma/\Gamma$. Values are from 1975De31 normalized to $S_{p\gamma}$=3.10 eV *26* (1958Sm95) for E(p)(lab)=620 keV resonance, unless otherwise noted.

[c] From 1964Va11.

[d] From 1967Bo12.

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$

Evaluators′ note for POL values from 1964Va09, 1968Va08 and 1967Wi10 given under comments: it seems that the POL values from 1964Va09 and 1968Va08 have opposite signs to values from 1967Wi10, based on results deduced from POL values. While a clear definition for POL is given in 1967Wi10, it is unclear how POL values are defined and obtained in 1964Va09 and 1968Va08. Despite probable different definitions for POL, level parities implied from POL values from all those work by comparison with predicted values are considered valid by the evaluators.

A_2 and A_4 values given under comments are from $\gamma(\theta)$ data, unless otherwise noted.

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
1266.13	3/2$^+$	1266.1	100	0.0	1/2$^+$	M1+E2	+0.28 *2*	A_2=−0.16 *2* (1958Br98). A_2=−0.66 *3*, A_4=−0.06 *4* from E(p)=1392 resonance, A_2=−0.28 *8*, A_4=+0.01 *10* from E(p)=1400 resonance, A_2=−0.61 *4*, A_4=−0.05 *4* from E(p)=1509 resonance (1963Ha25). δ: −0.28 *2* (1963Ha25), 0.28 *2* (1968Wo01), 0.28 *2* (1964Va11), −1.2 (1958Br98).
2233.8	5/2$^+$	967.7	<0.2	1266.13	3/2$^+$			I_γ: others: <0.8 (1967Wi10), <5 (1962Ha33).
		2233.7	100	0.0	1/2$^+$	E2		A_2=+0.39 *2* (1958Br98). A_2=+0.35 *5*, A_4=+0.04 *7* from E(p)=1204 resonance, A_2=+0.38 *2*, A_4=−0.02 *2* from E(p)=1489 resonance (1963Ha25). δ: 0.0 (1967Wi10).
3134.3	1/2$^+$	900.5	<0.2	2233.8	5/2$^+$			I_γ: other: <5 (1962Ha33).
		1868.1	2.7 *3*	1266.13	3/2$^+$			I_γ: other: <5 (1962Ha33).
		3134.1	97.3 *3*	0.0	1/2$^+$	(M1)		A_2=+0.17 *4* (1958Br98); A_2=+0.09 *7*, A_4=−0.01 *12*, or A_2=+0.14 *5*, A_4=+0.03 *4* (1963Ha25). I_γ: other: 100 (1968Wo01). Mult.,δ: D+Q with δ(Q/D)=+0.22 *2* or −3.0 *2* (1963Ha25), −0.24 *2* or +3.3 *3* and −0.27 *2* or +3.7 *3* (1966Va08), but M1 from level scheme.
3295.0	5/2$^+$	1061.2	20.7 *10*	2233.8	5/2$^+$	M1+E2	+0.41 *6*	A_2=+0.27 *11*, A_4=−0.02 *10* (1969Wo01). I_γ: others: 23 *2* (1967Wi10), 23 *2* (1966Ha20), 16 *2* (1968Wo01), 18 *5* (1966Va08). δ: −0.4 *4* (1967Wi10), −0.41 *6* (1966Ha20), +0.12 *10* (1969Wo01).
		2028.8	78.2 *10*	1266.13	3/2$^+$	M1+E2	+0.44 *2*	A_2=+0.53 *4*, A_4=+0.05 *3* (1963Ha25); A_2=−+0.33 *5*, A_4=+0.08 *5* (1969Wo01). POL=−0.54 *11* and −0.22 *35* imply π(3295)=+ (1967Wi10). I_γ: others: 77 *2* (1967Wi10), 77 *2* (1966Ha20), 84 *2* (1968Wo01), 82 *5* (1966Va08). δ: −0.44 *2* (1966Ha20), −0.42 *4* (1969Wo01), −0.32 *8* or −0.55 *+25−60* (1967Wi10).
		3294.8	1.1 *2*	0.0	1/2$^+$			I_γ: others: 0.8 *12* (1967Wi10), 0.8 *12* (1966Ha20).
3414.6	7/2$^+$	1180.8	2.4 *5*	2233.8	5/2$^+$			I_γ: other: 3 (1962Ha33).
		2148.4	97.6 *5*	1266.13	3/2$^+$			POL=+0.65 *23* implies π(3415)=+ (1967Wi10). I_γ: others: 100 (1967Wi10), 90 (1962Ha33), 100 (1968Wo01).
		3414.4	<0.8	0.0	1/2$^+$	[M3]		I_γ: other: 10 (1962Ha33).
3506.1	3/2$^+$	1272.3	<5	2233.8	5/2$^+$	M1(+E2)	+0.05 *11*	I_γ: others: 16 *14* (1967Wi10), 16 *4* (1966Ha20), <6 (1968Wo01). δ: −0.05 *11* (1967Wi10), −0.05 *105* (1966Ha20).
		2239.9	43 *2*	1266.13	3/2$^+$	M1(+E2)	−0.06 *19*	I_γ: others: 20 *14* (1967Wi10), 20 *14* (1966Ha20), 38 *4* (1968Wo01). δ: +0.06 *19* (1967Wi10), +0.06 *19* (1966Ha20).
		3505.9	57 *2*	0.0	1/2$^+$	M1+E2	+0.41 *3*	δ: −0.41 *3* (1967Wi10), −0.41 *3* (1966Ha20), −0.43 *3* (1966Va08), +0.30 or −5.3

$^{31}_{15}P_{16}$-11

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
								(1958Br98).
								POL=−0.88 *25* implies π(3506)=+ (1967Wi10).
								A_2=+0.12 *3* (1958Br98).
								A_2=+0.13 *4*, A_4=−0.08 *6* from E(p)=1204 resonance, A_2=+0.50 *4*, A_4=+0.02 *5* from E(p)=1324 resonance, A_2=+0.61 *6*, A_4=+0.04 *8* from E(p)=1392 resonance (1963Ha25).
								I_γ: others: 64 *3* (1967Wi10), 64 *3* (1966Ha20), 62 *4* (1968Wo01).
4190.9	5/2$^+$	895.9	<0.5	3295.0	5/2$^+$			
		1957.0	25 *2*	2233.8	5/2$^+$			I_γ: other: 24 *2* (1968Wo01).
		2924.6	72 *2*	1266.13	3/2$^+$	M1+E2		I_γ: other: 76 *2* (1968Wo01).
								A_2=−0.55 *2* (1958Br98).
								δ: −0.25 *3* or −1.7 *4* (1958Br98).
		4190.6	<1.5	0.0	1/2$^+$			
4260.4	3/2$^+$	965.4	<0.5	3295.0	5/2$^+$			
		1126.1	<1	3134.3	1/2$^+$			I_γ: others: 4 *4* (1967Wi10), 10<(1962Ha33), 4 *3* (1966Ha20).
		2994.1	25.8 *15*	1266.13	3/2$^+$	M1+E2	+0.25 *5*	A_2=+0.8 *2*, A_4=+0.3 *2* (1963Ha25).
								POL=+0.46 *22* implies π(4260)=+ (1967Wi10).
								I_γ: others: 20 *3* (1967Wi10), 16 (1962Ha33), 20 *3* (1966Ha20), 25 *3* (1968Wo01).
								δ: −0.25 (1967Wi10), −0.25 *5* (1966Ha20); other solution of δ=+4.7 *9* from 1966Ha20 ruled out by polarization.
		4260.1	74.2 *15*	0.0	1/2$^+$	M1+E2	+0.32 *4*	I_γ: others: 76 *3* (1967Wi10), 84 (1962Ha33), 76 *3* (1966Ha20), 75 *3* (1968Wo01).
								δ: −0.32 *4* (1967Wi10), −0.32 *4* (1966Ha20).
4431.2	7/2$^-$	1016.6	4.1 *15*	3414.6	7/2$^+$			I_γ: other: 4 *1* (1968Wo01).
		1136.2	40 *2*	3295.0	5/2$^+$	D+Q	−0.04 *3*	A_2=−0.23 *3*, A_4=+0.03 *3* (1969Wo01).
								δ: −0.04 *3* (1969Wo01).
								I_γ: other: 41 *2* (1968Wo01).
		1296.9	<0.1	3134.3	1/2$^+$	[E3]		
		2197.3	53 *3*	2233.8	5/2$^+$	D(+Q)	−0.03 *2*	A_2=−0.25 *5*, A_4=+0.04 *6* (1969Wo01).
								δ: from 1969Wo01.
								I_γ: other: 55 *2* (1968Wo01).
		3164.9	1.9 *5*	1266.13	3/2$^+$			
		4430.9	1.0 *2*	0.0	1/2$^+$	[E3]		
4592.5	3/2	1086.4	<1	3506.1	3/2$^+$			
		1177.9	<0.5	3414.6	7/2$^+$			
		1297.5	<2	3295.0	5/2$^+$			
		2358.6	18 *2*	2233.8	5/2$^+$			I_γ: other: 22 *6* (1968Wo01).
		3326.2	56 *2*	1266.13	3/2$^+$	D+Q		I_γ: other: 54 *5* (1968Wo01).
								Mult.,δ: D+Q mixing ratio of −0.02 *5* or −3.9 *10* for 3360γ with Iγ=52 *4* from 4634 level in 1966Ha20 may belong to this transition. See comments for 3367.9γ from 4634 level.
		4592.1	26 *2*	0.0	1/2$^+$	D+Q		I_γ: other: 24 *4* (1968Wo01).
								Mult.,δ: D+Q mixing ratio of −0.07 *4* or −1.48 *12* for 4630γ with Iγ=27 *4* in 1966Ha20 may belong to this transition. See comments for 3367.9γ from 4634 level.

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult.[a]	δ[b]	Comments
4634.2	(5/2,7/2)	1128.1	<5	3506.1	3/2$^+$			
		1219.6	36.2 *10*	3414.6	7/2$^+$			I_γ: other: 28 *3* (1968Wo01).
		1339.2	34.5 *15*	3295.0	5/2$^+$			A_2=+0.19 *7*, A_4=+0.04 *8* (1969Wo01). I_γ: other: 47 *5* (1968Wo01).
		1499.9	<2	3134.3	1/2$^+$			
		2400.3	26.3 *10*	2233.8	5/2$^+$			A_2=+0.45 *10*, A_4=−0.05 *12* (1969Wo01). I_γ: others: 21 *6* (1966Ha20), 25 *3* (1968Wo01).
		3367.9	3.0 *10*	1266.13	3/2$^+$			I_γ: other: 52 *4* (1966Ha20) with δ(E2/M1)=−0.02 *5* or −3.9 *10* likely misidentified from this level, but should be correspond to 3326γ from 4593 level, considering that 3368γ+3326γ is unresolved in 1966Ha20 with only a single broad peak shown in the γ spectrum, and that the discrepant branching ratio from 1966Ha20 matches the branching ratio of 3326γ seen and resolved in other studies. It is also the similar case for the 4630γ placed from this level in 1966Ha20.
		4633.8	<4	0.0	1/2$^+$			I_γ: other: 27 *4* (1966Ha20) with δ(E2/M1)=−0.07 *4* or −1.48 *12* likely misidentified from this level, but should be from 4593 level. See comments for 3367.9γ above.
4783.4	5/2$^+$	1368.8	<2	3414.6	7/2$^+$			
		1488.4	31 *2*	3295.0	5/2$^+$	D(+Q)		I_γ: others: 35 *2* (1967Wi10), 31 *3* (1968Wo01). Mult.,δ: +0.05 *6* or −1.7 *4* (1967Wi10).
		1649.1	<1	3134.3	1/2$^+$			
		2549.5	22 *2*	2233.8	5/2$^+$	D+Q		I_γ: others: 18 *2* (1967Wi10), 15 *3* (1968Wo01). Mult.,δ: +0.18 *11* or −2.5 *20* (1967Wi10).
		3517.1	4.6 *15*	1266.13	3/2$^+$			I_γ: others: 4 *2* (1967Wi10), 12 *3* (1968Wo01).
		4783.0	42.4 *15*	0.0	1/2$^+$	E2		I_γ: others: 43 *2* (1967Wi10), 42 *3* (1968Wo01). Mult.: δ(O/Q)=−0.01 *12* (1967Wi10).
5014.9	(1/2,3/2)	1508.8	3.0 *10*	3506.1	3/2$^+$			
		1600.3	<0.5	3414.6	7/2$^+$			
		1719.8	2.0 *10*	3295.0	5/2$^+$			
		2781.0	<1	2233.8	5/2$^+$			
		3748.5	23 *3*	1266.13	3/2$^+$			I_γ: others: 30 (1962Ha33), 20 (1968Wo01).
		5014.5	72 *3*	0.0	1/2$^+$	D(+Q)	−0.2 *5*	δ: from 1969Wo01. I_γ: others: 70 (1962Ha33), 40 (1968Wo01). 1968Wo01 report a 40% branching for unknown transitions to other levels. A_2=−0.03 *14* (1969Wo01).
5015.2	(1/2,3/2)	1509.1	<1	3506.1	3/2$^+$			
		1600.6	<2	3414.6	7/2$^+$			
		1720.1	<3	3295.0	5/2$^+$			
		1880.8	2.0 *5*	3134.3	1/2$^+$			
		2781.3	<1	2233.8	5/2$^+$			
		3748.8	59 *3*	1266.13	3/2$^+$			A_2=+0.02 *13* (1969Wo01). I_γ: other: 60 *3* (1968Wo01).
		5014.8	39 *3*	0.0	1/2$^+$			A_2=−0.13 *9* (1969Wo01). I_γ: other: 40 *3* (1968Wo01).
5116.0		1609.9	<4	3506.1	3/2$^+$			
		1701.3	14 *2*	3414.6	7/2$^+$			

$^{31}_{15}P_{16}$-13

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	Comments
5116.0		1820.9	11 *2*	3295.0	$5/2^+$		
		1981.6	<4	3134.3	$1/2^+$		
		2882.1	25 *2*	2233.8	$5/2^+$		I_γ: other: 20 (1968Wo01).
		3849.6	50 *3*	1266.13	$3/2^+$		I_γ: other: 40 (1968Wo01).
		5115.5	<5	0.0	$1/2^+$		1968Wo01 report a 40% branching for unknown transitions to other levels.
5256.8		825.6	<3	4431.2	$7/2^-$		
		1750.6	<3	3506.1	$3/2^+$		
		1842.1	<3	3414.6	$7/2^+$		
		5256.3	100	0.0	$1/2^+$		
5342.9		1928.2	81 *2*	3414.6	$7/2^+$		I_γ: other: 50 *10* (1968Wo01).
		2047.8	4.0 *10*	3295.0	$5/2^+$		I_γ: other: 21 *8* (1968Wo01).
		3108.9	15 *2*	2233.8	$5/2^+$		I_γ: other: 29 *8* (1968Wo01).
		4076.5	<2	1266.13	$3/2^+$		
		5342.4	<4	0.0	$1/2^+$		
5530.0		1098.8	<3	4431.2	$7/2^-$		
		2115.3	35 *5*	3414.6	$7/2^+$		I_γ: other: 35 (1968Wo01).
		2234.9 [c]	35 *5*	3295.0	$5/2^+$		
		3296.0	30 *5*	2233.8	$5/2^+$		I_γ: other: 30 (1968Wo01).
		5529.5	<5	0.0	$1/2^+$		1968Wo01 report a 35% branching for unknown transitions to other levels.
5558.9	3/2	3324.9	12 *2*	2233.8	$5/2^+$		I_γ: other: 18 *5* (1968Wo01).
		4292.5	<10	1266.13	$3/2^+$		
		5558.4	88 *2*	0.0	$1/2^+$		I_γ: other: 82 *5* (1968Wo01). Mult.: M2 is unlikely based on RUL and measured $T_{1/2}$ limit.
5672.4	5/2	1241.2	<0.5	4431.2	$7/2^-$		I_γ: other: 10 (1968Wo01).
		2257.7	10 *3*	3414.6	$7/2^+$		I_γ: other: 10 (1968Wo01).
		2377.3	<1	3295.0	$5/2^+$		
		2538.0	<1	3134.3	$1/2^+$		
		3438.4	12 *4*	2233.8	$5/2^+$	D	I_γ: other: 10 (1968Wo01). A_2=−0.24 *6*, A_4=−0.07 *6* (1969Wo01).
		4405.9	76 *4*	1266.13	$3/2^+$	D+Q	A_2=−0.33 *9*, A_4=+0.12 *10* (1969Wo01). *δ*: +0.03 *8* or +3.3 *13*; +0.04 *4* or +3.2 *5* (1969Wo01). I_γ: other: 55 (1968Wo01).
		5671.8	2.0 *10*	0.0	$1/2^+$		1968Wo01 report a 15% branching for unknown transitions to other levels.
5773.5		1139.3	18 *5*	4634.2	(5/2,7/2)		I_γ: other: 25 (1968Wo01).
		1513.1	<4	4260.4	$3/2^+$		
		1582.6	12 *4*	4190.9	$5/2^+$		
		2267.3	<5	3506.1	$3/2^+$		
		2358.8	35 *9*	3414.6	$7/2^+$		I_γ: other: 20 (1968Wo01).
		2639.1	<10	3134.3	$1/2^+$		
		3539.5	15 *4*	2233.8	$5/2^+$		I_γ: other: 15 (1968Wo01).
		4507.0	20 *5*	1266.13	$3/2^+$		
		5772.9	<5	0.0	$1/2^+$		1968Wo01 report a 40% branching for unknown transitions to other levels.
5891.9	+	2477.2	8 *3*	3414.6	$7/2^+$		

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult.[a]	δ[b]	Comments
5891.9	+	2596.8	<3	3295.0	5/2+			
		2757.5	<10	3134.3	1/2+			
		3657.9	92 *3*	2233.8	5/2+			I_γ: other: 100 (1968Wo01).
		4625.4	<5	1266.13	3/2+			
		5891.3	<5	0.0	1/2+			
5987.9		871.9	<5	5116.0				I_γ: other: 20 *15* (1968Wo01).
		2692.8	7 *2*	3295.0	5/2+			
		2853.5	<3	3134.3	1/2+			
		5987.3	93 *2*	0.0	1/2+			I_γ: other: 80 *15* (1968Wo01).
6046.4		x	20					I_γ: account for a 20% branching for unknown transitions (1975De31).
		1412.2	9 *3*	4634.2	(5/2,7/2)			
		1615.2[c]	4 *2*	4431.2	7/2−			
		1785.9[c]	2 *1*	4260.4	3/2+			
		2631.7	33 *5*	3414.6	7/2+			
		2751.3	18 *5*	3295.0	5/2+			
		3812.3	14 *4*	2233.8	5/2+			
6078.8		1444.6	10 *3*	4634.2	(5/2,7/2)			
		2664.1[c]	8 *4*	3414.6	7/2+			
		2783.7[c]	7 *4*	3295.0	5/2+			
		3844.7	75 *10*	2233.8	5/2+			
		4812.3	<8	1266.13	3/2+			
		6078.2	<10	0.0	1/2+			
6233.4		x	25					I_γ: account for a 25% branching for unknown transitions (1975De31).
		2818.7	40 *5*	3414.6	7/2+			I_γ: other: 40 (1968Wo01).
		3098.9	<5	3134.3	1/2+			
		3999.3	30 *10*	2233.8	5/2+			
		6232.7	5 *3*	0.0	1/2+			1968Wo01 report a 60% branching for unknown transitions to other levels.
6336.6		6335.9	100	0.0	1/2+			
6380.8		x	12					I_γ: account for a 12% branching for unknown transitions (1975De31).
		2966.0	<2	3414.6	7/2+			I_γ: other: <2 (2005Vo24).
		3085.6	12 *2*	3295.0	5/2+			I_γ: other: 12 (2005Vo24).
		4146.7	54 *5*	2233.8	5/2+			I_γ: others: 82 *5* (1968Wo01), 54 (2005Vo24).
		5114.2	11 *4*	1266.13	3/2+			I_γ: other: 11 (2005Vo24).
		6380.1	11 *2*	0.0	1/2+			I_γ: others: 18 *5* (1968Wo01), 11 (2005Vo24).
6399.0	7/2	726.6	4.5 *15*	5672.4	5/2			I_γ: other: 4 *1* (1968Wo01).
		1283.0	5.0 *15*	5116.0				I_γ: other: 6 *2* (1968Wo01).
		1967.7	79 *3*	4431.2	7/2−	D+Q	+0.15 *14*	A_2=−0.23 *11*, A_4=+0.03 *11* and A_2=+0.51 *13*, A_4=+0.14 *12* (1969Wo01). δ: +0.15 *14* or −0.34 *32* (1969Wo01). I_γ: other: 75 *4* (1968Wo01).
		2208.0	<4	4190.9	5/2+			I_γ: other: 7 *3* (1968Wo01).
		2984.2	2.0 *5*	3414.6	7/2+			
		3103.8	6.5 *20*	3295.0	5/2+			
		3264.5	<2	3134.3	1/2+			I_γ: other: 6 *2* (1968Wo01).

$^{31}_{15}P_{16}$-15

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Comments
6399.0	7/2	4164.9	3.0 *10*	2233.8	$5/2^+$	I_γ: other: 2 *1* (1968Wo01).
		6398.3	<2	0.0	$1/2^+$	
6454.7		x	15			I_γ: account for a 15% branching for unknown transitions (1975De31).
		3039.9	85 *10*	3414.6	$7/2^+$	
		3320.2	<2	3134.3	$1/2^+$	
		4220.6	<1	2233.8	$5/2^+$	
		5188.1	<2	1266.13	$3/2^+$	
		6454.0	<1	0.0	$1/2^+$	
6460.8		x	10			I_γ: account for a 10% branching for unknown transitions (1975De31).
		3326.3	70 *5*	3134.3	$1/2^+$	
		6460.1[c]	20 *10*	0.0	$1/2^+$	
6496.1		3200.9	<5	3295.0	$5/2^+$	
		3361.6	<5	3134.3	$1/2^+$	
		5229.5	24 *5*	1266.13	$3/2^+$	
		6495.4	76 *5*	0.0	$1/2^+$	I_γ: other: 60 (1968Wo01). 1968Wo01 report 40 of their intensity measurement is unknown.
6501.8		x	20			I_γ: account for a 20% branching for unknown transitions (1975De31).
		2070.5	80 *10*	4431.2	$7/2^-$	
		3087.0	<7	3414.6	$7/2^+$	
6594.3		x	30			I_γ: account for a 30% branching for unknown transitions (1975De31).
		2163.0	16 *5*	4431.2	$7/2^-$	
		2333.8[c]	4 *2*	4260.4	$3/2^+$	
		3088.0	<3	3506.1	$3/2^+$	
		3299.1	<5	3295.0	$5/2^+$	
		5327.7	50 *5*	1266.13	$3/2^+$	I_γ: other: 70 (1968Wo01).
		6593.5	<5	0.0	$1/2^+$	1968Wo01 report 30 of their intensity measurement is unknown.
6610.4		x	13			I_γ: account for a 13% branching for unknown transitions (1975De31).
		1595.5	39 *3*	5014.9	(1/2,3/2)	I_γ: other: 36 *9* (1968Wo01).
		1976.1	<3	4634.2	(5/2,7/2)	I_γ: other: 41 *9* (1968Wo01).
		2179.1	<2	4431.2	$7/2^-$	
		2419.4	6 *2*	4190.9	$5/2^+$	
		3104.1	<3	3506.1	$3/2^+$	
		3195.6	<3	3414.6	$7/2^+$	
		4376.3	<3	2233.8	$5/2^+$	
		5343.8	27 *4*	1266.13	$3/2^+$	
		6609.6	15 *3*	0.0	$1/2^+$	I_γ: other: 23 *8* (1968Wo01).
6824.2		1481.3	35 *10*	5342.9		
		2392.9	65 *15*	4431.2	$7/2^-$	
		3529.0	<8	3295.0	$5/2^+$	
6841.9		2650.9	<10	4190.9	$5/2^+$	I_γ: other: 100 (1968Wo01).
		3546.7	40 *10*	3295.0	$5/2^+$	
		4607.7	60 *10*	2233.8	$5/2^+$	
6909.6		4675.4	20 *5*	2233.8	$5/2^+$	

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
6909.6		5642.9	<10	1266.13	3/2$^+$			
		6908.8	80 *5*	0.0	1/2$^+$			I_γ: other: 60 (1968Wo01).
6931.4	(5/2,7/2)	2297.1	<5	4634.2	(5/2,7/2)			
		2500.1	14 *4*	4431.2	7/2$^-$			I_γ: other: 17 *6* (1968Wo01).
		4697.2	86 *4*	2233.8	5/2$^+$	D+Q		A_2=−0.25 *18*, A_4=+0.05 *19* (1969Wo01). I_γ: other: 83 *6* (1968Wo01).
		6930.6	<10	0.0	1/2$^+$			1968Wo01 report a branching %40 for unknown transitions.
7079.9		2648.6	50 *15*	4431.2	7/2$^-$			
		7079.0[c]	50 *15*	0.0	1/2$^+$			
7084.0		3577.7	5 *2*	3506.1	3/2$^+$			
		3669.2	43 *5*	3414.6	7/2$^+$			
		3788.8	20 *5*	3295.0	5/2$^+$			
		3949.4	<4	3134.3	1/2$^+$			
		4849.8	21 *5*	2233.8	5/2$^+$			
		5817.3	11 *3*	1266.13	3/2$^+$			
		7083.1	<3	0.0	1/2$^+$			
7117.9		x	40					I_γ: account for a 40% branching for unknown transitions (1975De31).
		3703.1	60 *10*	3414.6	7/2$^+$			
7141.1		5874.4	16	1266.13	3/2$^+$			I_γ: from 2005Vo24. Other: <12 (1975De31).
		7140.2	84	0.0	1/2$^+$			I_γ: from 2005Vo24. Other: 100 (1975De31).
7214.3		x	30					I_γ: account for a 30% branching for unknown transitions (1975De31).
		5947.6	<5	1266.13	3/2$^+$			
		7213.4	70 *10*	0.0	1/2$^+$			
7313.7		7312.8	100	0.0	1/2$^+$			
7687.2?		5452.9[c]	100	2233.8	5/2$^+$			
7717.0	(3/2$^-$,5/2$^-$)	2702.3[‡] *4*	37.9[‡] *9*	5014.9	(1/2,3/2)			
		3285.9[‡] *5*	38.5[‡] *10*	4431.2	7/2$^-$			
		4422.2[‡] *7*	23.6[‡] *10*	3295.0	5/2$^+$			
7781.5	3/2$^-$	1185.7[‡] *5*	0.5[‡] *1*	6594.3				
		1284.0[‡] *5*	0.5[‡] *1*	6496.1				
		2663.5[‡] *5*	0.5[‡] *1*	5116.0				
		2765.7[‡] *5*	2.4[‡] *1*	5014.9	(1/2,3/2)			I_γ: others: 1.6 (1975De31), 2 (1968Wo01).
		2996.3[‡] *5*	2.7[‡] *1*	4783.4	5/2$^+$			I_γ: others: 2.3 (1975De31), 3 (1968Wo01).
		3519.2[‡] *6*	0.6[‡] *1*	4260.4	3/2$^+$			I_γ: others: 0.5 (1975De31), 1 (1968Wo01).
		4488.7[‡] *7*	0.8[‡] *1*	3295.0	5/2$^+$			
		4649.1[‡] *7*	10.4[‡] *2*	3134.3	1/2$^+$	E1+M2	−0.05 *2*	I_γ: others: 11 (1975De31), 11 (1968Wo01). δ: from 1964Va09. Others: −0.05 *2* or +1.94 *9* (1966Va08) (1964Va09). A_2=−0.55 *6* (1958Br98); A_2=−0.41 *6*. POL=−0.60 *25* (1964Va09) and POL=−0.63 *27* (1966Va08) are used to determine J(3134)=1/2, with both π=+ and π=− possible. As mentioned in 1966Va08, the sign of POL in 1964Va09 is wrong.

$^{31}_{15}P_{16}$-17

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
7781.5	3/2$^-$	5548.6[‡] *8*	4.8[‡] *2*	2233.8	5/2$^+$			I_γ: others: 5 (1975De31), 6 (1968Wo01). POL=−0.42 *67* support π(7782)=− (1966Va08) electric nature.
		6515.3[‡] *10*	26.8[‡] *3*	1266.13	3/2$^+$			I_γ: others: 27 (1975De31), 29 (1968Wo01). A_2=+0.44 *2* (1958Br98). POL=+0.71 *32* implies π(7782)=− (1966Va08),
		7780.9[‡] *12*	50.2[‡] *4*	0.0	1/2$^+$	E1+M2	+0.045 *5*	I_γ: others: 52 (1975De31), 48 (1968Wo01). A_2=−0.39 *1*, A_4=−0.01 *1*, POL=−0.56 *26* (1966Va08); A_2=−0.41 *2* (1958Br98); A_2=−0.49 *3*, A_4=0.00 *2* (1979Ri01); A_2=−0.423 *10*, POL=−0.35 *27* (1964Va09). δ: from 1966Va08. Other: −0.02 from 1958Br98.
7898.2	1/2	2882.2[‡] *4*	2.63[‡] *6*	5014.9	(1/2,3/2)			I_γ: others: 2.5 (1975De31), 3 (1968Wo01), 2.3 *3* (1979Ri01).
		4389.8[‡] *6*	0.53[‡] *5*	3506.1	3/2$^+$			I_γ: others: 0.5 (1975De31), 1 (1968Wo01), 0.4 *1* (1979Ri01).
		4766.0[‡] *7*	0.65[‡] *6*	3134.3	1/2$^+$			I_γ: others: 0.6 (1975De31), 1 (1968Wo01), 0.4 *1* (1979Ri01).
		6633.6[‡] *10*	1.79[‡] *13*	1266.13	3/2$^+$			I_γ: others: 1.4 (1975De31), 2 (1968Wo01), 1.9 *2* (1979Ri01).
		7898.1[‡] *12*	94.4[‡] *2*	0.0	1/2$^+$			I_γ: others: 95 (1975De31), 93 (1968Wo01), 95 *1* (1979Ri01).
7944.6		3161.0	11	4783.4	5/2$^+$			I_γ: other: 9 (1968Wo01).
		3351.9	1.7	4592.5	3/2			I_γ: other: 2 (1968Wo01).
		3753.5	25	4190.9	5/2$^+$			I_γ: other: 26 (1968Wo01).
		4438.2	14	3506.1	3/2$^+$			I_γ: other: 16 (1968Wo01).
		4649.2	4.3	3295.0	5/2$^+$			I_γ: other: 5 (1968Wo01).
		4809.9	4	3134.3	1/2$^+$			I_γ: other: 4 (1968Wo01).
		6677.7	20	1266.13	3/2$^+$			I_γ: other: 20 (1968Wo01).
		7943.5	20	0.0	1/2$^+$			I_γ: other: 18 (1968Wo01).
8031.2	5/2	2501.1	2.0	5530.0				I_γ: other: 2 (2005Vo24).
		3016.1	1.0	5014.9	(1/2,3/2)			I_γ: other: 1 (2005Vo24).
		3247.6	5.0	4783.4	5/2$^+$			I_γ: others: 5 (1968Wo01), 5 (2005Vo24).
		3396.8	3.2	4634.2	(5/2,7/2)			I_γ: others: 3 (1968Wo01), 3 (2005Vo24).
		3438.5	3.3	4592.5	3/2			I_γ: other: 3 (2005Vo24).
		3599.8	2	4431.2	7/2$^-$			I_γ: others: 1 (1968Wo01), 2 (2005Vo24).
		3770.6	2.4	4260.4	3/2$^+$			I_γ: other: 2 (2005Vo24).
		3840.0	24	4190.9	5/2$^+$	D		I_γ: others: 28 (1968Wo01), 24 (2005Vo24). Mult.: δ(Q/D)=0 from $\gamma\gamma(\theta)$ in 1958Br98. A_2=+0.45 *4* (1958Br98).
		4524.7	21	3506.1	3/2$^+$	D+Q	+0.033	I_γ: others 24 (1968Wo01), 21 (2005Vo24). A_2=−0.33 *8* (1958Br98). Mult.,δ: from 1958Br98.
		4616.2	8.1	3414.6	7/2$^+$			I_γ: others: 10 (1968Wo01), 8 (2005Vo24).
		4735.8	3.5	3295.0	5/2$^+$			I_γ: others: 4 (1968Wo01), 4 (2005Vo24).
		5796.8	4	2233.8	5/2$^+$			I_γ: others: 5 (1968Wo01), 4 (2005Vo24).
		6764.3	18	1266.13	3/2$^+$			I_γ: others: 18 (1968Wo01), 18 (2005Vo24).
		8030.1	2.5	0.0	1/2$^+$			I_γ: others: 2 (1968Wo01), 3 (2005Vo24). A_2=+0.41 *10*, A_4=−0.59 *10* (1958Br98).

$^{31}_{15}P_{16}$-18

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult.[a]	δ[b]	Comments
8047.7	3/2	833.4	0.5	7214.3				
		1138.1	0.8	6909.6				
		2375.2	1.6	5672.4	5/2			I_γ: other: 3 (1968Wo01).
		2488.7	0.2	5558.9	3/2			
		3032.6	3.8	5014.9	(1/2,3/2)			I_γ: other: 3 (1968Wo01).
		3455.0	2.1	4592.5	3/2			
		3856.5	5.0	4190.9	$5/2^+$			I_γ: other: 5 (1968Wo01).
		4541.2	10	3506.1	$3/2^+$			I_γ: other: 14 (1968Wo01).
		4752.3	1.8	3295.0	$5/2^+$			I_γ: other: 2 (1968Wo01).
		4913.0	3.0	3134.3	$1/2^+$			I_γ: other: 3 (1968Wo01).
		5813.3	2.2	2233.8	$5/2^+$			I_γ: other: 2 (1968Wo01).
		6780.8	1.0	1266.13	$3/2^+$			
		8046.6	68	0.0	$1/2^+$	D		I_γ: other: 68 (1968Wo01). A_2=−0.31 *1* (1958Br98); A_2=−0.40 *2*, A_4=+0.01 *4* (1979Ri01).
8103.6	5/2	1870.1	6.2	6233.4				I_γ: others: 8 (1968Wo01), 6 (2005Vo24).
		2211.6	0.8	5891.9	+			I_γ: others: 2 (1968Wo01), 1 (2005Vo24).
		2330.0	2.3	5773.5				I_γ: others: 3 (1968Wo01), 2 (2005Vo24).
		2431.1	0.5	5672.4	5/2			I_γ: other: 1 (2005Vo24).
		2544.6	0.5	5558.9	3/2			I_γ: other: 1 (2005Vo24).
		3088.5	0.6	5014.9	(1/2,3/2)			
		3320.0	0.4	4783.4	$5/2^+$			I_γ: other: 2 (1968Wo01).
		3842.9	2.5	4260.4	$3/2^+$			I_γ: others: 2 (1968Wo01), 1 (2005Vo24), 3 (2005Vo24).
		3912.4	9.6	4190.9	$5/2^+$	D+Q	+0.06 *1*	I_γ: others: 11 (1968Wo01), 10 (2005Vo24), 10 (2005Vo24). Mult.,δ: from $\gamma(\theta)$ in 1958Br98. A_2=+0.43 *5* (1958Br98).
		4597.1	2.0	3506.1	$3/2^+$			I_γ: others: 2 (1968Wo01), 2 (2005Vo24), 2 (2005Vo24).
		4808.2	5.2	3295.0	$5/2^+$			I_γ: others: 5 (1968Wo01), 5 (2005Vo24), 5 (2005Vo24). A_2=+0.46 *4* (1958Br98).
		4968.9	0.6	3134.3	$1/2^+$			I_γ: others: 1 (2005Vo24), 1 (2005Vo24).
		5869.2	1.0	2233.8	$5/2^+$			I_γ: others: 1 (2005Vo24), 1 (2005Vo24).
		6836.7	67	1266.13	$3/2^+$			I_γ: others: 65 (1968Wo01), 67 (2005Vo24). A_2=−0.23 *1* (1958Br98).
		8102.5	0.8	0.0	$1/2^+$			I_γ: other: 1 (2005Vo24).
8207.9	3/2	1827.0	0.4	6380.8				
		2950.9	0.8	5256.8				I_γ: other: 1 (1968Wo01).
		3192.8	0.1	5014.9	(1/2,3/2)			
		3424.3	0.8	4783.4	$5/2^+$			I_γ: other: 1 (1968Wo01).
		3615.2	0.2	4592.5	3/2			
		3947.2	0.4	4260.4	$3/2^+$			
		4016.7	0.5	4190.9	$5/2^+$			
		4701.4	1.2	3506.1	$3/2^+$			I_γ: other: 2 (1968Wo01).
		4912.5	1.4	3295.0	$5/2^+$			I_γ: other: 2 (1968Wo01).
		5073.2	0.2	3134.3	$1/2^+$			
		5973.5	7.0	2233.8	$5/2^+$	D+Q	+0.028 *18*	I_γ: other: 10 (1968Wo01).

$^{31}_{15}P_{16}$-19

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
								Mult.,δ: from 1958Br98.
								A_2=−0.13 *2* (1958Br98).
8207.9	3/2	6940.9	21	1266.13	$3/2^+$			I_γ: other: 24 (1968Wo01).
		8206.7	66	0.0	$1/2^+$			I_γ: other: 60 (1968Wo01).
								A_2=−0.83 *3*, A_4=+0.05 *5* (1979Ri01); A_2=−0.72 *2* (1958Br98).
8224.4	7/2	1400.2	2.1	6824.2				I_γ: other: 2 (1968Wo01).
		1825.3	18	6399.0	7/2	D(+Q)	−0.11 *28*	A_2=+0.48 *23*, A_4=+0.11 *23* (1969Wo01).
								δ: −0.11 *28* (1969Wo01).
								I_γ: other: 18 (1968Wo01).
		2332.4	1.0	5891.9	+			
		2694.3	0.5	5530.0				
		3108.2	3.2	5116.0				I_γ: other: 4 (1968Wo01).
		3209.3	0.7	5014.9	(1/2,3/2)			
		3440.8	13	4783.4	$5/2^+$			I_γ: other: 11 (1968Wo01).
		3590.0	3.5	4634.2	(5/2,7/2)			I_γ: other: 3 (1968Wo01).
		3793.0	0.8	4431.2	$7/2^-$			
		4033.2	3.2	4190.9	$5/2^+$			I_γ: other: 3 (1968Wo01).
		4809.4	1	3414.6	$7/2^+$			I_γ: from 1968Wo01 only.
		4929.0	54	3295.0	$5/2^+$	D+Q	−0.03 *1*	A_2=−0.29 *3*, A_4=+0.03 *3* (1969Wo01).
								δ: −0.03 *1* (1969Wo01).
								I_γ: other: 50 (1968Wo01).
8242.7	5/2	1333.1	1.2	6909.6				I_γ: other: 2 (1968Wo01).
		1400.8	1.3	6841.9				I_γ: other: 3 (1968Wo01).
		1632.3	2.6	6610.4				
		2570.2	22	5672.4	5/2	D(+Q)	+0.01 *8*	A_2=+0.37 *8*, A_4=+0.10 *8* (1969Wo01).
								δ: +0.01 *8* (1969Wo01).
								I_γ: other: 24 (1968Wo01).
		2683.7	0.6	5558.9	3/2			
		3227.6	1	5014.9	(1/2,3/2)			I_γ: from 1968Wo01 only.
		3459.1	0.9	4783.4	$5/2^+$			
		3650.0	0.4	4592.5	3/2			
		3811.2	54	4431.2	$7/2^-$	D+Q	−0.12 *1*	A_2=−0.29 *2*, A_4=0.00 *2* (1969Wo01).
								δ: −0.12 *1* (1969Wo01).
								I_γ: other: 55 (1968Wo01).
		3982.0	1.3	4260.4	$3/2^+$			I_γ: other: 1 (1968Wo01).
		4051.5	1.7	4190.9	$5/2^+$			I_γ: other: 2 (1968Wo01).
		4736.2	0.6	3506.1	$3/2^+$			
		4827.7	10	3414.6	$7/2^+$			I_γ: other: 10 (1968Wo01).
		4947.3	0.8	3295.0	$5/2^+$			
		6008.3	1.0	2233.8	$5/2^+$			
		6975.7	0.9	1266.13	$3/2^+$			I_γ: other: 1 (1968Wo01).
		8241.5	0.7	0.0	$1/2^+$			A_2=−0.65 *3*, A_4=+0.07 *4* (1979Ri01).
8247.6		1106.5	0.3	7141.1				
		1338.0	0.4	6909.6				I_γ: other: 1 (1968Wo01).

$^{31}_{15}P_{16}$-20

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
8247.6		1637.2	1.3	6610.4				I_γ: other: 2 (1968Wo01).
		1653.3	1.4	6594.3				I_γ: other: 2 (1968Wo01).
		1751.4	0.8	6496.1				I_γ: other: 1 (1968Wo01).
		2575.1	0.7	5672.4	5/2			
		2990.6	0.5	5256.8				I_γ: other: 1 (1968Wo01).
		3232.5	3.6	5014.9	(1/2,3/2)			I_γ: other: 3 (1968Wo01).
		4056.4	0.3	4190.9	$5/2^+$			
		4741.1	0.4	3506.1	$3/2^+$			I_γ: other: 1 (1968Wo01).
		5112.8	9.2	3134.3	$1/2^+$			I_γ: other: 10 (1968Wo01).
		6013.2	8.0	2233.8	$5/2^+$			I_γ: other: 9 (1968Wo01).
		6980.6	3.1	1266.13	$3/2^+$			I_γ: other: 4 (1968Wo01).
		8246.4	70	0.0	$1/2^+$			I_γ: other: 66 (1968Wo01).
8264	3/2	5129		3134.3	$1/2^+$			A_2=−0.27 *2* (1958Br98).
		8263		0.0	$1/2^+$	D+Q		A_2=−0.55 *3* (1958Br98).
								δ: +0.03 or +1.6 (1958Br98).
8355.6	5/2	1424.2	3.1	6931.4	(5/2,7/2)			I_γ: other: 3 (1968Wo01).
		1513.7	1.9	6841.9				I_γ: other: 1 (1968Wo01).
		1745.1	0.9	6610.4				
		1956.5	5.0	6399.0	7/2			
		1974.7	1.0	6380.8				
		2367.6	1.8	5987.9				
		2683.1	1.6	5672.4	5/2			
		2796.6	1.8	5558.9	3/2			
		3340.5	0.6	5014.9	(1/2,3/2)			I_γ: other: 15 (1964Va11).
		3572.0	2.0	4783.4	$5/2^+$			I_γ: other: 3 (1968Wo01).
		3762.9	16	4592.5	3/2			I_γ: other: 19 (1968Wo01), 9 (1964Va11).
		3924.1	1.4	4431.2	$7/2^-$			I_γ: other: 2 (1968Wo01).
		4094.9	1.4	4260.4	$3/2^+$			I_γ: other: 4 (1968Wo01).
		4164.4	1.0	4190.9	$5/2^+$			
		4849.1	4.5	3506.1	$3/2^+$			I_γ: other: 6 (1968Wo01).
		4940.6	0.4	3414.6	$7/2^+$			I_γ: other: 1 (1968Wo01).
		5060.2	10	3295.0	$5/2^+$			I_γ: other: 14 (1968Wo01).
		6121.2	2.0	2233.8	$5/2^+$			I_γ: other: 5 (1964Va11).
		7088.6	43	1266.13	$3/2^+$	D+Q	+0.010 *4*	I_γ: others: 46 (1968Wo01), 65 (1964Va11).
								A_2=−0.39 *1*, A_4=+0.02 *1* (1964Va11).
								δ: −0.010 *4* (1964Va11). Other: +0.01 *1* and +0.04 *3* from $\gamma\gamma(\theta)$ from 1966Va08.
		8354.4	0.6	0.0	$1/2^+$			I_γ: other: 1 (1968Wo01).
8433.9	7/2	1839.5	5.0	6594.3				I_γ: other: 4 (1968Wo01).
		2034.8	10	6399.0	7/2			I_γ: others: 15 (1962Ha33), 10 (1968Wo01).
		2541.9	1.1	5891.9	$^+$			I_γ: other: 2 (1968Wo01).
		3799.4	4.4	4634.2	(5/2,7/2)			I_γ: others: 5 (1962Ha33), 4 (1968Wo01).
		4002.4	1.7	4431.2	$7/2^-$			
		4242.7	4.3	4190.9	$5/2^+$	D+Q	+0.11 *3*	A_2=−0.12 *4*, A_4=−0.06 *6* (1963Ha25).

$^{31}_{15}P_{16}$-21

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
								I_γ: others: 5 (1962Ha33), 4 (1968Wo01), 5 (1964Va11). δ: −0.11 *3* (1963Ha25).
8433.9	7/2	5018.9	2.1	3414.6	$7/2^+$			I_γ: others: 33 (1968Wo01) likely misidentified.
		5138.4	29	3295.0	$5/2^+$	D+Q	+0.021 *3*	A_2=−0.33 *1*, A_4=0.00 *1* (1964Va11); A_2=−0.26 *3*, A_4=0.00 *4* (1963Ha25). I_γ: others: 31 (1962Ha33), 35 (1964Va11). δ: −0.05 *2* (1963Ha25), −0.021 *3* (1964Va11).
		6199.4	42	2233.8	$5/2^+$	D+Q	+0.03 *2*	A_2=−0.28 *3*, A_4=−0.02 *5* (1963Ha25). I_γ: others: 44 (1962Ha33), 41 (1968Wo01), 48 (1964Va11). δ: −0.03 *2* (1963Ha25).
		8432.7	0.4	0.0	$1/2^+$			
8461.0	$5/2^+$	3344.8	0.5	5116.0				
		3826.5	3.5	4634.2	(5/2,7/2)			I_γ: other: 4 (1968Wo01).
		3868.2	0.9	4592.5	3/2			I_γ: other: 1 (1968Wo01).
		4200.3	24	4260.4	$3/2^+$	D(+Q)	>−0.26	I_γ: others: 24 (1962Ha33), 23(1968Wo01), 25 (1964Va11). A_2=−0.16 *3*, A_4=0.00 *3* for doublet (1963Ha25). δ: <0.26 (1963Ha25).
		4269.8	0.8	4190.9	$5/2^+$			
		4954.5	10	3506.1	$3/2^+$	(M1+E2)	+0.11 *3*	POL=−0.8 *4* implies π(8461)=+ (1967Wi10). A_2=−0.18 *5*, A_4=0.00 *8* (1963Ha25). I_γ: others: 10 (1962Ha33), 13 (1968Wo01), 10 (1964Va11). Mult.,δ: D+Q with δ=−0.11 *3* from 1963Ha25; M1+E2 implied from $\Delta\pi$=no based on POL in 1967Wi10.
		5046.0	0.7	3414.6	$7/2^+$			
		5165.5	28	3295.0	$5/2^+$	(M1(+E2))	+0.01 *5*	A_2=+0.46 *5*, A_4=+0.03 *8* (1963Ha25). POL=+0.7 *4* implies π(3295)=+ based on π(8461)=+ (1967Wi10). I_γ: others: 32 (1962Ha33), 28 (1968Wo01), 33 (1964Va11). Mult.,δ: D(+Q) with δ=−0.01 *5* from 1963Ha25; M1+E2 implied from $\Delta\pi$=no based on POL in 1967Wi10.
		5326.2	1.4	3134.3	$1/2^+$			I_γ: other: 2 (1968Wo01).
		6226.5	26	2233.8	$5/2^+$	D+Q	+0.100 *11*	A_2=+0.56 *1*, A_4=−0.03 *1* (1964Va11); A_2=+0.61 *5*, A_4=0.00 *7* (1963Ha25). I_γ: others: 27 (1962Ha33), 25 (1968Wo01), 27 (1964Va11). δ: −0.16 *7* (1963Ha25), −0.100 *11* (1964Va11).
		7194.0	4.0	1266.13	$3/2^+$	D(+Q)	−0.02 *3*	A_2=−0.20 *1*, A_4=−0.02 *2* (1964Va11); A_2=−0.45 *6*, A_4=+0.09 *7* (1963Ha25). I_γ: others: 7 (1962Ha33), 4 (1968Wo01), 5 (1964Va11). δ: +0.02 *3* (1963Ha25).
		8459.8	0.2	0.0	$1/2^+$			
8470.4	5/2	1628.5	2	6841.9				I_γ: from 1968Wo01 only.
		1876.0	8.4	6594.3				I_γ: other: 4 (1968Wo01).
		2797.9	5.0	5672.4	5/2			I_γ: other: 7 (1968Wo01).
		3455.3	4.4	5014.9	(1/2,3/2)			I_γ: others: 6 (1968Wo01), 31 (1964Va11).
		3877.6	2.0	4592.5	3/2			
		4038.9	4.2	4431.2	$7/2^-$			I_γ: other: 4 (1968Wo01).
		4209.7	1.7	4260.4	$3/2^+$			
		4279.2	3.5	4190.9	$5/2^+$			I_γ: other: 3 (1968Wo01).

$^{31}_{15}P_{16}$-22

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
8470.4	5/2	4963.9	21	3506.1	$3/2^+$			I_γ: other: 24 (1968Wo01).
		5055.4	3.2	3414.6	$7/2^+$			I_γ: other: 3 (1968Wo01).
		5174.9	17	3295.0	$5/2^+$			I_γ: others: 18 (1968Wo01), 24 (1964Va11).
		6235.9	0.9	2233.8	$5/2^+$			I_γ: other: 7 (1964Va11).
		7203.4	28	1266.13	$3/2^+$	D+Q	−0.06 *3*	A_2=−0.55 *8*, A_4=−0.02 *4* (1964Va11). δ: +0.06 *3* (1964Va11). I_γ: others: 29 (1968Wo01), 38 (1964Va11).
		8469.2	0.7	0.0	$1/2^+$			
8543.6	1/2	3528.5	32	5014.9	(1/2,3/2)			I_γ: other: 4 (1968Wo01).
		3950.8	2.3	4592.5	3/2			I_γ: other: 2 (1968Wo01).
		4282.9	2.7	4260.4	$3/2^+$			I_γ: other: 1 (1968Wo01).
		5408.8	52	3134.3	$1/2^+$	D		A_2=+0.01 *1*, A_4=0.00 *1* (1964Va11). I_γ: others: 54 (1968Wo01), 71 (1964Va11). Mult.: D+Q from 1964Va11; Q is not allowed by level scheme.
		7276.6	10	1266.13	$3/2^+$			I_γ: others: 9 (1968Wo01), 17 (1964Va11).
		8542.3	1.0	0.0	$1/2^+$			
8552.2	1/2	2564.2	0.6	5987.9				
		2993.1	4.3	5558.9	3/2			I_γ: other: 5 (1968Wo01).
		3295.2	0.4	5256.8				
		3537.1	2.8	5014.9	(1/2,3/2)			I_γ: other: 3 (1968Wo01).
		3959.4	0.6	4592.5	3/2			
		4291.5	0.9	4260.4	$3/2^+$			I_γ: other: 1 (1968Wo01).
		5045.7	5.0	3506.1	$3/2^+$			I_γ: other: 6 (1968Wo01).
		5256.7	0.6	3295.0	$5/2^+$			
		5417.4	0.9	3134.3	$1/2^+$			I_γ: other: 1 (1968Wo01).
		7285.2	83	1266.13	$3/2^+$	D+Q		A_2=+0.02 *1*, A_4=−0.01 *1* (1964Va11). δ: +0.30 *2* or −4.1 *3* (1964Va11). I_γ: other: 84 (1968Wo01).
		8550.9	0.9	0.0	$1/2^+$			
8555.4	3/2	1341.1	0.9	7214.3				
		1414.3	0.4	7141.1				
		1944.9	0.5	6610.4				
		1961.0	0.8	6594.3				
		2059.2	2.2	6496.1				
		2882.9	1.1	5672.4	5/2			
		2996.3	0.8	5558.9	3/2			
		3298.4	2.0	5256.8				I_γ: other: 5 (1968Wo01).
		3439.2	0.9	5116.0				
		3540.3	7.6	5014.9	(1/2,3/2)	D+Q	−0.09 *8*	A_2=+0.48 *10* (1969Wo01). I_γ: other: 12 (1968Wo01). Mult.,δ: from 1968Wo01.
		4294.7	0.4	4260.4	$3/2^+$			
		4364.2	0.7	4190.9	$5/2^+$			
		5048.9	1.4	3506.1	$3/2^+$			I_γ: other: 1 (1968Wo01).

$^{31}_{15}P_{16}$-23

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
8555.4	3/2	5259.9	0.5	3295.0	$5/2^+$			
		5420.6	9.8	3134.3	$1/2^+$			I_γ: other: 2 (1968Wo01).
		6320.9	22	2233.8	$5/2^+$			I_γ: other: 25 (1968Wo01).
		7288.3	15	1266.13	$3/2^+$			I_γ: other: 14 (1968Wo01).
		8554.1	33	0.0	$1/2^+$	D+Q		A_2=−0.70 *1*, A_4=+0.05 *1* (1964Va11). δ: +0.114 *7* or +1.38 *2* (1964Va11). I_γ: other: 31 (1968Wo01).
8575.6	$5/2^+$	2194.7	1.5	6380.8				
		2587.6	1.0	5987.9				
		2683.6	0.8	5891.9	$^+$			
		2903.1	0.6	5672.4	5/2			
		3045.4	3.8	5530.0				I_γ: other: 3 (1968Wo01).
		3941.1	3.2	4634.2	(5/2,7/2)			I_γ: 3other: 2 (1968Wo01).
		4314.9	9.0	4260.4	$3/2^+$	D(+Q)	+0.28 *33*	I_γ: other: 9 (1968Wo01). δ: from −0.60<δ<0.05 (1963Ha25).
		4384.4	4.2	4190.9	$5/2^+$			I_γ: other: 4 (1968Wo01).
		5069.1	28	3506.1	$3/2^+$	M1+E2	+0.18 *2*	δ: −0.18 *2* (1963Ha25). POL=−0.49 *21* implies π(8576)=+ (1967Wi10). A_2=−0.03 *4*, A_4=+0.03 *5* (1963Ha25). I_γ: other: 27 (1968Wo01).
		5160.5	1.8	3414.6	$7/2^+$			I_γ: other: 4 (1968Wo01).
		5280.1	1.4	3295.0	$5/2^+$			I_γ: other: 3 (1968Wo01).
		5440.8[c]		3134.3	$1/2^+$	Q(+O)	−0.04 *5*	δ: 0.04 *5* (1963Ha25). A_2=−0.48 *9*, A_4=−0.01 *13* (1963Ha25). Level not reported in 1975De31.
		6341.1	8.6	2233.8	$5/2^+$	D+Q	−0.09 *5*	A_2=+0.36 *5*, A_4=+0.08 *8* (1963Ha25). I_γ: other: 10 (1968Wo01). δ: +0.09 *5* (1963Ha25).
		7308.5	36	1266.13	$3/2^+$	D(+Q)	+0.01 *1*	A_2=−0.37 *1*, A_4=−0.04 *1* (1964Va11); A_2=−0.38 *2*, A_4=−0.04 *3* (1963Ha25). I_γ: other: 38 (1968Wo01). δ: −0.01 *1* (1963Ha25), −0.004 *4* (1964Va11).
		8574.3	0.1	0.0	$1/2^+$			
8584.2	5/2	1973.7	9.9	6610.4				I_γ: other: 10 (1968Wo01).
		2088.0	0.7	6496.1				
		2505.3[c]	8	6078.8				I_γ: other: 8 (1968Wo01).
		3569.1	4.1	5014.9	(1/2,3/2)			I_γ: other: 4 (1968Wo01).
		3991.4	26	4592.5	3/2			I_γ: other: 24 (1968Wo01).
		5077.7	13	3506.1	$3/2^+$			I_γ: other: 13 (1968Wo01).
		5449.4	0.3	3134.3	$1/2^+$			I_γ: 0.3 (1975De31).
		7317.1	14	1266.13	$3/2^+$	D(+Q)	+0.008 *6*	I_γ: other: 14 (1968Wo01). A_2=−0.38 *1*, A_4=+0.01 *1* (1964Va11). δ: −0.008 *6* (1964Va11).
		8582.9	32	0.0	$1/2^+$			I_γ: other: 27 (1968Wo01).
8601.0		2709.0	11	5891.9	$^+$			I_γ: other: 13 (1968Wo01).

$^{31}_{15}P_{16}$-24

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
8601.0		3257.9	1.8	5342.9				
		3484.8	0.6	5116.0				
		3817.3	1.6	4783.4	$5/2^+$			I_γ: other: 2 (1968Wo01).
		3966.5	12	4634.2	(5/2,7/2)			I_γ: other: 10 (1968Wo01).
		4169.5	6.1	4431.2	$7/2^-$			I_γ: other: 4 (1968Wo01).
		4409.8	2.3	4190.9	$5/2^+$			
		5185.9	49	3414.6	$7/2^+$			I_γ: other: 56 (1968Wo01). A_2=−0.11 *2*, A_4=−0.04 *2* (1964Va11); no Mult deduced by 1964Va11.
		5305.5	10	3295.0	$5/2^+$			I_γ: other: 10 (1968Wo01).
		6366.5	4.9	2233.8	$5/2^+$			I_γ: other: 5 (1968Wo01).
		8599.7	0.7	0.0	$1/2^+$			
8641.2	5/2	2653.2	1.0	5987.9				
		2867.6	2.1	5773.5				I_γ: other: 4 (1962Ha33).
		3525.0	4.3	5116.0				
		4006.7	2.1	4634.2	(5/2,7/2)			I_γ: other: 1 (1968Wo01).
		4048.4	2.7	4592.5	3/2			I_γ: other: 3 (1968Wo01).
		4209.7	3.9	4431.2	$7/2^-$			A_2=+0.12 *5*, A_4=+0.03 *8* (1963Ha25). I_γ: others: 6 (1962Ha33), 4 (1968Wo01).
		4450.0	4.4	4190.9	$5/2^+$	D+Q	+0.6	A_2=+1.2 *4* (1963Ha25). I_γ: others: 4 (1962Ha33), 4 (1968Wo01). δ: estimated −0.6 (1963Ha25).
		5134.6	4.0	3506.1	$3/2^+$	D(+Q)	+0.09 *9*	A_2=−0.22 *16*, A_4=+0.22 *23* (1963Ha25). I_γ: others: 7 (1962Ha33), 5 (1968Wo01). δ: from 1963Ha25.
		5226.1	1.4	3414.6	$7/2^+$			I_γ: other: 2 (1968Wo01).
		5345.7	7.0	3295.0	$5/2^+$	D+Q	−0.13 *6*	A_2=+0.31 *7*, A_4=−0.13 *12* (1963Ha25). I_γ: others: 13 (1962Ha33), 8 (1968Wo01). δ: from 1963Ha25.
		6406.7	16	2233.8	$5/2^+$	D(+Q)	−0.03 *4*	A_2=+0.42 *4*, A_4=+0.07 *6* (1963Ha25). I_γ: others: 15 (1962Ha33), 20 (1968Wo01). δ: from 1963Ha25.
		7374.1	51	1266.13	$3/2^+$	D+Q	−0.042 *3*	A_2=−0.48 *1*, A_4=+0.01 *1* (1964Va11). A_2=−0.49 *2*, A_4=−0.02 *3* (1963Ha25). I_γ: others: 51 (1962Ha33), 49 (1968Wo01). δ: +0.04 *2* (1963Ha25), +0.042 *3* (1964Va11).
		8639.9	0.1	0.0	$1/2^+$			
8649.5	3/2	2661.5	0.9	5987.9				I_γ: other: 1 (1968Wo01).
		3865.8	0.9	4783.4	$5/2^+$			
		4056.7	0.6	4592.5	3/2			I_γ: other: 1 (1968Wo01).
		4388.8	2.7	4260.4	$3/2^+$			I_γ: other: 3 (1968Wo01).
		4458.3	1.3	4190.9	$5/2^+$	D+Q	−1.1 *8*	A_2=+0.28 *8*, A_4=+0.16 *16* (1963Ha25). I_γ: others: 4 (1962Ha33), 2 (1968Wo01). δ: +0.29<δ<+1.8 (1963Ha25).
		5142.9	0.6	3506.1	$3/2^+$			

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
8649.5	3/2	5354.0	3.4	3295.0	$5/2^+$	D+Q	+0.10 *6*	A_2=−0.22 *7*, A_4=+0.11 *12* (1963Ha25). I_γ: others: 5 (1962Ha33), 3 (1968Wo01). δ: −0.10 *6* or +5.6<δ<+14.3 (1963Ha25).
		5514.7	11	3134.3	$1/2^+$	Q+D	−3.7 *3*	A_2=−0.37 *3*, A_4=+0.01 *7* (1963Ha25). I_γ: 11 (1975De31), 12 (1962Ha33), 13 (1968Wo01). δ: from 1963Ha25.
		6415.0	0.9	2233.8	$5/2^+$	D+Q	−0.28 *5*	A_2=+0.19 *4*, A_4=+0.09 *16* (1963Ha25). I_γ: 0.9 (1975De31), 5 (1962Ha33), 1 (1968Wo01). δ: +0.28 *5* or 1.85 *20* (1963Ha25).
		7382.4	75	1266.13	$3/2^+$	D+Q	+0.045 *3*	A_2=+0.47 *1*, A_4=−0.01 *1* (1964Va11); A_2=+0.53 *2*, A_4=+0.02 *3* (1963Ha25). I_γ: others: 72 (1962Ha33), 73 (1968Wo01). δ: −0.043 *3* (1963Ha25), −0.050 *5* or +1.97 *3* (1964Va11).
		8648.2	2.7	0.0	$1/2^+$			I_γ: others: 2 (1962Ha33), 3 (1968Wo01).
8729.1	3/2	3714.0	0.1	5014.9	(1/2,3/2)			
		3945.4	2.2	4783.4	$5/2^+$			I_γ: other: 2 (1968Wo01).
		4468.4	0.9	4260.4	$3/2^+$			I_γ: other: 1 (1968Wo01).
		5222.5	0.2	3506.1	$3/2^+$			
		5433.6	2.9	3295.0	$5/2^+$			I_γ: other: 4 (1968Wo01).
		5594.3	3.0	3134.3	$1/2^+$			I_γ: other: 4 (1968Wo01).
		6494.6	6.3	2233.8	$5/2^+$	D+Q	−0.20 *7*	I_γ: other: 8 (1968Wo01). Mult.,δ: from $\gamma\gamma(\theta)$ (1964Va11).
		7462.0	0.4	1266.13	$3/2^+$			I_γ: other: 1 (1968Wo01).
		8727.8	84	0.0	$1/2^+$	D+Q		A_2=−0.41 *1*, A_4=−0.01 *1* (1964Va11); A_2=−0.44 *2* (1963Ha25). I_γ: other: 80 (1968Wo01). δ: −0.04 *1* or 1.91 *5* (1963Ha25), −0.022 *5* or +1.83 *3* (1964Va11).
8730.5	3/2	1799.0[c]	<6	6931.4	(5/2,7/2)			I_γ: from 1962Ha33 only.
		2120.0	0.5	6610.4				
		2742.5	0.1	5987.9				I_γ: other: 3 (1962Ha33).
		2956.8[c]	<6	5773.5				I_γ: from 1962Ha33 only.
		3473.5	0.4	5256.8				
		3614.3	0.3	5116.0				
		3715.4	3.0	5014.9	(1/2,3/2)			I_γ: others: <4 (1962Ha33), 4 (1968Wo01). A_2=+0.32 *12*, A_4=+0.11 *12*, A_6=+0.03 *10* (2009Ka37).
		3946.8	0.6	4783.4	$5/2^+$			
		4137.7	2.0	4592.5	3/2			I_γ: others: <2 (1962Ha33), 3 (1968Wo01).
		4539.2[c]	<3	4190.9	$5/2^+$			I_γ: from 1962Ha33 only.
		5223.9	1.8	3506.1	$3/2^+$			I_γ: other: 2 (1968Wo01).
		5435.0	1.8	3295.0	$5/2^+$			I_γ: others: <4 (1962Ha33), 2 (1968Wo01). A_2=+0.42 *15*, A_4=+0.41 *15*, A_6=+0.14 *17* (2009Ka37).
		5595.7	3.6	3134.3	$1/2^+$			I_γ: others: 3 (1962Ha33), 5 (1968Wo01). A_2=+0.38 *9*, A_4=+0.05 *8*, A_6=+0.06 *9* (2009Ka37).
		6496.0	11	2233.8	$5/2^+$	D+Q	−0.01 *13*	I_γ: others: 9 (1962Ha33), 14 (1968Wo01). Mult.,δ: from $\gamma\gamma(\theta)$ (1964Va11). A_2=+0.40 *10*, A_4=+0.05 *10*, A_6=+0.11 *9* (2009Ka37).

$^{31}_{15}P_{16}$-26

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
8730.5	3/2	7463.4	0.9	1266.13	3/2$^+$	D+Q	+0.12 *5*	A_2=+0.22 *2*, A_4=−0.02 *3* (1964Va11). δ: from 1964Va11. I_γ: others: 4 (1962Ha33), 2 (1968Wo01).
		8729.2	74	0.0	1/2$^+$	D(+Q)	+0.02 *2*	I_γ: others: 68 (1962Ha33), 68 (1968Wo01). A_2=−0.46 *1*, A_4=−0.01 *1* (1964Va11); A_2=−0.47 *2* (1963Ha25); A_2=+0.25 *12*, A_4=+0.14 *12*, A_6=+0.009 *13* (2009Ka37). δ: −0.02 *2* or +1.83 *7* (1963Ha25).
8738.0	3/2	3178.9	3.7	5558.9	3/2	D(+Q)	−0.15 *19*	A_2=+0.19 *18*, A_4=−0.28 *24* (2005Vo24). δ: from 2005Vo24. I_γ: others: 5 (1968Wo01), 4 (2005Vo24).
		3481.0	1.4	5256.8				I_γ: others: 2 (1968Wo01), 1 (2005Vo24).
		3621.8	1.4	5116.0				I_γ: other: 1 (2005Vo24).
		3722.9	13	5015.2	(1/2,3/2)	D+Q	−0.75 *28*	A_2=−0.20 *21*, A_4=−0.13 *18* (2005Vo24). I_γ: others: 14 (1962Ha33), 13 (1968Wo01), 13 (2005Vo24). δ: from 2005Vo24.
		3954.3	12	4783.4	5/2$^+$	D(+Q)	−0.02 *15*	A_2=−0.01 *13*, A_4=−0.03 *14* (2005Vo24); A_2=+0.02 *3*, A_4=−0.06 *5* (1963Ha25). I_γ: others: 8 (1962Ha33), 12 (1968Wo01), 12 (2005Vo24). δ: 2005Vo24.
		4145.2	1.3	4592.5	3/2			I_γ: other: 1 (2005Vo24).
		5231.4	2.6	3506.1	3/2$^+$			I_γ: others: 6 (1962Ha33), 2.6 (1968Wo01), 3 (2005Vo24).
		5442.5	37	3295.0	5/2$^+$	D+Q	−0.24 *6*	A_2=+0.17 *4*, A_4=−0.06 *4* (2005Vo24). I_γ: others: 35 (1962Ha33), 37 (1968Wo01), 37 (2005Vo24). δ: +0.24 *6* (2005Vo24). Other: +0.08 *5* (1963Ha25).
		5603.2	8.8	3134.3	1/2$^+$	D+Q	+20 *14*	A_2=+0.19 *9*, A_4=+0.02 *9* (2005Vo24). I_γ: others: 12(1962Ha33), 8 (1968Wo01), 9 (2005Vo24). δ: −4.0 *15* (1963Ha25), −20 *14* (2005Vo24).
		6503.5	8.2	2233.8	5/2$^+$	D+Q	−0.8 *4*	A_2=+0.37 *12*, A_4=+0.01 *10* (2005Vo24); A_2=+0.11 *4*, A_4=−0.03 *5* (1963Ha25). I_γ: others: 12 (1962Ha33), 9 (1968Wo01), 8 (2005Vo24). δ: +0.8 *4* (2005Vo24). Other: +0.21 *4* (1963Ha25).
		7470.9	6.4	1266.13	3/2$^+$	D+Q	+1.2 *6*	A_2=+0.47 *12*, A_4=+0.07 *11* (2005Vo24); A_2=+0.42 *4*, A_4=+0.09 *6* (1963Ha25). I_γ: others: 8 (1962Ha33), 8 (1968Wo01), 7 (2005Vo24). δ: −0.01 *3* or −3.6 *4* (1963Ha25), −1.2 *6* (2005Vo24).
		8736.7	4.2	0.0	1/2$^+$	D+Q	−0.20 *7*	A_2=−0.41 *8*, A_4=+0.04 *7* (2005Vo24). I_γ: others: <5 (1962Ha33), 4 (1968Wo01), 4 (2005Vo24). δ: from 2005Vo24.
8757.3	5/2$^+$	3742.2	0.8	5014.9	(1/2,3/2)			
		3973.6	3.5	4783.4	5/2$^+$			I_γ: other: 3 (1968Wo01).
		4122.8	0.6	4634.2	(5/2,7/2)			I_γ: other: 1 (1968Wo01).
		4164.5	2.0	4592.5	3/2			I_γ: other: 3 (1968Wo01).
		4325.8	4.0	4431.2	7/2$^-$			I_γ: others: 4 (1962Ha33), 4 (1968Wo01).
		5250.7	1.2	3506.1	3/2$^+$			I_γ: other: 1 (1968Wo01).
		5342.2	24	3414.6	7/2$^+$	D+Q	−0.13 *2*	δ: from A_2=+0.10 *3*, A_4=+0.04 *4* (1963Ha25). POL=−0.5 *3* implies π(8757)=+ (1967Wi10). I_γ: others: 28 (1962Ha33), 26 (1968Wo01).

$^{31}_{15}P_{16}$-27

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
8757.3	5/2$^+$	5622.5	1.0	3134.3	1/2$^+$			
		6522.8	7.5	2233.8	5/2$^+$	D+Q	+0.09 *5*	A_2=+0.55 *4*, A_4=+0.05 *6* (1963Ha25). I_γ: others: 10 (1962Ha33), 7 (1968Wo01). δ: 1963Ha25.
		7490.2	55	1266.13	3/2$^+$	D+Q	+0.206 *3*	A_2=+0.03 *1*, A_4=+0.01 *1* (1964Va11). Other: A_2=+0.12 *2*, A_4=+0.04 *2* (1963Ha25). I_γ: others: 56 (1962Ha33), 55 (1968Wo01). δ: −0.25 *2* (1963Ha25), −0.206 *3* (1964Va11). The value from 1964Va11 seems to be from $\gamma\gamma(\theta)$ data with A_2=−0.76 *1*.
		8756.0	0.4	0.0	1/2$^+$			
8763.3	(1/2,3/2)	2302.4	0.7	6460.8				
		2426.6	2.0	6336.6				
		3748.2	7.5	5014.9	(1/2,3/2)			I_γ: other: 8 (1968Wo01).
		5256.7	1.5	3506.1	3/2$^+$			
		5467.8	0.4	3295.0	5/2$^+$			
		5628.5	3.0	3134.3	1/2$^+$			I_γ: other: 4 (1968Wo01).
		6528.8	0.9	2233.8	5/2$^+$			
		7496.2	4.0	1266.13	3/2$^+$			I_γ: other: 4 (1968Wo01).
		8762.0	80	0.0	1/2$^+$			I_γ: other: 84 (1968Wo01).
8840.0	7/2	1908.5	12	6931.4	(5/2,7/2)			A_2=+0.03 *12*, A_4=+0.03 *13* (1969Wo01). I_γ: other: 12 (1968Wo01).
		2440.9	27	6399.0	7/2	D(+Q)	+0.07 *9*	A_2=+0.38 *9*, A_4=−0.03 *9* (1969Wo01). δ: from 1969Wo01. I_γ: other: 32 (1968Wo01).
		2947.9	4.2	5891.9	$^+$			I_γ: other: 6 (1968Wo01).
		3167.4	4.0	5672.4	5/2			I_γ: other: 4 (1968Wo01).
		3824.8	0.7	5014.9	(1/2,3/2)			1969Wo01 report A_2=−0.46 *5* for a 3819γ.
		4056.3	7.3	4783.4	5/2$^+$			I_γ: other: 6 (1968Wo01).
		4408.5	9.5	4431.2	7/2$^-$			I_γ: other: 7 (1968Wo01).
		4648.7	5.1	4190.9	5/2$^+$			I_γ: other: 4 (1968Wo01).
		5424.9	16	3414.6	7/2$^+$			I_γ: other: 17 (1968Wo01).
		5544.5	3.6	3295.0	5/2$^+$			I_γ: other: 3 (1968Wo01).
		6605.4	9.6	2233.8	5/2$^+$	D+Q	+0.03 *2*	I_γ: other: 9 (1968Wo01). Mult.,δ: from 1966Va07. A_2=−0.28 *5*, A_4=−0.05 *5* (1966Va07).
		8838.6	1.0	0.0	1/2$^+$			
8902.9	1/2	1589.2	1.1	7313.7				
		2914.9	2.5	5987.9				
		3343.8	1.3	5558.9	3/2			
		3887.7	1.3	5014.9	(1/2,3/2)			
		4310.1	6.7	4592.5	3/2			
		4642.1	0.6	4260.4	3/2$^+$			
		5396.3	45	3506.1	3/2$^+$	D+Q		I_γ: other: 47 (1968Wo01).

$^{31}_{15}P_{16}$-28

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult.[a]	δ[b]	Comments
								δ: 0.12 *7* or 2.4 *5* from 1966Va07.
								γγ(θ): A_2=−0.32 *7*, A_4=+0.01 *6* (1966Va07).
8902.9	1/2	5768.0	35	3134.3	$1/2^+$			I_γ: other: 38 (1968Wo01).
		6668.3	1.3	2233.8	$5/2^+$			I_γ: other: 1 (1968Wo01).
		7635.8	3.8	1266.13	$3/2^+$			I_γ: other: 5 (1968Wo01).
		8901.5	1.4	0.0	$1/2^+$			I_γ: other: 2 (1968Wo01).
8909.7	5/2	2315.3	4.4	6594.3				I_γ: other: 3 (1968Wo01).
		2921.7	2	5987.9				I_γ: from 1968Wo01 only.
		3237.1	26	5672.4	5/2	D(+Q)	−0.01 *9*	A_2=+0.40 *10*, A_4=+0.09 *9* (1969Wo01).
								δ: from 1969Wo01.
								I_γ: other: 26 (1968Wo01).
		3350.6	6.7	5558.9	3/2	D(+Q)	+0.03 *6*	A_2=−0.43 *14*, A_4=+0.05 *15* (1969Wo01).
								δ: from 1969Wo01.
								I_γ: other: 9 (1968Wo01).
		3894.5	1.0	5014.9	(1/2,3/2)			
		4275.2	2.5	4634.2	(5/2,7/2)			I_γ: other: 2 (1968Wo01).
		4478.2	14	4431.2	$7/2^-$			I_γ: other: 13 (1968Wo01).
		4648.9	0.7	4260.4	$3/2^+$			
		4718.4	2.8	4190.9	$5/2^+$			I_γ: other: 3 (1968Wo01).
		5403.1	1.2	3506.1	$3/2^+$			I_γ: other: 2 (1968Wo01).
		5494.6	3.4	3414.6	$7/2^+$			I_γ: other: 4 (1968Wo01).
		5614.2	4.1	3295.0	$5/2^+$			I_γ: other: 3 (1968Wo01).
		6675.1	8.3	2233.8	$5/2^+$			I_γ: other: 8 (1968Wo01).
		7642.6	24	1266.13	$3/2^+$	D+Q	+0.07 *1*	I_γ: other: 24 (1968Wo01).
								Mult.,δ: from 1966Va07.
								A_2=−0.23 *1*, A_4=−0.02 *1* (1966Va07).
		8908.3	0.9	0.0	$1/2^+$			I_γ: other: 2 (1968Wo01).
8935.8	3/2	1794.6	1	7141.1				I_γ: from 1968Wo01 only.
		3263.2	5	5672.4	5/2			I_γ: from 1967Wi10 only.
		3678.8	0.5	5256.8				
		3819.5	6.5	5116.0				I_γ: others: 6 *1* (1967Wi10), 7 (1968Wo01).
		3920.6	1.6	5014.9	(1/2,3/2)			I_γ: other: 2 (1968Wo01).
		4152.1	15	4783.4	$5/2^+$	D(+Q)		I_γ: others: 11 *2* (1967Wi10), 14 (1968Wo01).
								δ: −0.02 *4*, +0.16 *8* or +0.03 *5* from γγ(θ) in 1967Wi10.
		4675.0	6.6	4260.4	$3/2^+$			I_γ: others: 7 *1* (1967Wi10), 7 (1968Wo01).
		5429.2	3.7	3506.1	$3/2^+$			I_γ: others: 5 *1* (1967Wi10), 4 (1968Wo01).
		5640.2	2.3	3295.0	$5/2^+$			I_γ: other: 2 (1968Wo01).
		5800.9	4.2	3134.3	$1/2^+$			I_γ: others: 6 *1* (1967Wi10), 4 (1968Wo01).
		6701.2	36	2233.8	$5/2^+$	D+Q	−0.17 *5*	I_γ: others: 36 *1* (1967Wi10), 35 (1968Wo01).
								Mult.,δ: from 1966Va07.
								γγ(θ): A_2=+0.25 *6*, A_4=−0.07 *6* (1966Va07).
		7668.7	6.6	1266.13	$3/2^+$			I_γ: others: 8 *1* (1967Wi10), 6 (1968Wo01).
		8934.4	17	0.0	$1/2^+$	D+Q		I_γ: others: 17 *1* (1967Wi10), 18 (1968Wo01).

$^{31}_{15}P_{16}$-29

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
								δ: 0.255 *5* or 1.02 *1* from 1966Va07.
								A_2=−0.79 *1*, A_4=0.00 *1* (1966Va07).
8985.9	3/2	x	40					
		8984.5	60	0.0	$1/2^+$	D+Q		δ: −0.010 *5* or 1.78 *1* from 1966Va07.
								A_2=−0.45 *1*, A_4=+0.02 *1* (1966Va07).
9009.1	5/2	2610.0	3.4	6399.0	7/2			I_γ: others: 3 (1968Wo01), 3 (2004Vo22).
		3021.0	1	5987.9				I_γ: from 2004Vo22 only.
		3235.4	8.3	5773.5				I_γ: others: 6 (1968Wo01), 8 (2004Vo22).
		3478.9	5.3	5530.0				I_γ: others: 6 (1968Wo01), 5 (2004Vo22).
		4225.4	0.8	4783.4	$5/2^+$			I_γ: others: 1 (1968Wo01), 1 (2004Vo22).
		4374.6	4.8	4634.2	(5/2,7/2)			I_γ: others: 4 (1968Wo01), 5 (2004Vo22).
		4416.3	6.0	4592.5	3/2			I_γ: others: 6 (1968Wo01), 6 (2004Vo22).
		4577.5	4.1	4431.2	$7/2^-$			I_γ: others: 3 (1968Wo01), 4 (2004Vo22).
		4817.8	32	4190.9	$5/2^+$			I_γ: others: 35 (1968Wo01), 32 (2004Vo22.
		5502.5	13	3506.1	$3/2^+$	D+Q	+0.15 *2*	I_γ: others: 5 (1968Wo01, 13 (2004Vo22).
								Mult.,δ: from $\gamma\gamma(\theta)$ (1966Va08).
		5594.0	1.9	3414.6	$7/2^+$			I_γ: others: 3 (1968Wo01), 2 (2004Vo22).
		5874.2	1	3134.3	$1/2^+$			I_γ: from 2004Vo22 only.
		6774.5	6.0	2233.8	$5/2^+$	D+Q	+0.64 *10*	I_γ: others: 6 (1968Wo01, 6 (2004Vo22).
								Mult.,δ: from 1966Va07.
								$\gamma\gamma(\theta)$: A_2=+0.65 *7*, A_4=−0.05 *7* (1966Va07).
		7741.9	1.4	1266.13	$3/2^+$			I_γ: others: 1 (1968Wo01), 1 (2004Vo22).
		9007.7	13	0.0	$1/2^+$	Q		I_γ: others: 11 (1968Wo01), 13 (2004Vo22).
								Mult.: from 1966Va07.
								A_2=+0.50 *1*, A_4=−0.38 *2* (1966Va07).
9046.1	3/2	2665.2	0.5	6380.8				
		4030.9	0.7	5014.9	(1/2,3/2)			
		4262.4	0.2	4783.4	$5/2^+$			
		4453.3	2.0	4592.5	3/2			
		4785.3	0.9	4260.4	$3/2^+$			
		5750.5	1.0	3295.0	$5/2^+$			
		5911.2	4.8	3134.3	$1/2^+$			I_γ: other: 6 (1968Wo01).
		6811.5	0.5	2233.8	$5/2^+$			
		7778.9	9.4	1266.13	$3/2^+$			I_γ: other: 4 (1968Wo01).
		9044.7	80	0.0	$1/2^+$	D+Q		I_γ: other: 90 (1968Wo01).
								δ: 0.008 *5* or 1.70 *1* from 1966Va07.
								A_2=−0.47 *1*, A_4=0.00 *1* (1966Va07).
9052.7	$(5/2)^+$	2121.2	2.0	6931.4	(5/2,7/2)			
		2143.0	6.5	6909.6				
		2458.3	2.0	6594.3				I_γ: other: 3 (1968Wo01).
		2653.6	8.0	6399.0	7/2			
		2671.8	4.5	6380.8				I_γ: other: 7 (1968Wo01).
		3380.1	9.0	5672.4	5/2			I_γ: other: 13 (1968Wo01).
		4037.5	5.0	5014.9	(1/2,3/2)			I_γ: other: 6 (1968Wo01).

$^{31}_{15}P_{16}$-30

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9052.7	$(5/2)^+$	4459.9	7.0	4592.5	3/2			I_γ: other: 9 (1968Wo01).
		4791.9	1.0	4260.4	$3/2^+$			
		4861.4	3.0	4190.9	$5/2^+$			I_γ: other: 3 (1968Wo01).
		5546.1	7.0	3506.1	$3/2^+$			I_γ: other: 8 (1968Wo01).
		5637.5	22	3414.6	$7/2^+$			I_γ: other: 24 (1968Wo01).
		5757.1	0.5	3295.0	$5/2^+$			
		6818.1	9.5	2233.8	$5/2^+$			I_γ: other: 10 (1968Wo01). Mult.: 1966Va07 proposed Q, $\Delta J=2$ based on $\gamma\gamma(\theta)$ which, however, could be also consistent with $\Delta J=0$. $\gamma\gamma(\theta)$: $A_2=-0.04$ *7*, $A_4=+0.06$ *7* (1966Va07).
		7785.5	13	1266.13	$3/2^+$			I_γ: other: 17 (1968Wo01).
9067.1	5/2	2606.2	0.8	6460.8				I_γ: other: 1 (2004Vo22).
		3079.0	1.5	5987.9				I_γ: other: 2 (2004Vo22).
		3536.9	3.2	5530.0		D+Q		$A_2=-0.27$ *15*, $A_4=-0.04$ *16* (1969Wo01). I_γ: others: 5 (1968Wo01), 3 (2004Vo22). Mult.,δ: 1969Wo01 report that δ is small if J(5530)=7/2, $\delta=+0.52$ *12* if J(5530)=5/2.
		4283.4	3.7	4783.4	$5/2^+$			I_γ: others: 5 (1968Wo01), 4 (2004Vo22).
		4432.6	21	4634.2	(5/2,7/2)			I_γ: others: 20 (1968Wo01), 21 (2004Vo22). $A_2=-0.06$ *2*, $A_4=+0.05$ *3* (1969Wo01).
		4474.3	1.8	4592.5	3/2			I_γ: others: 2 (1968Wo01), 2 (2004Vo22).
		4635.5	1.5	4431.2	$7/2^-$			
		4875.8	3.3	4190.9	$5/2^+$			I_γ: others: 3 (1968Wo01), 3 (2004Vo22).
		5560.5	0.5	3506.1	$3/2^+$			I_γ: others: 1 (1968Wo01), 1 (2004Vo22).
		5651.9	6.8	3414.6	$7/2^+$			I_γ: others: 9 (1968Wo01), 7 (2004Vo22).
		5771.5	9.7	3295.0	$5/2^+$			I_γ: others: 10 (1968Wo01), 10 (2004Vo22).
		5932.2	0.5	3134.3	$1/2^+$			I_γ: other: 1 (2004Vo22).
		6832.5	42	2233.8	$5/2^+$	D+Q	−0.07 *1*	I_γ: others: 37 (1968Wo01), 42 (2004Vo22). Mult.,δ: from 1966Va07. $A_2=+0.34$ *1*, $A_4=-0.01$ *1* (1966Va07).
		7799.9	2.3	1266.13	$3/2^+$			I_γ: others: 3 (1968Wo01), 2 (2004Vo22).
		9065.7	1.4	0.0	$1/2^+$			I_γ: others: 1 (1968Wo01), 1 (2004Vo22).
9113.4	7/2	2714.3	8.8	6399.0	7/2			
		3034.4	0.6	6078.8				
		3221.3	3.0	5891.9	$^+$			I_γ: other: 9 (1968Wo01).
		3440.8	0.7	5672.4	5/2			
		3997.1	0.7	5116.0				
		4098.2	0.5	5014.9	(1/2,3/2)			
		4329.7	6.0	4783.4	$5/2^+$			I_γ: other: 8 (1968Wo01).
		4478.9	2.4	4634.2	(5/2,7/2)			
		4922.1	7.6	4190.9	$5/2^+$			I_γ: other: 8 (1968Wo01).
		5698.2	18	3414.6	$7/2^+$			I_γ: other: 20 (1968Wo01).
		5817.8	5.2	3295.0	$5/2^+$			I_γ: other: 7 (1968Wo01).
		6878.8	46	2233.8	$5/2^+$	D(+Q)	−0.01 *3*	I_γ: other: 48 (1968Wo01).

$^{31}_{15}P_{16}$-31

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
								Mult.,δ: from 1966Va07.
								$\gamma\gamma(\theta)$: A_2=−0.14 *7*, A_4=+0.04 *8* (1966Va07).
9113.4	7/2	7846.2	0.2	1266.13	$3/2^+$			
		9112.0	0.3	0.0	$1/2^+$			
9115.5	5/2	2734.6	0.8	6380.8				I_γ: other: 1 (2004Vo22).
		2882.0	1	6233.4				I_γ: from 2004Vo22 only.
		3341.8	2.4	5773.5				I_γ: other: 2 (2004Vo22).
		3556.4	7.0	5558.9	3/2			I_γ: others: 8 (1968Wo01), 7 (2004Vo22).
		3585.3	6.1	5530.0				I_γ: others: 6 (1968Wo01), 6 (2004Vo22).
		4331.8	3.6	4783.4	$5/2^+$			I_γ: others: 2 (1968Wo01), 4 (2004Vo22).
		4481.0	4.0	4634.2	(5/2,7/2)			I_γ: others: 3 (1968Wo01), 4 (2004Vo22).
		4522.6	8.8	4592.5	3/2			I_γ: others: 9 (1968Wo01), 9 (2004Vo22).
		4924.2	7.1	4190.9	$5/2^+$			I_γ: others: 8 (1968Wo01), 7 (2004Vo22).
		5608.9	6.2	3506.1	$3/2^+$			I_γ: others: 8 (1968Wo01), 6 (2004Vo22).
		5819.9	4.8	3295.0	$5/2^+$			I_γ: others: 5 (1968Wo01), 5 (2004Vo22).
		6880.9	49	2233.8	$5/2^+$	D+Q	−0.07 *1*	I_γ: others: 51 (1968Wo01), 49 (2004Vo22).
								Mult.,δ: from 1966Va07.
								A_2=+0.35 *1*, A_4=−0.01 *1* (1966Va07).
		9114.1	0.2	0.0	$1/2^+$			
9128.5	5/2	2747.6	3.0	6380.8				I_γ: other: 3 (2004Vo22).
		2895.0	3	6233.4				I_γ: from 2004Vo22 only.
		3236.4	6.1	5891.9	$^+$			I_γ: other: 6 (2004Vo22).
		3598.3	1.4	5530.0				I_γ: other: 1 (2004Vo22).
		4344.8	2.1	4783.4	$5/2^+$			I_γ: other: 2 (2004Vo22).
		4493.9	28	4634.2	(5/2,7/2)			I_γ: others: 28 (1968Wo01), 28 (2004Vo22).
		4535.6	2.3	4592.5	3/2			I_γ: other: 2 (2004Vo22).
		4696.9	4.9	4431.2	$7/2^-$			I_γ: other: 5 (2004Vo22).
		4867.7	3.1	4260.4	$3/2^+$			I_γ: others: 4 (1968Wo01), 3 (2004Vo22).
		4937.2	1.5	4190.9	$5/2^+$			I_γ: other: 2 (2004Vo22).
		5621.9	5.7	3506.1	$3/2^+$			I_γ: others: 10 (1968Wo01), 6 (2004Vo22).
		5713.3	6.8	3414.6	$7/2^+$			I_γ: others: 12 (1968Wo01), 7 (2004Vo22).
		5832.9	3.7	3295.0	$5/2^+$			I_γ: others: 6 (1968Wo01), 4 (2004Vo22).
		5993.6	0.9	3134.3	$1/2^+$			I_γ: other: 1 (2004Vo22).
		6893.9	18	2233.8	$5/2^+$	D+Q	+1.18 *9*	I_γ: others: 26 (1968Wo01), 18 (2004Vo22).
								Mult.,δ: from 1966Va07.
								$\gamma\gamma(\theta)$: A_2=+0.45 *10*, A_4=+0.08 *10* (1966Va07).
		7861.3	5.5	1266.13	$3/2^+$			I_γ: others: 9 (1968Wo01), 6 (2004Vo22).
		9127.1	7.0	0.0	$1/2^+$			I_γ: others: 7 (1968Wo01), 7 (2004Vo22).
9130.9	5/2	2288.9	2.0	6841.9				I_γ: other: 2 (2004Vo22).
		2520.4	2.9	6610.4				I_γ: other: 3 (2004Vo22).
		3142.8	0.9	5987.9				I_γ: other: 1 (2004Vo22).
		3600.7	1.9	5530.0				I_γ: other: 2 (2004Vo22).
		4347.2	13	4783.4	$5/2^+$			I_γ: others: 14 (1968Wo01), 13 (2004Vo22).
		4496.3	6.5	4634.2	(5/2,7/2)			I_γ: others: 2 (1968Wo01), 7 (2004Vo22).

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
9130.9	5/2	4699.3	16	4431.2	$7/2^-$			I_γ: others: 21 (1968Wo01), 16 (2004Vo22).
		4870.1	6.0	4260.4	$3/2^+$			I_γ: others: 5 (1968Wo01), 6 (2004Vo22).
		5715.7	1.6	3414.6	$7/2^+$			I_γ: other: 2 (2004Vo22).
		5996.0	19	3134.3	$1/2^+$			I_γ: others: 22 (1968Wo01), 19 (2004Vo22).
		6896.3	0.8	2233.8	$5/2^+$			I_γ: other: 1 (2004Vo22).
		7863.7	29	1266.13	$3/2^+$	D+Q	−0.03 *1*	I_γ: others: 36 (1968Wo01), 29 (2004Vo22). Mult.,δ: from 1966Va07. A_2=−0.42 *1*, A_4=−0.02 *1* (1966Va07).
		9129.5	0.4	0.0	$1/2^+$			
9154.2	7/2	3075.2	3.6	6078.8				
		3380.5	3.0	5773.5				I_γ: other: 2 (1968Wo01).
		3811.0	15	5342.9				I_γ: other: 16 (1968Wo01).
		4370.5	1.8	4783.4	$5/2^+$			I_γ: other: 1 (1968Wo01).
		4519.6	0.5	4634.2	(5/2,7/2)			
		4962.9	15	4190.9	$5/2^+$			I_γ: other: 15 (1968Wo01).
		5647.5	1.6	3506.1	$3/2^+$			
		5739.0	9.8	3414.6	$7/2^+$			I_γ: other: 13 (1968Wo01).
		6919.6	44	2233.8	$5/2^+$	D+Q	+0.20 *2*	I_γ: other: 47 (1968Wo01). Mult.,δ: from 1966Va07. $\gamma\gamma(\theta)$: A_2=+0.16 *10*, A_4=−0.06 *10* (1966Va07).
		7887.0	5.7	1266.13	$3/2^+$			I_γ: other: 7 (1968Wo01).
9156.2	3/2	2775.3	2.7	6380.8				
		3597.1	0.5	5558.9	3/2			
		3899.1	0.9	5256.8				
		4141.0	1.1	5014.9	(1/2,3/2)			I_γ: other: 3 (1968Wo01).
		4563.3	1.1	4592.5	3/2			
		4895.4	1.0	4260.4	$3/2^+$			
		4964.9	1.8	4190.9	$5/2^+$			
		5649.5	1.9	3506.1	$3/2^+$			
		5741.0	0.3	3414.6	$7/2^+$			
		5860.6	7.9	3295.0	$5/2^+$			I_γ: other: 12 (1968Wo01).
		6021.3	0.8	3134.3	$1/2^+$			
		6921.6	10	2233.8	$5/2^+$	D(+Q)	+0.08 *10*	I_γ: other: 11 (1968Wo01). Mult.,δ: from 1966Va07. $\gamma\gamma(\theta)$: A_2=+0.16 *10*, A_4=−0.06 *10* (1966Va07).
		7889.0	6.0	1266.13	$3/2^+$			I_γ: other: 5 (1968Wo01).
		9154.7	64	0.0	$1/2^+$	D+Q		δ: −0.250 *5* or 3.48 *5* from 1966Va07. I_γ: other: 69 (1968Wo01). A_2=−0.03 *1*, A_4=0.00 *1* (1966Va07).
9176.0	3/2	1394.5	1.8	7781.5	$3/2^-$	D(+Q)	+0.07 *2*	I_γ: other: 2 *1* (1988Va06). δ: from 1988Va06. A_2=+0.48 *3* (1988Va06).
		2565.5	7.0	6610.4		D(+Q)	−0.05 *2*	I_γ: others: 7 *1* (1988Va06), 6 (1968Wo01).

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
								δ: from 1988Va06. A_2=+0.28 *2* (1988Va06).
9176.0	3/2	2839.3	0.9	6336.6		D(+Q)	+0.01 *2*	I_γ: other: 1.1 *5* (1988Va06). δ: from 1988Va06. A_2=−0.46 *3* (1988Va06).
		3503.4	8.4	5672.4	5/2			I_γ: others: 7 *1* (1988Va06), 7 (1968Wo01).
		3616.9	2.6	5558.9	3/2	D(+Q)	0.00 *2*	I_γ: other: 2 *1* (1988Va06). δ: from 1988Va06. A_2=+0.38 *3* (1988Va06).
		3918.9	0.6	5256.8				
		4160.8	7.6	5014.9	(1/2,3/2)	D(+Q)	0.00 *1*	I_γ: others: 7 *1* (1988Va06), 8 (1968Wo01). δ: from 1988Va06. A_2=−0.47 *2* (1988Va06).
		4583.1	2.0	4592.5	3/2			I_γ: other: 1 (1968Wo01).
		5669.3	0.9	3506.1	$3/2^+$			
		5880.4	6.1	3295.0	$5/2^+$	D+Q	+0.06 *2*	I_γ: others: 5 *1* (1988Va06), 5 (1968Wo01). δ: from 1988Va06. A_2=−0.16 *2* (1988Va06).
		6941.4	9.9	2233.8	$5/2^+$	D+Q	+0.11 *2*	I_γ: others: 8 *1* (1988Va06), 13 (1968Wo01). Mult.,δ: from 1988Va06. Other: +0.16 *7* (1966Va07). γγ(θ): A_2=+0.26 *10*, A_4=+0.07 *11* (1966Va07); A_2=−0.22 *2* (1988Va06).
		7908.8	3.2	1266.13	$3/2^+$	D+Q	+0.05 *2*	I_γ: others: 3 *1* (1988Va06), 2 (1968Wo01). δ: from 1988Va06. A_2=+0.45 *2* (1988Va06).
		9174.5	49	0.0	$1/2^+$	D+Q	+0.07 *1*	I_γ: others: 53 *3* (1988Va06), 57 (1968Wo01). Mult.,δ: from 1988Va06. Other: −0.088 *5* or 2.15 *1* (1966Va07). A_2=−0.32 *1*, A_4=+0.00 *1* (1966Va07); A_2=−0.36 *2* (1988Va06).
9206.1	7/2	3314.0	2.9	5891.9	$^+$			
		3675.9	4.8	5530.0				
		3862.9	1.7	5342.9				
		4190.9	8.2	5014.9	(1/2,3/2)			I_γ: other: 6 (1968Wo01).
		4422.4	3.0	4783.4	$5/2^+$			
		4571.5	0.6	4634.2	(5/2,7/2)			
		5014.8	1.5	4190.9	$5/2^+$			
		5910.5	64	3295.0	$5/2^+$	D+Q	+0.10 *8*	Mult.,δ: from 1966Va07. I_γ: other: 81 (1968Wo01). γγ(θ): A_2=+0.38 *7*, A_4=+0.08 *8* (1966Va07).
		6971.5	6.1	2233.8	$5/2^+$			I_γ: other: 7 (1968Wo01).
		7938.9	6.5	1266.13	$3/2^+$			I_γ: other: 6 (1968Wo01).
		9204.6	0.7	0.0	$1/2^+$			
9226.3	1/2	2085.1	1.3	7141.1				
		2615.8	2.4	6610.4				
		2730.1	2.8	6496.1				

$^{31}_{15}P_{16}$-34

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9226.3	1/2	2845.4	1.8	6380.8				
		4211.1	20	5014.9	(1/2,3/2)			
		5719.6	4.7	3506.1	$3/2^+$			
		6091.4	1	3134.3	$1/2^+$			I_γ: from 1968Wo01 only.
		7959.1	57	1266.13	$3/2^+$	D+Q		δ: δ=0.12 *4* or −2.3 *2* from 1966Va07. I_γ: other: 58 (1968Wo01). $\gamma\gamma(\theta)$: A_2=−0.23 *6*, A_4=+0.06 *6* (1966Va07).
		9224.8	10	0.0	$1/2^+$			I_γ: other: 10 (1968Wo01).
9240.7	3/2	2630.2	1.2	6610.4				
		2744.5	0.5	6496.1				
		3568.1	0.8	5672.4	5/2			
		3681.6	2.6	5558.9	3/2			
		4124.4	5.2	5116.0				
		4225.5	6.5	5014.9	(1/2,3/2)			
		4457.0	16	4783.4	$5/2^+$			
		4647.8	0.7	4592.5	3/2			
		4979.9	3.5	4260.4	$3/2^+$			
		5049.4	1.7	4190.9	$5/2^+$			
		5734.0	2.8	3506.1	$3/2^+$			
		5945.1	1.3	3295.0	$5/2^+$			
		6105.8	5.6	3134.3	$1/2^+$			
		7006.0	21	2233.8	$5/2^+$	D+Q	+0.14 *3*	Mult.,δ: from $\gamma\gamma(\theta)$ (1968Bo13).
		7973.5	0.6	1266.13	$3/2^+$			
		9239.2	30	0.0	$1/2^+$	D+Q		A_2=+0.16 *1*, A_4=−0.01 *1* (1968Bo13). δ: −0.36 *1* or +5.55 *7* (1968Bo13).
9252.9		3206.3	8.0	6046.4				
		3360.8	7.5	5891.9	$^+$			
		3479.2	1.9	5773.5				
		3722.7	18	5530.0				
		3909.7	3.2	5342.9				
		4136.6	4.2	5116.0				
		4469.2	2.6	4783.4	$5/2^+$			
		4618.3	1.3	4634.2	(5/2,7/2)			
		5837.7	51	3414.6	$7/2^+$			
		7018.2	0.4	2233.8	$5/2^+$			
		7985.7	0.2	1266.13	$3/2^+$			
		9251.4	1.7	0.0	$1/2^+$			
9255.9		2759.7	4.5	6496.1				
		3209.3	4.1	6046.4				
		3363.8	5.0	5891.9	$^+$			
		3482.2	1.7	5773.5				
		3583.3	0.5	5672.4	5/2			
		3725.7	14	5530.0				
		3912.7	3.6	5342.9				

$^{31}_{15}P_{16}$-35

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9255.9		4139.6	3.6	5116.0				
		4472.2	2.5	4783.4	$5/2^+$			
		4621.3	1.1	4634.2	(5/2,7/2)			
		4824.3	1.4	4431.2	$7/2^-$			
		5064.6	4.8	4190.9	$5/2^+$			
		5840.7	40	3414.6	$7/2^+$			
		5960.3	6.1	3295.0	$5/2^+$			
		7021.2	4.8	2233.8	$5/2^+$			
		7988.7	0.2	1266.13	$3/2^+$			
		9254.4	2.1	0.0	$1/2^+$			
9290.8	3/2	2149.6	1.1	7141.1				
		2448.8	0.4	6841.9				
		2909.9	1.2	6380.8				
		3731.7	0.5	5558.9	3/2			
		4033.7	1.0	5256.8				
		4275.6	2.0	5014.9	(1/2,3/2)			
		5030.0	5.3	4260.4	$3/2^+$			
		5784.1	8.4	3506.1	$3/2^+$			
		5995.2	1.0	3295.0	$5/2^+$			
		6155.8	19	3134.3	$1/2^+$	D+Q		A_2=−0.73 *8*, A_4=+0.37 *13* (1975De31). δ: −0.05 *4* or −1.54 *10* (1975De31).
		7056.1	10	2233.8	$5/2^+$	D+Q		A_2=−0.18 *12*, A_4=−0.13 *18* (1975De31). δ: +0.18 *2* or −5.7 *5* (1975De31).
		8023.6	2.1	1266.13	$3/2^+$			
		9289.3	48	0.0	$1/2^+$	D+Q		A_2=−0.76 *4*, A_4=+0.14 *7* (1975De31). δ: −0.18 *2* or −1.19 *4* (1975De31).
9319.5	3/2	2409.8	0.5	6909.6				
		2823.3	6.8	6496.1				
		2858.6	1.7	6460.8				
		4304.3	11	5014.9	(1/2,3/2)			
		4726.6	0.9	4592.5	3/2			
		5058.7	5.3	4260.4	$3/2^+$			
		5812.8	0.8	3506.1	$3/2^+$			
		6184.5	36	3134.3	$1/2^+$			
		8052.2	25	1266.13	$3/2^+$			
		9318.0	12	0.0	$1/2^+$	D+Q	+0.27 *1*	A_2=+0.01 *2*, A_4=−0.02 *2* (1968Bo13). δ(Q/D)=−0.27 *1* or +3.75 *12* (1968Bo13), with preference for the lower value.
9358.1		2240.1	6.4	7117.9				
		2856.2	1.9	6501.8				
		3466.0	7.6	5891.9	+			
		3584.4	4.5	5773.5				
		3827.8	24	5530.0				
		4014.9	9.0	5342.9				
		4241.8	0.4	5116.0				

$^{31}_{15}P_{16}$-36

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π
9358.1		4342.9	2.3	5014.9	(1/2,3/2)
		4574.3	0.8	4783.4	$5/2^+$
		4723.5	13	4634.2	(5/2,7/2)
		4926.5	4.7	4431.2	$7/2^-$
		5166.7	4.4	4190.9	$5/2^+$
		5851.4	0.8	3506.1	$3/2^+$
		5942.9	0.6	3414.6	$7/2^+$
		6062.5	1.9	3295.0	$5/2^+$
		6223.1	4.6	3134.3	$1/2^+$
		7123.4	1.5	2233.8	$5/2^+$
		8090.8	0.6	1266.13	$3/2^+$
		9356.6	11	0.0	$1/2^+$
9360.8		2429.3	3.3	6931.4	(5/2,7/2)
		2518.8	2.2	6841.9	
		2766.4	1.9	6594.3	
		2858.9	2.1	6501.8	
		2961.6	7.3	6399.0	7/2
		3281.8	7.5	6078.8	
		3468.7	1.3	5891.9	+
		3587.1	2.2	5773.5	
		3688.2	1.4	5672.4	5/2
		3830.5	1.4	5530.0	
		4244.5	1.5	5116.0	
		4345.6	1.3	5014.9	(1/2,3/2)
		4726.2	3.5	4634.2	(5/2,7/2)
		4929.2	2.1	4431.2	$7/2^-$
		5169.4	4.7	4190.9	$5/2^+$
		5854.1	0.5	3506.1	$3/2^+$
		6065.2	47	3295.0	$5/2^+$
		6225.8	2.0	3134.3	$1/2^+$
		8093.5	0.4	1266.13	$3/2^+$
		9359.3	6.4	0.0	$1/2^+$
9399.7		2319.7	1.3	7079.9	
		3018.7	0.5	6380.8	
		3062.9	0.7	6336.6	
		3840.5	1.3	5558.9	3/2
		4384.5	1.9	5014.9	(1/2,3/2)
		4806.8	1.3	4592.5	3/2
		5138.8	15	4260.4	$3/2^+$
		5893.0	8.7	3506.1	$3/2^+$
		6264.7	26	3134.3	$1/2^+$
		7165.0	0.3	2233.8	$5/2^+$
		8132.4	17	1266.13	$3/2^+$
		9398.2	26	0.0	$1/2^+$

$^{31}_{15}$P$_{16}$-37

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9412.4	7/2$^-$	3013.2	1.4	6399.0	7/2			
		3520.3	0.9	5891.9	$^+$			
		3739.8	1.4	5672.4	5/2			
		4069.2	1.8	5342.9				
		4296.1	1.0	5116.0				
		4628.6	1.1	4783.4	5/2$^+$			
		4777.8	0.9	4634.2	(5/2,7/2)			
		4980.8	87	4431.2	7/2$^-$			
		5221.0	0.4	4190.9	5/2$^+$			
		5997.2	0.8	3414.6	7/2$^+$	D(+Q)	+0.02 *3*	A_2=+0.45 *2*, A_4=+0.01 *12* (2002Vo17). δ: −0.02 *3* (2002Vo17).
		7177.7	2.9	2233.8	5/2$^+$			
		8145.1	0.2	1266.13	3/2$^+$			
		9410.9	0.2	0.0	1/2$^+$			
9440.8	3/2	2979.8	0.6	6460.8				
		3059.8	4.0	6380.8				
		3104.0	0.8	6336.6				
		3452.7	2.0	5987.9				
		4324.5	2.9	5116.0				
		4425.6	2.1	5014.9	(1/2,3/2)			
		4847.9	1.9	4592.5	3/2			
		5179.9	12	4260.4	3/2$^+$			
		5249.4	12	4190.9	5/2$^+$			
		6145.1	16	3295.0	5/2$^+$			
		6305.8	3.7	3134.3	1/2$^+$			
		7206.1	6.0	2233.8	5/2$^+$			
		8173.5	8.0	1266.13	3/2$^+$			
		9439.3	28	0.0	1/2$^+$	D+Q		A_2=−0.15 *1*, A_4=−0.01 *1* (1968Bo13). δ: −0.18 *1* or +2.75 *4* (1968Bo13).
9448.9	5/2	2987.9	2.9	6460.8				
		3067.9	11	6380.8				
		3889.7	2.1	5558.9	3/2			
		3918.6	9.3	5530.0				
		4332.6	5.0	5116.0				
		4665.1	16	4783.4	5/2$^+$			
		4814.3	2.3	4634.2	(5/2,7/2)			
		4856.0	6.0	4592.5	3/2			
		5188.0	1.1	4260.4	3/2$^+$			
		5257.5	4.7	4190.9	5/2$^+$			
		5942.2	1.0	3506.1	3/2$^+$			
		6033.7	9.5	3414.6	7/2$^+$			
		6153.2	1.5	3295.0	5/2$^+$			
		7214.2	5.7	2233.8	5/2$^+$			

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9448.9	5/2	8181.6	21	1266.13	3/2$^+$	D+Q	+0.13 *2*	A_2=+0.01 *1* (1968Bo13). δ: from 1968Bo13.
		9447.4	0.9	0.0	1/2$^+$			
9476.9		2545.4	0.9	6931.4	(5/2,7/2)			
		2974.9	0.6	6501.8				
		3243.3	1.2	6233.4				
		3584.8	2.0	5891.9	$^+$			
		3703.2	0.4	5773.5				
		4133.7	1.7	5342.9				
		4360.6	0.7	5116.0				
		4842.3	4.0	4634.2	(5/2,7/2)			
		5045.3	1.5	4431.2	7/2$^-$			
		5285.5	10	4190.9	5/2$^+$			
		5970.2	1.9	3506.1	3/2$^+$			
		6061.7	2.3	3414.6	7/2$^+$			
		6181.2	11	3295.0	5/2$^+$			
		7242.2	45	2233.8	5/2$^+$			
		8209.6	5.8	1266.13	3/2$^+$			
		9475.3	11	0.0	1/2$^+$			
9524.6	3/2$^+$	3063.6	1.4	6460.8				
		3143.6	3.3	6380.8				
		3750.9	9.7	5773.5				
		3965.4	1.9	5558.9	3/2			
		4408.3	4.6	5116.0				
		4740.8	0.6	4783.4	5/2$^+$			
		4890.0	0.3	4634.2	(5/2,7/2)			
		4931.7	2.8	4592.5	3/2			
		5092.9	9.1	4431.2	7/2$^-$			
		5333.2	32	4190.9	5/2$^+$	M1+E2	−0.58 *4*	Mult.,δ: D+Q from $\gamma\gamma(\theta)$ (1968Bo13); E1+M2 ruled out based on measured strength and RUL.
		6017.9	11	3506.1	3/2$^+$			
		6109.4	2.5	3414.6	7/2$^+$			
		7289.9	0.5	2233.8	5/2$^+$			
		8257.3	8.3	1266.13	3/2$^+$			
		9523.0	12	0.0	1/2$^+$	D+Q	+1.7 *10*	A_2=+1.30 *27*, A_4=−0.12 *17* (1968Bo13). δ: −1.7 *10* (1968Bo13).
9536.4	5/2	1849.1	2.3	7687.2?				
		2418.4	1.1	7117.9				
		2452.3	6.5	7084.0				
		2712.1	4.9	6824.2				
		3081.5	15	6454.7				
		3457.4	6.0	6078.8				
		3644.3	2.1	5891.9	$^+$			
		4006.1	1.1	5530.0				

$^{31}_{15}P_{16}$-39

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9536.4	5/2	4193.2	7.5	5342.9				
		4420.1	0.7	5116.0				
		4521.1	0.6	5014.9	(1/2,3/2)			
		4901.8	9.5	4634.2	(5/2,7/2)			
		5104.7	16	4431.2	$7/2^-$			
		6029.7	1.8	3506.1	$3/2^+$			
		6121.2	2.9	3414.6	$7/2^+$			
		6240.7	2.9	3295.0	$5/2^+$			
		7301.7	0.8	2233.8	$5/2^+$	D+Q	−0.03 *1*	A_2=+0.38 *1*, A_4=+0.02 *1* (1968Bo13). δ: from 1968Bo13.
		8269.1	9.2	1266.13	$3/2^+$			
		9534.8	9.1	0.0	$1/2^+$			
9570.5	3/2	2660.8	0.3	6909.6				
		3582.4	0.1	5987.9				
		4555.2	1.3	5014.9	(1/2,3/2)			
		6063.8	1.6	3506.1	$3/2^+$			
		6435.5	4.2	3134.3	$1/2^+$			A_2=+0.09 *11*, A_4=+0.12 *13*, A_6=+0.15 *14* (2009Ka37).
		7335.8	0.6	2233.8	$5/2^+$			
		8303.2	1.9	1266.13	$3/2^+$			A_2=+0.12 *12*, A_4=+0.09 *13*, A_6=+0.07 *12* (2009Ka37).
		9568.9	90	0.0	$1/2^+$	D+Q		A_2=−0.04 *1*, A_4=0.00 *1* (1968Bo13). A_2=+0.01 *11*, A_4=+0.04 *12*, A_6=+0.08 *13* (2009Ka37). δ: −0.24 *1* or +3.43 *3* (1968Bo13).
9577.8	7/2	2646.3	2.6	6931.4	(5/2,7/2)			
		2967.2	0.4	6610.4				
		3178.6	0.6	6399.0	7/2			
		4461.5	3.5	5116.0				
		4562.5	4.2	5014.9	(1/2,3/2)			
		4943.2	5.8	4634.2	(5/2,7/2)			
		5146.1	4.2	4431.2	$7/2^-$			
		5386.4	6.3	4190.9	$5/2^+$			
		6282.1	15	3295.0	$5/2^+$			
		6442.8	1.1	3134.3	$1/2^+$			
		7343.1	52	2233.8	$5/2^+$	D(+Q)	−0.04 *2*	δ: from $\gamma\gamma(\theta)$ (1968Bo13).
		8310.5	4.3	1266.13	$3/2^+$			
9585.0	3/2	2443.8	1.2	7141.1				
		3204.0	0.6	6380.8				
		3248.2	1.8	6336.6				
		3596.9	1.1	5987.9				
		4025.8	1.3	5558.9	3/2			
		4327.9	1.2	5256.8				
		4569.7	6.5	5014.9	(1/2,3/2)			
		6078.3	2.6	3506.1	$3/2^+$			
		6289.3	1.0	3295.0	$5/2^+$			
		6450.0	21	3134.3	$1/2^+$			

$^{31}_{15}P_{16}$-40

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9585.0	3/2	7350.3	3.7	2233.8	$5/2^+$			
		8317.7	18	1266.13	$3/2^+$	D+Q	+0.36 *2*	A_2=−0.10 *3*, A_4=0.00 *4* (1975De31). δ: −0.36 *2* (1975De31).
		9583.4	40	0.0	$1/2^+$	D(+Q)		A_2=−0.62 *4*, A_4=+0.11 *6* (1975De31). δ: 0.00 *2* or +1.73 *7* (1975De31).
9593.8	3/2	3212.8	3.9	6380.8				
		3921.1	0.7	5672.4	5/2			
		4578.5	2.8	5014.9	(1/2,3/2)			
		4810.0	5.5	4783.4	$5/2^+$			
		5402.4	3.3	4190.9	$5/2^+$			
		6087.1	3.9	3506.1	$3/2^+$			
		6298.1	0.5	3295.0	$5/2^+$			
		6458.8	1.4	3134.3	$1/2^+$			
		7359.1	3.0	2233.8	$5/2^+$			
		8326.5	37	1266.13	$3/2^+$	D(+Q)	−0.01 *3*	Mult.,δ: from $\gamma\gamma(\theta)$ (1968Bo13).
		9592.2	38	0.0	$1/2^+$			
9598.5	3/2	3199.3	1.0	6399.0	7/2			
		4583.2	5.2	5014.9	(1/2,3/2)			
		5005.6	3.0	4592.5	3/2			
		5166.8	2.4	4431.2	$7/2^-$			
		5337.6	3.8	4260.4	$3/2^+$			
		5407.1	0.8	4190.9	$5/2^+$			
		6091.8	1.3	3506.1	$3/2^+$			
		6302.8	5.5	3295.0	$5/2^+$			
		6463.5	2.4	3134.3	$1/2^+$			
		7363.8	7.6	2233.8	$5/2^+$			
		8331.2	28	1266.13	$3/2^+$	D+Q	+0.84 *6*	A_2=−0.51 *3*, A_4=+0.10 *4* (1975De31). δ: −0.84 *6* (1975De31).
		9596.9	39	0.0	$1/2^+$	D(+Q)		A_2=−0.55 *3*, A_4=+0.14 *3* (1975De31). δ: 0.00 *2* or +1.73 *7* (1975De31).
9611.9		3230.9	4.0	6380.8				
		3719.8	1.0	5891.9	$^+$			
		4081.6	3.0	5530.0				
		4495.6	3.4	5116.0				
		4828.1	8.5	4783.4	$5/2^+$			
		4977.3	1.6	4634.2	(5/2,7/2)			
		5420.5	2.5	4190.9	$5/2^+$			
		6196.6	1.0	3414.6	$7/2^+$			
		6316.2	16	3295.0	$5/2^+$			
		7377.2	13	2233.8	$5/2^+$			
		8344.6	36	1266.13	$3/2^+$			A_2=+0.22 *2*, A_4=−0.10 *3* (1975De31), consistent with ΔJ=2.
		9610.3	10	0.0	$1/2^+$			A_2=−0.21 *7*, A_4=0.00 *10* (1975De31).
9720.5	1/2	2602.5	1.6	7117.9				
		3218.5	1.5	6501.8				

$^{31}_{15}P_{16}$-41

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	Comments
9720.5	1/2	3265.6	2.1	6454.7			
		3321.3	1.9	6399.0	7/2		
		3673.9	7.5	6046.4			
		3946.7	0.5	5773.5			
		4047.8	2.0	5672.4	5/2		
		4377.3	0.5	5342.9			
		4463.4	0.6	5256.8			
		4705.2	4	5014.9	(1/2,3/2)		
		4936.7	0.5	4783.4	$5/2^+$		
		5085.9	0.4	4634.2	(5/2,7/2)		
		5127.5	0.5	4592.5	3/2		
		5288.8	2.1	4431.2	$7/2^-$		
		5459.6	8.0	4260.4	$3/2^+$		A_2=+0.04 *11*, A_4=+0.35 *13*, A_6=+0.10 *12* (2009Ka37).
		5529.1	1.0	4190.9	$5/2^+$		
		6213.7	14	3506.1	$3/2^+$		A_2=+0.23 *26*, A_4=+0.24 *28*, A_6=+0.2 *3* (2009Ka37).
		6305.2	1.5	3414.6	$7/2^+$		
		6424.8	1.5	3295.0	$5/2^+$		
		6585.4	0.6	3134.3	$1/2^+$		
		7485.7	7.7	2233.8	$5/2^+$		A_2=+0.29 *11*, A_4=+0.07 *12*, A_6=+0.13 *14* (2009Ka37).
		8453.1	15	1266.13	$3/2^+$	D+Q	δ: +0.07 *3* or −2.05 *15* from $\gamma\gamma(\theta)$ (1968Bo13). A_2=+0.39 *14*, A_4=+0.04 *13*, A_6=+0.005 *14* (2009Ka37).
		9718.9	25	0.0	$1/2^+$		A_2=+0.09 *14*, A_4=+0.09 *15*, A_6=+0.12 *16* (2009Ka37).
9756.5	5/2	2846.8	1	6909.6			
		3357.3	1	6399.0	7/2		
		3375.5	1	6380.8			
		3864.3	2	5891.9	$^+$		
		4972.7	1	4783.4	$5/2^+$		
		5324.8	4	4431.2	$7/2^-$		
		5565.1	2	4190.9	$5/2^+$		
		6249.7	3	3506.1	$3/2^+$		
		6341.2	5	3414.6	$7/2^+$		
		6621.4	1	3134.3	$1/2^+$		
		7521.7	12	2233.8	$5/2^+$		
		8489.1	58	1266.13	$3/2^+$	D	δ: 0.00 *2* from $\gamma\gamma(\theta)$ (1968Bo13).
		9754.9	9	0.0	$1/2^+$		
9760.4	5/2	4087.7	2	5672.4	5/2		
		4644.0	2	5116.0			
		5125.7	4	4634.2	(5/2,7/2)		
		5167.4	3	4592.5	3/2		
		5328.7	1	4431.2	$7/2^-$		
		6253.6	1	3506.1	$3/2^+$		
		6345.1	1	3414.6	$7/2^+$		
		7525.6	15	2233.8	$5/2^+$		
		8493.0	71	1266.13	$3/2^+$	D	δ: 0.00 *2* from $\gamma\gamma(\theta)$ (1968Bo13).

$^{31}_{15}P_{16}$-42

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
9765.2	3/2	3154.6	2	6610.4				
		4206.0	2	5558.9	3/2			
		4648.8	1	5116.0				
		4749.9	4	5014.9	(1/2,3/2)			
		5172.2	6	4592.5	3/2			
		5573.8	5	4190.9	$5/2^+$			
		6469.5	4	3295.0	$5/2^+$			
		6630.1	2	3134.3	$1/2^+$			
		7530.4	8	2233.8	$5/2^+$			
		8497.8	51	1266.13	$3/2^+$	D+Q	−0.24 *2*	A_2=+0.03 *1*, A_4=0.00 *1* (1968Bo13). δ: from 1968Bo13.
		9763.5	15	0.0	$1/2^+$			
9843.6	3/2	3444.4	1	6399.0	7/2			
		3951.4	1	5891.9	$^+$			
		5059.8	5	4783.4	$5/2^+$			
		5250.6	6	4592.5	3/2			
		5411.9	1	4431.2	$7/2^-$			
		5582.7	3	4260.4	$3/2^+$			
		5652.1	6	4190.9	$5/2^+$			
		6336.8	4	3506.1	$3/2^+$			
		6547.9	4	3295.0	$5/2^+$			
		6708.5	1	3134.3	$1/2^+$			
		7608.8	27	2233.8	$5/2^+$			
		8576.2	26	1266.13	$3/2^+$	D(+Q)	+0.01 *4*	δ: from γγ(θ) (1968Bo13).
		9841.9	15	0.0	$1/2^+$	D+Q	+0.65 *2*	A_2=+0.54 *2*, A_4=+0.03 *2* (1968Bo13). δ: −0.65 *2* (1968Bo13).
9852.3	(7/2)	3618.7	11	6233.4				
		3960.1	3	5891.9	$^+$			
		5660.8	18	4190.9	$5/2^+$			
		6437.0	15	3414.6	$7/2^+$			
		6556.6	2	3295.0	$5/2^+$			
		7617.5	51	2233.8	$5/2^+$	D+Q	+0.27 *2*	δ: from γγ(θ) (1968Bo13).
9865.8	7/2	3363.8	10	6501.8				
		4092.0	3	5773.5				
		4749.4	2	5116.0				
		5082.0	2	4783.4	$5/2^+$			
		5674.3	6	4190.9	$5/2^+$			
		6570.1	11	3295.0	$5/2^+$			
		7631.0	66	2233.8	$5/2^+$	D+Q	+0.01 *1*	δ: from γγ(θ) (1968Bo13).
9867.8	3/2	4610.6	3	5256.8				
		4852.5	4	5014.9	(1/2,3/2)			
		5606.9	2	4260.4	$3/2^+$			
		5676.3	5	4190.9	$5/2^+$			
		6361.0	8	3506.1	$3/2^+$			

$^{31}_{15}P_{16}$-43

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
9867.8	3/2	6572.1	2	3295.0	$5/2^+$			
		6732.7	10	3134.3	$1/2^+$			
		7633.0	10	2233.8	$5/2^+$			
		8600.4	8	1266.13	$3/2^+$			
		9866.1	48	0.0	$1/2^+$	D+Q		A_2=−0.37 *2*, A_4=−0.04 *2* (1968Bo13). δ: −0.04 *1* or +1.90 *2* (1968Bo13).
9907.5	(1/2,3/2,5/2)	3296.9	1	6610.4				I_γ: intensity of γ-rays from the doublet not separated.
		3673.9	1	6233.4				I_γ: intensity of γ-rays from the doublet not separated.
		4015.3	1	5891.9	+			I_γ: intensity of γ-rays from the doublet not separated.
		4133.7	7	5773.5				I_γ: intensity of γ-rays from the doublet not separated.
		4892.2	8	5014.9	(1/2,3/2)			I_γ: intensity of γ-rays from the doublet not separated.
		5272.8	3	4634.2	(5/2,7/2)			I_γ: intensity of γ-rays from the doublet not separated.
		6400.7	3	3506.1	$3/2^+$			I_γ: intensity of γ-rays from the doublet not separated.
		6492.2	23	3414.6	$7/2^+$			I_γ: intensity of γ-rays from the doublet not separated.
		6611.7	3	3295.0	$5/2^+$			I_γ: intensity of γ-rays from the doublet not separated.
		6772.4	4	3134.3	$1/2^+$			I_γ: intensity of γ-rays from the doublet not separated.
		7672.7	6	2233.8	$5/2^+$			I_γ: intensity of γ-rays from the doublet not separated.
		8640.1	2	1266.13	$3/2^+$			I_γ: intensity of γ-rays from the doublet not separated.
		9905.8	38	0.0	$1/2^+$	D+Q		A_2=−0.49 *1*, A_4=0.00 *1* (1968Bo13). δ: +0.02 *1* or +1.64 *2* (1968Bo13). I_γ: intensity of γ-rays from the doublet not separated.
9925.8	3/2	3331.3	4	6594.3				
		3544.8	5	6380.8				
		3937.6	3	5987.9				
		4366.6	2	5558.9	3/2			
		4809.4	4	5116.0				
		4910.5	6	5014.9	(1/2,3/2)			
		5141.9	6	4783.4	$5/2^+$			
		5332.8	6	4592.5	3/2			
		5494.1	6	4431.2	$7/2^-$			
		5664.8	9	4260.4	$3/2^+$			
		5734.3	9	4190.9	$5/2^+$			
		6419.0	2	3506.1	$3/2^+$			
		6510.5	5	3414.6	$7/2^+$			
		6630.0	4	3295.0	$5/2^+$			
		6790.7	5	3134.3	$1/2^+$			
		7691.0	9	2233.8	$5/2^+$			
		8658.4	2	1266.13	$3/2^+$			
		9924.1	13	0.0	$1/2^+$	D+Q	+0.60 *1*	A_2=+0.48 *2*, A_4=0.04 *2* (1968Bo13). δ: −0.60 *1* (1968Bo13).
9941.3		4268.6	17 &	5672.4	5/2			
		4684.1	10 &	5256.8				
		5509.6	15 &	4431.2	$7/2^-$			

$^{31}_{15}P_{16}$-44

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
9941.3		6806.2	18 &	3134.3	$1/2^+$			
		7706.5	40 &	2233.8	$5/2^+$			
10019.7	5/2	3409.1	1	6610.4				
		4460.5	5	5558.9	3/2			
		4903.3	1	5116.0				
		5235.8	3	4783.4	$5/2^+$			
		5758.7	4	4260.4	$3/2^+$			
		6512.9	3	3506.1	$3/2^+$			
		6604.3	8	3414.6	$7/2^+$			
		6723.9	9	3295.0	$5/2^+$			
		7784.8	31	2233.8	$5/2^+$			
		8752.2	33	1266.13	$3/2^+$	D+Q	−0.11 *2*	δ: from $\gamma\gamma(\theta)$ (1968Bo13).
		10018.0	2	0.0	$1/2^+$			
10046.8	5/2	3647.6	1	6399.0	7/2			
		5031.5	3	5014.9	(1/2,3/2)			
		5615.1	6	4431.2	$7/2^-$			
		5785.8	8	4260.4	$3/2^+$			
		6751.0	16	3295.0	$5/2^+$			
		7811.9	3	2233.8	$5/2^+$			
		8779.3	63	1266.13	$3/2^+$	D+Q	−0.03 *2*	δ: from $\gamma\gamma(\theta)$ (1968Bo13).
10075.8		4545.4	50 &	5530.0				
		6569.0	50 &	3506.1	$3/2^+$			
10089.4		4197.2	23 &	5891.9	$^+$			
		5454.7	8 &	4634.2	(5/2,7/2)			
		5496.4	8 &	4592.5	3/2			
		6582.5	6 &	3506.1	$3/2^+$			
		6674.0	9 &	3414.6	$7/2^+$			
		8821.9	40 &	1266.13	$3/2^+$			
		10087.6	6 &	0.0	$1/2^+$			
10099.1		3718.1	7	6380.8				
		4110.9	1	5987.9				
		4206.9	2	5891.9	$^+$			
		5083.8	8	5014.9	(1/2,3/2)			
		5315.2	13	4783.4	$5/2^+$			
		5506.1	10	4592.5	3/2			
		5667.3	11	4431.2	$7/2^-$			
		5838.1	1	4260.4	$3/2^+$			
		5907.6	1	4190.9	$5/2^+$			
		6592.2	1	3506.1	$3/2^+$			
		6683.7	2	3414.6	$7/2^+$			
		6803.3	5	3295.0	$5/2^+$			

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
10099.1		7864.2	25	2233.8	5/2$^+$			
		8831.6	10	1266.13	3/2$^+$			E_γ: 8829 *1* (1968Bo13).
		10097.3	3	0.0	1/2$^+$			
10144.5		3683.5	25[&]	6460.8				
		5551.5	<5[&]	4592.5	3/2			
		5953.0	10[&]	4190.9	5/2$^+$			
		6729.1	19[&]	3414.6	7/2$^+$			
		7909.6	24[&]	2233.8	5/2$^+$			
		8877.0	19[&]	1266.13	3/2$^+$			
		10142.7	3[&]	0.0	1/2$^+$			
10193.0	3/2	4300.8	1[@]	5891.9	$^+$			
		4520.2	1[@]	5672.4	5/2			
		4633.7	1[@]	5558.9	3/2			
		4935.8	1[@]	5256.8				
		5409.1	1[@]	4783.4	5/2$^+$			
		5932.0	5[@]	4260.4	3/2$^+$			
		6001.5	4[@]	4190.9	5/2$^+$			
		6777.6	1[@]	3414.6	7/2$^+$			
		6897.2	12[@]	3295.0	5/2$^+$			
		7958.1	3[@]	2233.8	5/2$^+$			
		8925.5	66[@]	1266.13	3/2$^+$	D(+Q)	+0.02 *7*	A_2=+0.37 *2*, A_4=−0.03 *2* (1969Wi02). δ: −0.14 *2* (1968Bo13), −0.02 *7* (1969Wi02).
		10191.2	4[@]	0.0	1/2$^+$			
10210.4	3/2	7975.5	40	2233.8	5/2$^+$			
		8942.9	50	1266.13	3/2$^+$	D+Q	−0.27 *3*	A_2=−0.03 *1*, A_4=+0.02 *2* (1969Wi02).
		10208.6	10	0.0	1/2$^+$	D+Q	+0.11 *3*	A_2=−0.28 *2*, A_4=+0.02 *2* (1969Wi02).
10212	7/2	7977	20	2233.8	5/2$^+$	D+Q	−0.05 *2*	A_2=−0.42 *1*, A_4=−0.01 *1* (1969Wi02).
		8944	40	1266.13	3/2$^+$			
		10210	40	0.0	1/2$^+$			
10225	7/2	4695	3[@]	5530.0				
		5441	4[@]	4783.4	5/2$^+$			
		5793	5[@]	4431.2	7/2$^-$			
		6033	10[@]	4190.9	5/2$^+$			
		7990	51[@]	2233.8	5/2$^+$	D+Q	+0.04 *2*	A_2=−0.081 *13*, A_4=−0.009 *7* (1969Wi02). δ: from $\gamma\gamma(\theta)$ (1968Bo13).
		8957	27[@]	1266.13	3/2$^+$			
		10223	5	0.0	1/2$^+$			A_2=+0.29 *10*, A_4=−0.47 *14* for doublet (1969Wi02).

$^{31}_{15}P_{16}$-46

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
10232	5/2	7997	40	2233.8	5/2$^+$			
		8964	50	1266.13	3/2$^+$	D(+Q)	−0.05 *6*	A_2=−0.44 *4*, A_4=0.00 *4* (1969Wi02).
		10230	10	0.0	1/2$^+$			
10267	3/2	8032	50	2233.8	5/2$^+$			
		8999	40	1266.13	3/2$^+$	D(+Q)	−0.04 *9*	A_2=+0.27 *3*, A_4=0.02 *2* (1969Wi02).
		10265	10	0.0	1/2$^+$			
10271	3/2	8036	60	2233.8	5/2$^+$			
		9003	30	1266.13	3/2$^+$	D+Q	−0.12 *2*	A_2=+0.19 *1*, A_4=0.00 *2* (1969Wi02).
		10269	10	0.0	1/2$^+$			
10288	5/2	8053	70	2233.8	5/2$^+$	D(+Q)	−0.02 *4*	A_2=+0.40 *1*, A_4=−0.06 *2* (1969Wi02).
		9020	20	1266.13	3/2$^+$			
		10286	10	0.0	1/2$^+$	Q		A_2=+0.54 *4*, A_4=−0.40 *5* (1969Wi02).
10304	3/2	8069	60	2233.8	5/2$^+$	D+Q	−0.65 *18*	A_2=+0.25 *2*, A_4=−0.04 *4* (1969Wi02).
		9036	30	1266.13	3/2$^+$			
		10302	10	0.0	1/2$^+$	D+Q	+0.23 *5*	A_2=−0.07 *8*, A_4=+0.09 *10* (1969Wi02).
10335	3/2	8100	70	2233.8	5/2$^+$			
		9067	20	1266.13	3/2$^+$			
		10333	10	0.0	1/2$^+$	D+Q	+0.18 *3*	A_2=−0.18 *10*, A_4=0.00 *10* (1969Wi02).
10385	5/2	8150	60	2233.8	5/2$^+$	D+Q	+0.40 *14*	A_2=+0.61 *4*, A_4=−0.04 *2* (1969Wi02).
		9117	30	1266.13	3/2$^+$			
		10383	10	0.0	1/2$^+$			
10401	5/2	8166	60	2233.8	5/2$^+$	D+Q	+0.23 *18*	A_2=+0.48 *4*, A_4=−0.08 *3* (1969Wi02).
		9133	30	1266.13	3/2$^+$			
		10399	10	0.0	1/2$^+$			
10425	(1/2,3/2)	8190	30	2233.8	5/2$^+$	(D+Q)		A_2+0.05 *15*, A_4=−0.24 *16* (1969Wi02).
		9157	30	1266.13	3/2$^+$			
		10423	40	0.0	1/2$^+$	D+Q		A_2=−0.01 *3*, A_4=+0.01 *4* (1969Wi02).
10455		8220	60	2233.8	5/2$^+$			
		9187	40	1266.13	3/2$^+$			
10483	5/2	8248	70	2233.8	5/2$^+$			
		9215	30	1266.13	3/2$^+$	D+Q	−0.42 *25*	A_2=−0.83 *11*, A_4=−0.18 *10* (1969Wi02).
10485	3/2	8250	30	2233.8	5/2$^+$			
		9217	50	1266.13	3/2$^+$			
		10483	20	0.0	1/2$^+$	D+Q	+0.19 *1*	A_2=−0.14 *4*, A_4=+0.02 *5* (1969Wi02).
10487	3/2	8252	30	2233.8	5/2$^+$			
		9219	30	1266.13	3/2$^+$			
		10485	40	0.0	1/2$^+$	D(+Q)	+0.02 *3*	A_2=−0.44 *4*, A_4=+0.05 *4* (1969Wi02).
10503		8268	60	2233.8	5/2$^+$			
		9235	30	1266.13	3/2$^+$			
		10501	10	0.0	1/2$^+$			
10537	3/2	8302	20	2233.8	5/2$^+$			
		9269	30	1266.13	3/2$^+$			
		10535	50	0.0	1/2$^+$	D+Q	−0.07 *3*	A_2=−0.57 *3*, A_4=−0.01 *4* (1969Wi02).

$^{31}_{15}P_{16}$-47

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
10564	3/2	8329	30	2233.8	$5/2^+$			
		9296	40	1266.13	$3/2^+$			
		10562	30	0.0	$1/2^+$	D+Q	+0.63 *9*	A_2=+0.52 *5*, A_4=−0.05 *6* (1969Wi02).
10607	3/2	8372	60	2233.8	$5/2^+$			
		9339	30	1266.13	$3/2^+$			
		10605	10	0.0	$1/2^+$	D+Q	+0.35 *3*	A_2=+0.14 *3*, A_4=+0.02 *3* (1969Wi02).
10620		8385	50	2233.8	$5/2^+$			
		9352	40	1266.13	$3/2^+$			
		10618	10	0.0	$1/2^+$			
10629		8394	60	2233.8	$5/2^+$			
		9361	30	1266.13	$3/2^+$			
		10627	10	0.0	$1/2^+$			
10645	3/2	8410	40	2233.8	$5/2^+$			
		9377	40	1266.13	$3/2^+$			
		10643	20	0.0	$1/2^+$	D+Q	−0.18 *5*	A_2=−0.71 *4*, A_4=−0.04 *4* (1969Wi02).
10650	5/2	8415	30	2233.8	$5/2^+$			
		9382	60	1266.13	$3/2^+$	D+Q	+0.08 *5*	A_2=−0.56 *7*, A_4=0.00 *5* (1969Wi02).
		10648	10	0.0	$1/2^+$			
10659	3/2	8424	40	2233.8	$5/2^+$			
		9391	40	1266.13	$3/2^+$			
		10657	20	0.0	$1/2^+$	Q+D	−1.04 *9*	A_2=−0.81 *4*, A_4=−0.01 *2* (1969Wi02).
10672	5/2	8437	50	2233.8	$5/2^+$			
		9404	40	1266.13	$3/2^+$	D+Q	+0.06 *5*	A_2=−0.25 *2*, A_4=+0.01 *1* (1969Wi02).
		10670	10	0.0	$1/2^+$			
10698	3/2	8463	20	2233.8	$5/2^+$			
		9430	50	1266.13	$3/2^+$			
		10696	30	0.0	$1/2^+$	D+Q	+0.02 *1*	A_2=−0.40 *3*, A_4=+0.02 *3* (1969Wi02).
10703	3/2	8468	20	2233.8	$5/2^+$			
		9435	50	1266.13	$3/2^+$			
		10701	30	0.0	$1/2^+$	D+Q	+0.09 *1*	A_2=−0.31 *3*, A_4=−0.03 *3* (1969Wi02).
10706	3/2	8471	30	2233.8	$5/2^+$			
		9438	40	1266.13	$3/2^+$			
		10704	30	0.0	$1/2^+$	D+Q	−0.27 *5*	A_2=−0.80 *3*, A_4=+0.05 *5* (1969Wi02).
10717		8482	40	2233.8	$5/2^+$			
		9449	50	1266.13	$3/2^+$			
		10715	10	0.0	$1/2^+$			
10758		8523	60	2233.8	$5/2^+$			
		9490	40	1266.13	$3/2^+$			
10774	3/2	8539	30	2233.8	$5/2^+$			
		9506	40	1266.13	$3/2^+$			
		10772	30	0.0	$1/2^+$	D(+Q)	+0.01 *1*	A_2=−0.43 *2*, A_4=−0.01 *2* (1969Wi02).
10792		8557	100	2233.8	$5/2^+$			level scheme may contain more branches.
10801	3/2	8566	40	2233.8	$5/2^+$			

$^{31}_{15}P_{16}$-48

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

γ(^{31}P) (continued)

E_i(level)	J_i^π	E_γ †	I_γ #	E_f	J_f^π	Mult. [a]	δ [b]	Comments
10801	3/2	9533	30	1266.13	3/2+			
		10799	30	0.0	1/2+	D+Q	+0.05 *1*	A_2=−0.37 *2*, A_4=+0.03 *3* (1969Wi02).
10818	3/2	8583	20	2233.8	5/2+			
		9550	40	1266.13	3/2+	D+Q	−0.34 *8*	A_2=−0.086 *28*, A_4=−0.002 *22* (1969Wi02).
		10816	40	0.0	1/2+	D+Q	+0.27 *2*	A_2=−0.019 *10*, A_4=−0.024 *14* (1969Wi02).
10834	3/2	8599	40	2233.8	5/2+			
		9566	40	1266.13	3/2+			
		10832	20	0.0	1/2+	D+Q	+0.33 *3*	A_2=+0.10 *2*, A_4=−0.02 *3* (1969Wi02) for complex resonance.
10846	(1/2,3/2)	8611	50	2233.8	5/2+			
		9578	40	1266.13	3/2+			A_2=+0.26 *5*, A_4=−0.20 *5* and A_2=+0.15 *1*, A_4=−0.15 *2* from different detector positions in 1969Wi02.
		10844	10	0.0	1/2+			A_2=−0.01 *3*, A_4=−0.03 *5* (1969Wi02).
10857		8622	60	2233.8	5/2+			
		9589	40	1266.13	3/2+			
10882	3/2	8647	50	2233.8	5/2+			
		9614	40	1266.13	3/2+			
		10880	10	0.0	1/2+	D+Q	+0.63 *7*	A_2=+0.50 *10*, A_4=−0.03 *14* (1969Wi02).
10907		8672	50	2233.8	5/2+			A_2=+0.628 *14*, A_4=+0.105 *13* and A_2=−0.363 *15*, A_4=0.00 *3* from different detector positions in (1969Wi02) for complex resonance.
		9639	40	1266.13	3/2+			
		10905	10	0.0	1/2+			A_2=−0.75 *7*, A_4=+0.16 *17* (1969Wi02).
10936		8701	40	2233.8	5/2+			
		9668	30	1266.13	3/2+			
		10934	30	0.0	1/2+			
10948	3/2	8713	30	2233.8	5/2+			
		9680	30	1266.13	3/2+			
		10946	40	0.0	1/2+	D+Q	+0.11 *2*	A_2=−0.27 *2*, A_4=−0.02 *2* (1969Wi02).
10980		8745	60	2233.8	5/2+			
		9712	20	1266.13	3/2+			
		10978	20	0.0	1/2+			
11075	3/2	8840	30	2233.8	5/2+			
		9807	30	1266.13	3/2+			
		11073	40	0.0	1/2+	D+Q	−0.14 *1*	A_2=−0.63 *2*, A_4=0.00 *3* (1969Wi02).
11080		8845	40	2233.8	5/2+			
		9812	30	1266.13	3/2+			
		11078	30	0.0	1/2+			
11119		8884	50	2233.8	5/2+			
		9851	30	1266.13	3/2+			
		11117	20	0.0	1/2+			
11135	3/2	8900	40	2233.8	5/2+			
		9867	40	1266.13	3/2+			
		11133	20	0.0	1/2+	D+Q	+0.51 *2*	A_2=+0.38 *5*, A_4=−0.03 *7* (1969Wi02).
11152		8917	70	2233.8	5/2+			

$^{31}_{15}P_{16}$-49

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01 (continued)

$\gamma(^{31}P)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[#]	E_f	J_f^π	Mult.[a]	δ[b]	Comments
11152		9884	10	1266.13	$3/2^+$			
		11150	20	0.0	$1/2^+$			
11172	5/2	8937	40	2233.8	$5/2^+$			
		9904	40	1266.13	$3/2^+$	D+Q	+0.042 *7*	A_2=−0.442 *7*, A_4=−0.019 *12* (1969Wi02).
		11170	20	0.0	$1/2^+$			

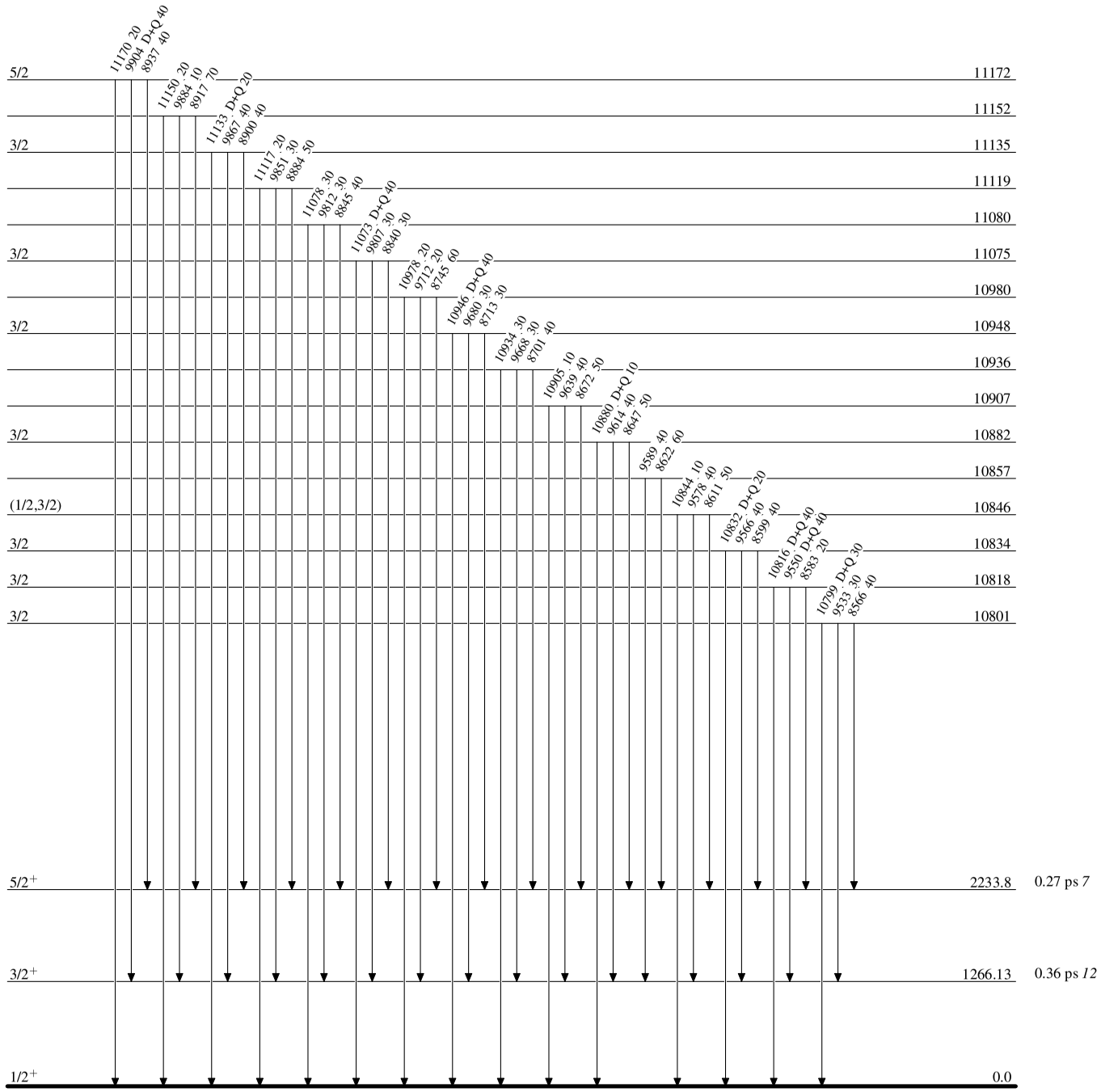
[†] From level-energy differences with recoil correction removed, unless otherwise noted.
[‡] From 2020De26.
[#] Branching ratios from 1975De31 below 9750 level, unless otherwise stated. When a branch was not reported by 1975De31 averages were taken from other studies. Branching ratios for levels between 9750 and 10100 are from 1968Bo13. For levels above 10100 keV, branching ratios are from 1969Wi02.
[@] From 1968Bo13.
[&] From 1967Bo12.
[a] From $\gamma(\theta)$, $\gamma\gamma(\theta)$ and γ(pol) data given under comments. Where there is no γ(pol) data, electric/magnetic character is determined based on RUL and the measured lifetime.
[b] Sign convention for mixing ratios in ENSDF is Krane and Steffen, however authors use a variety of different conventions and often do not state what convention they are using. The mixing ratios listed in comments are as taken directly from the respective work, the mixing ratio that is adopted in the dataset is the evaluators′ best guess as to the convention used. 1969Wo01, 1968Wo01, 1963Le16 conform to Krane and Steffen. 1963Ha25, 2005Vo24 conform to Ferguson and Rutledge. 1967Wi10, 1964Va11, 1966Va08, 1966Ha20 conform to Harris. All the others conform to Rose and Brink convention.
[c] Placement of transition in the level scheme is uncertain.

$^{31}_{15}P_{16}$-50

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme

Intensities: % photon branching from each level

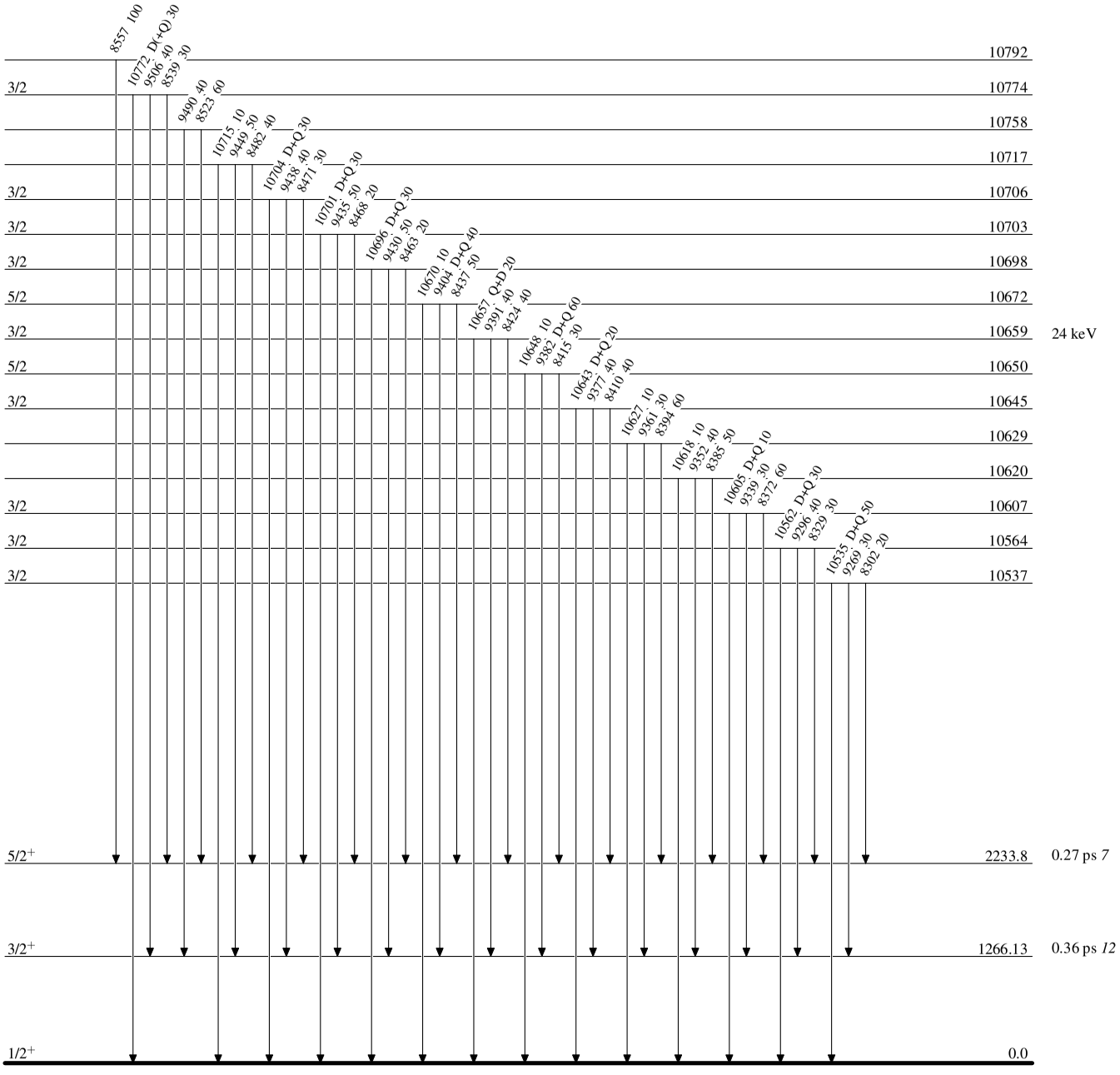


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

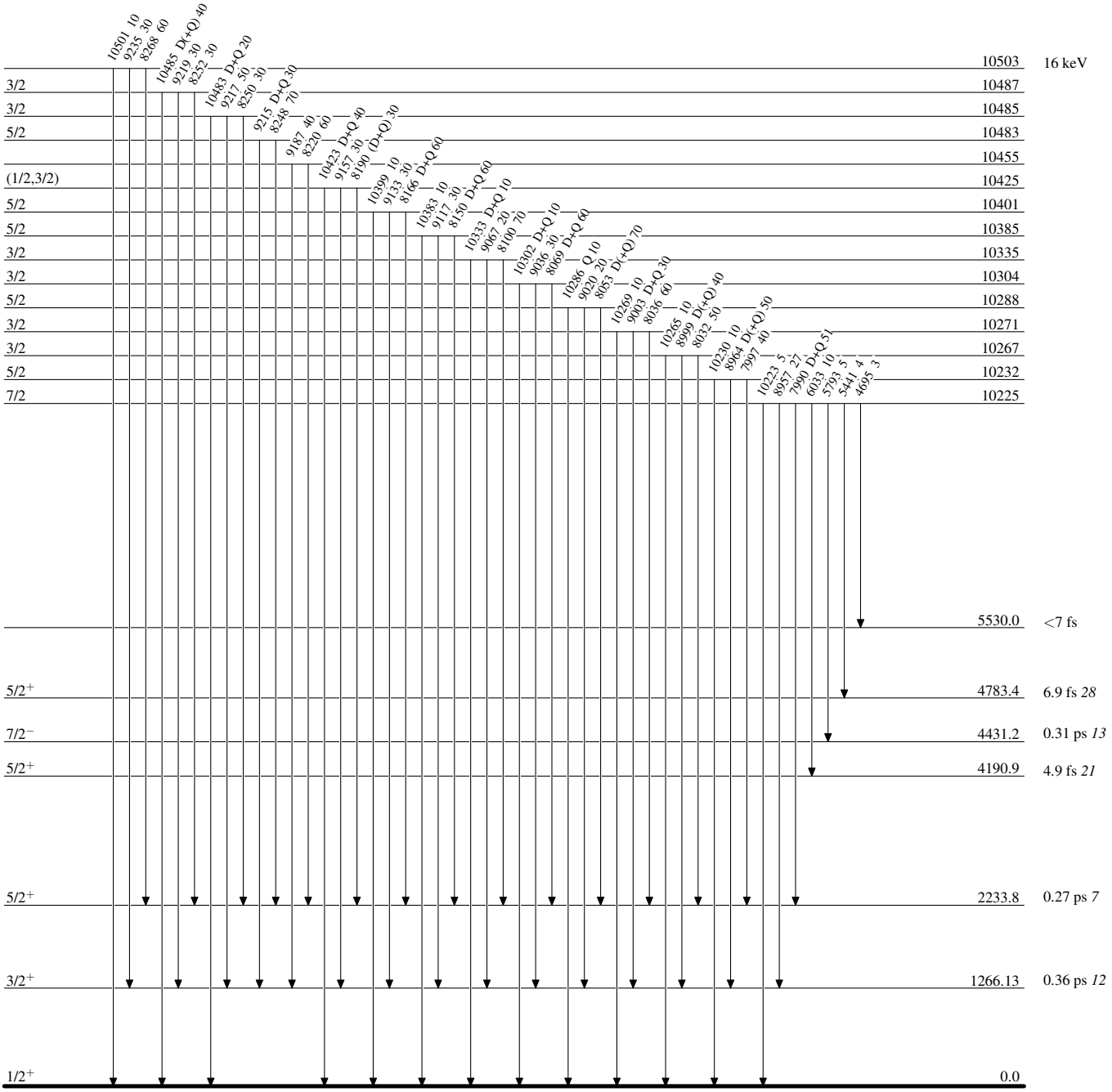


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

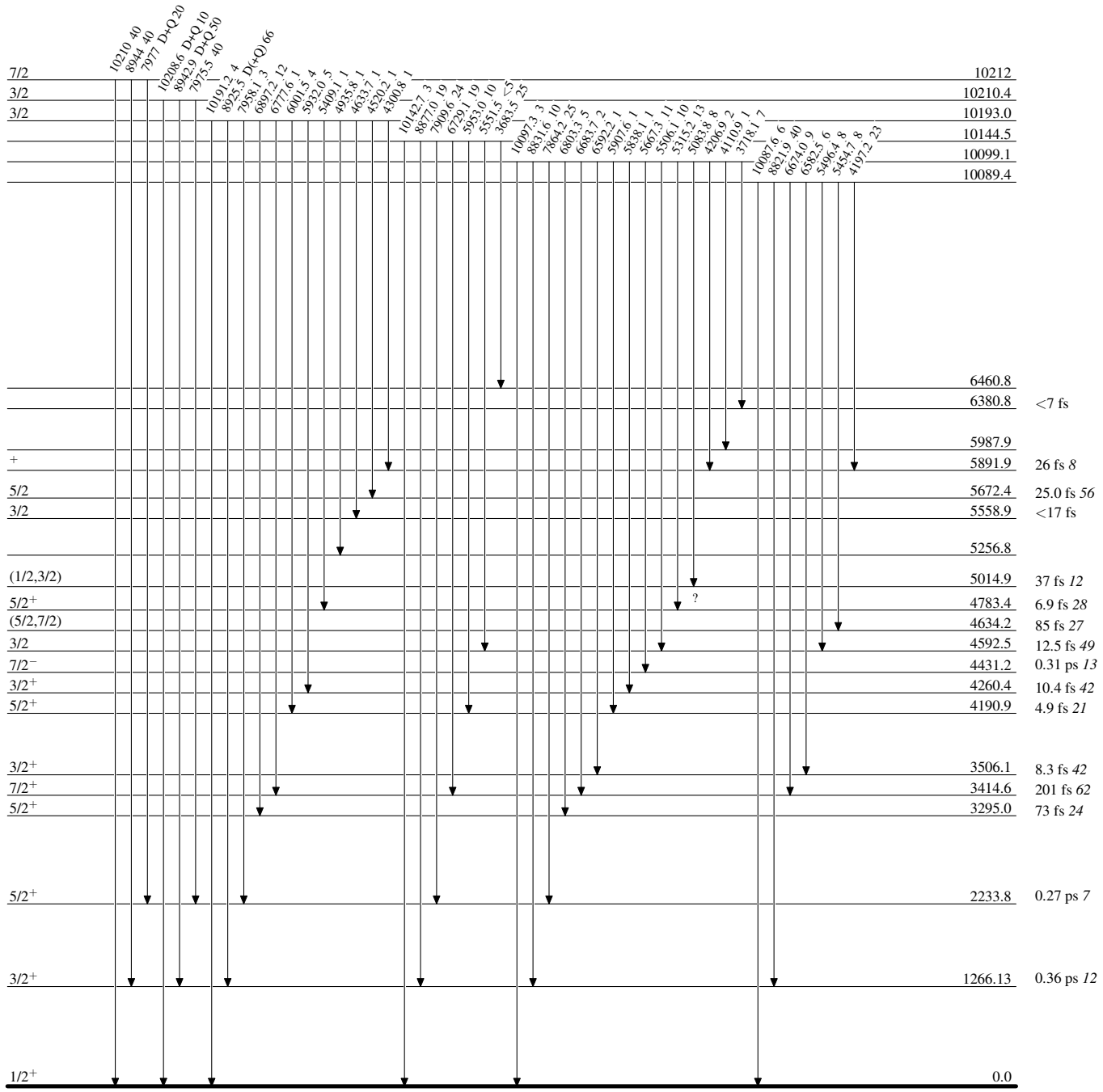


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

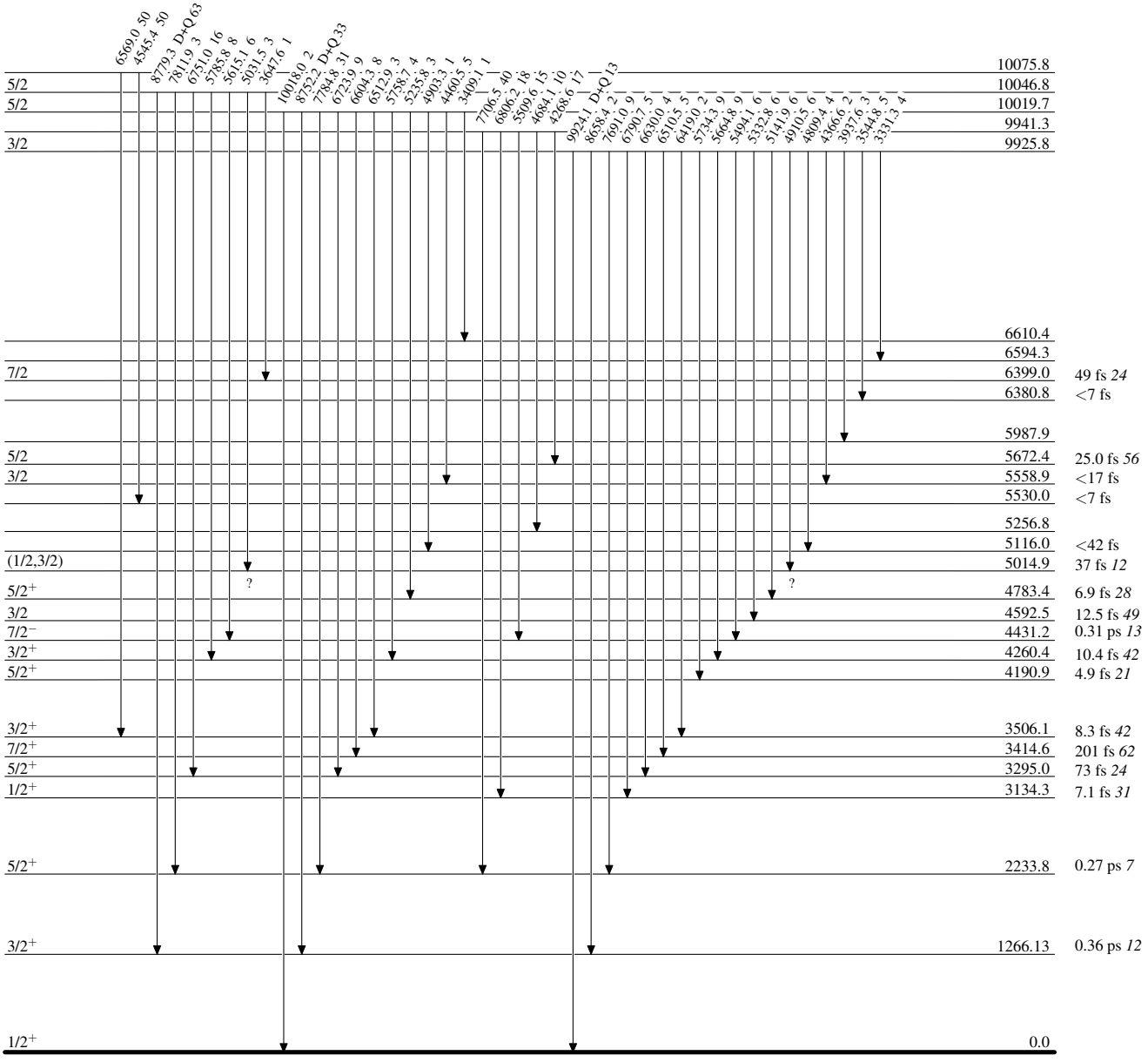


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

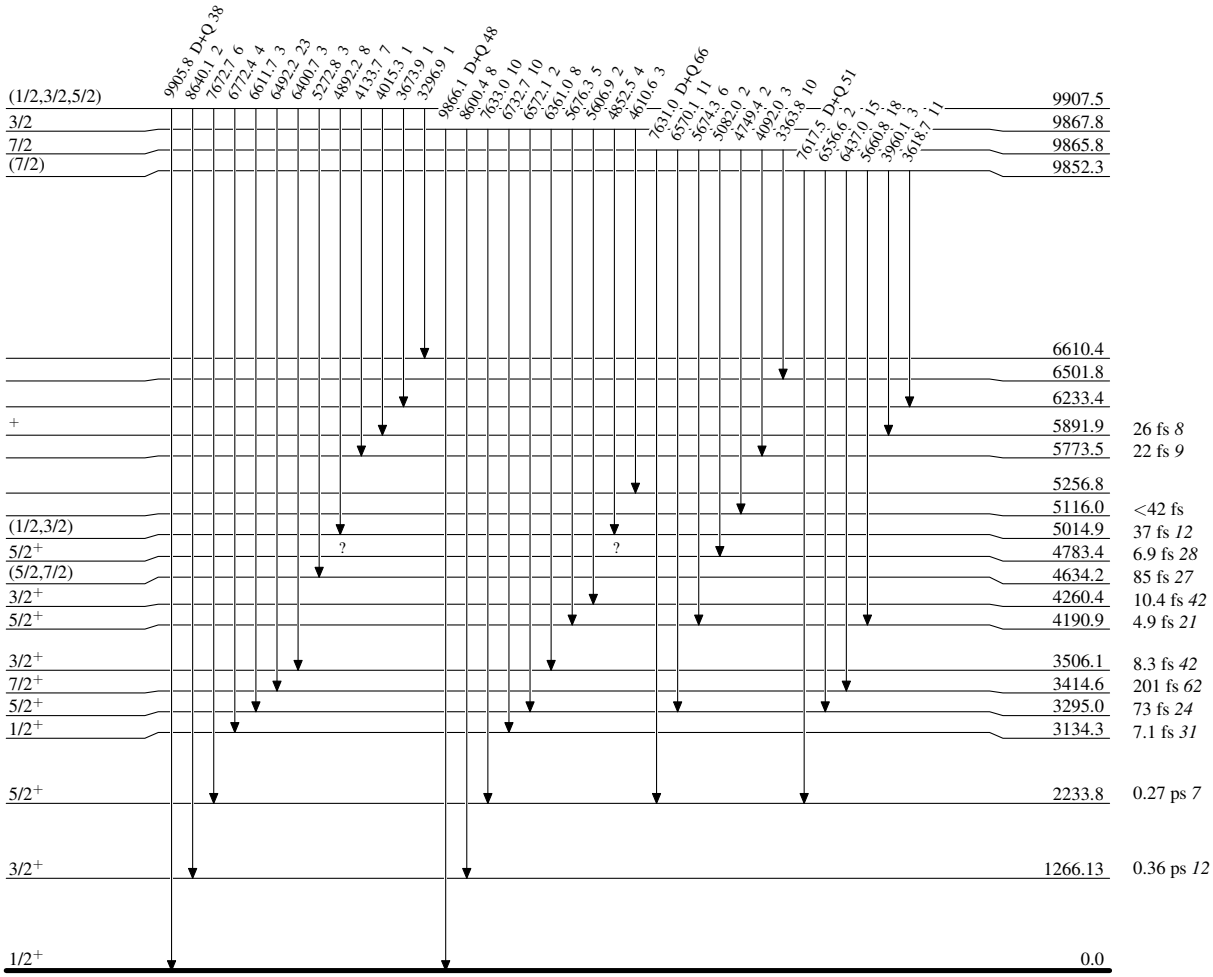


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

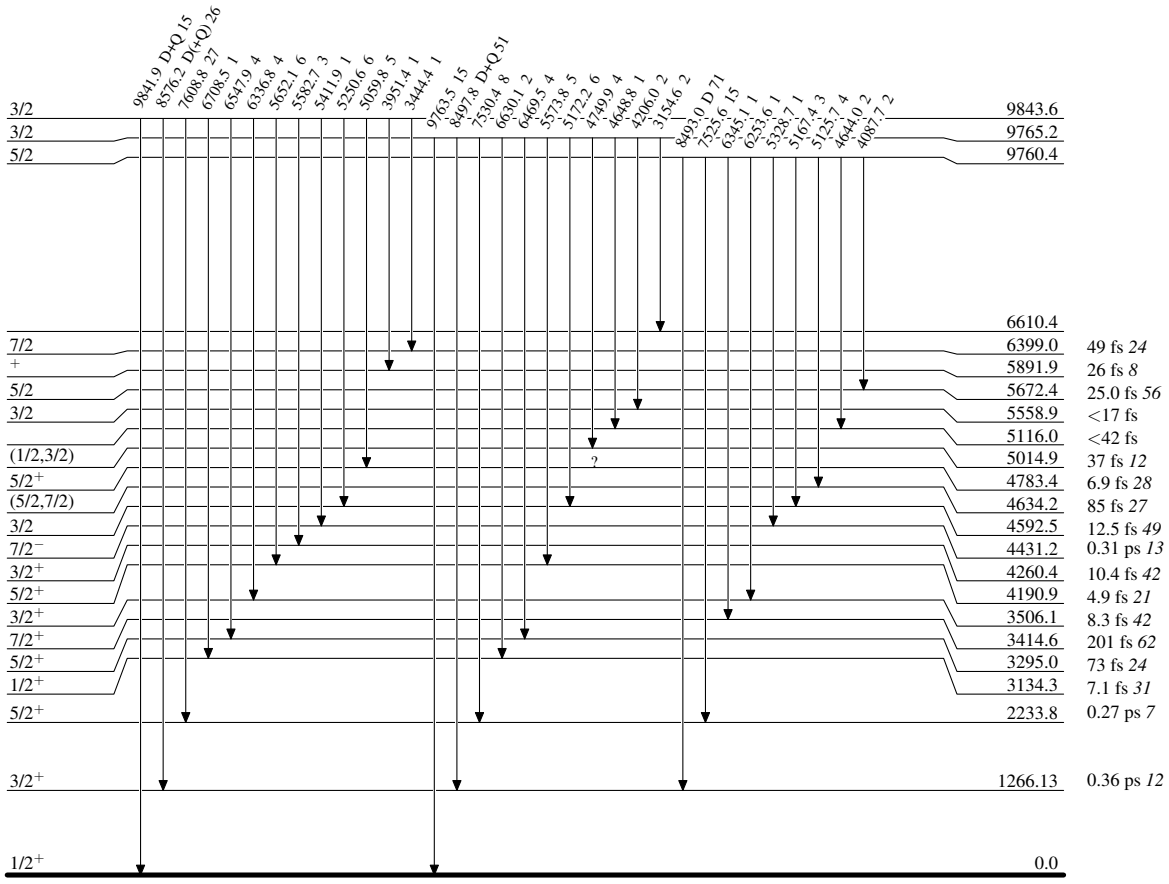


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

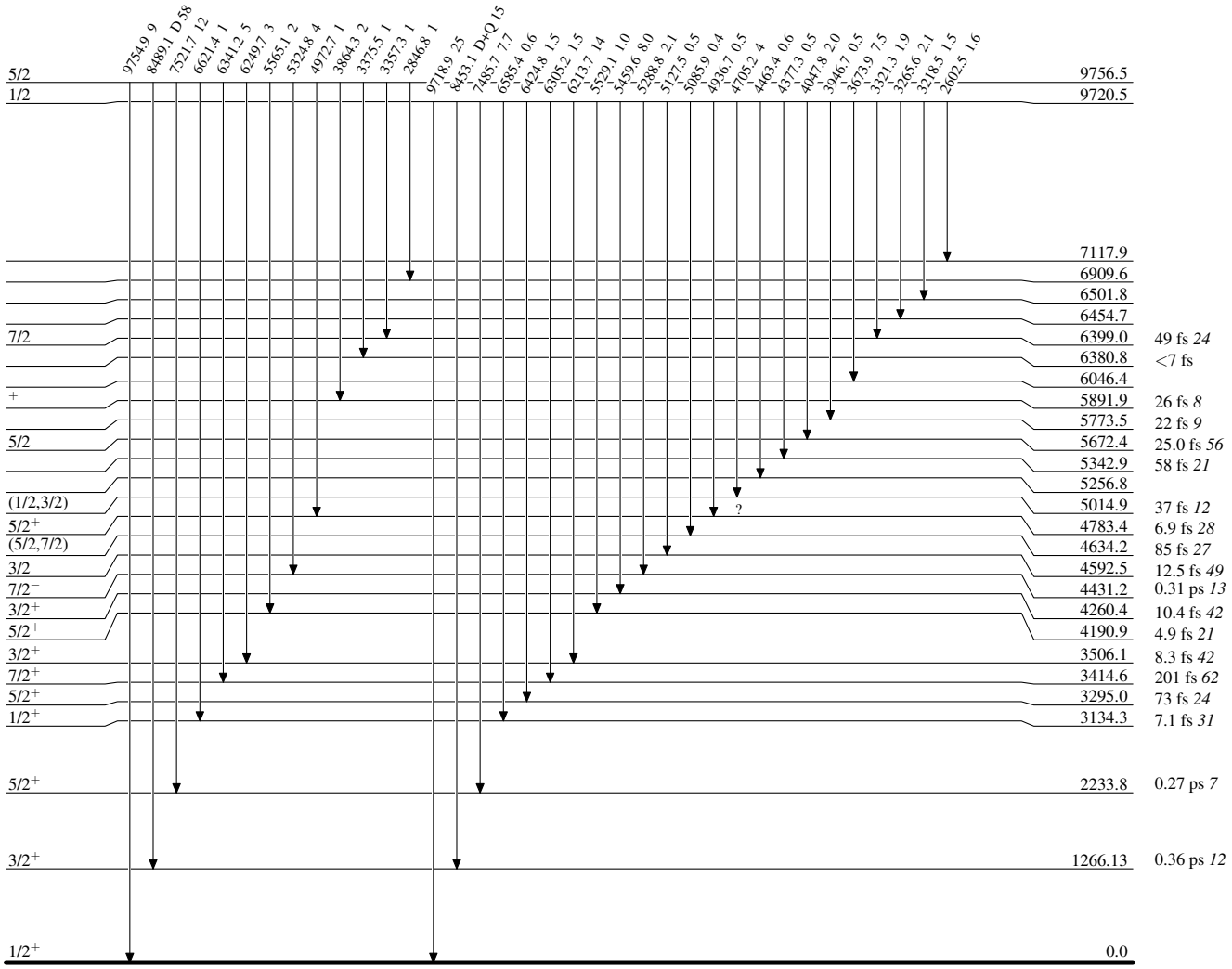


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

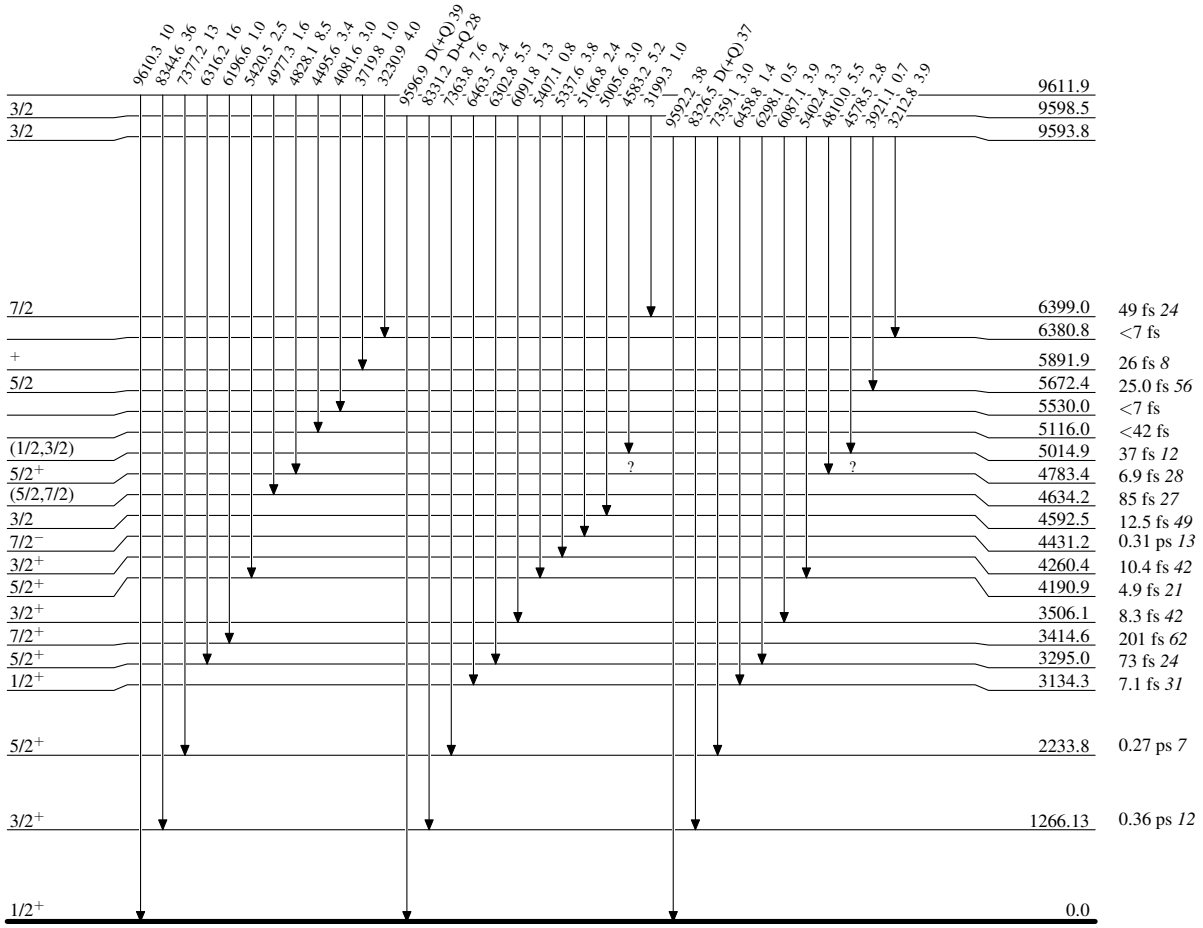


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

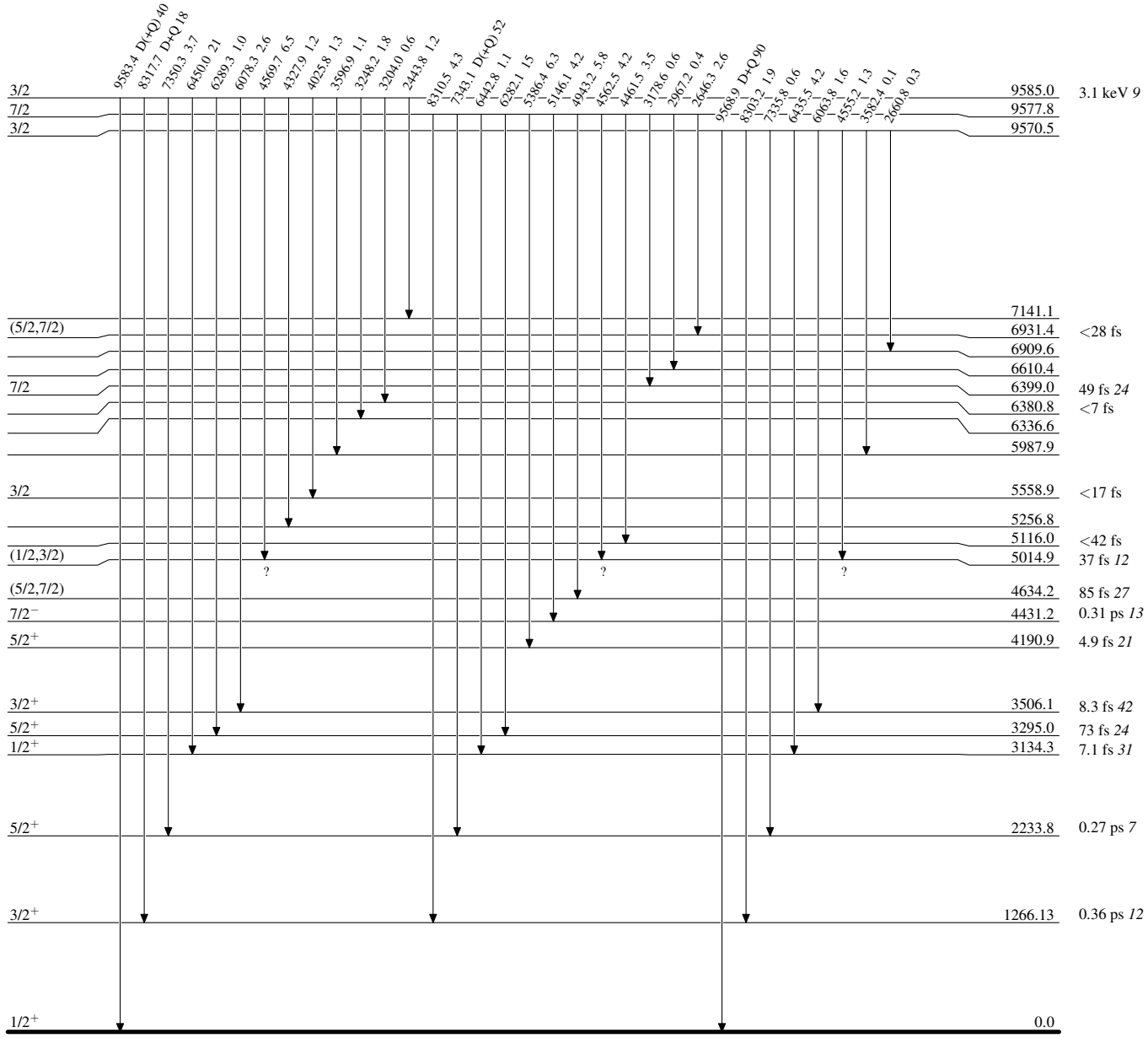


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

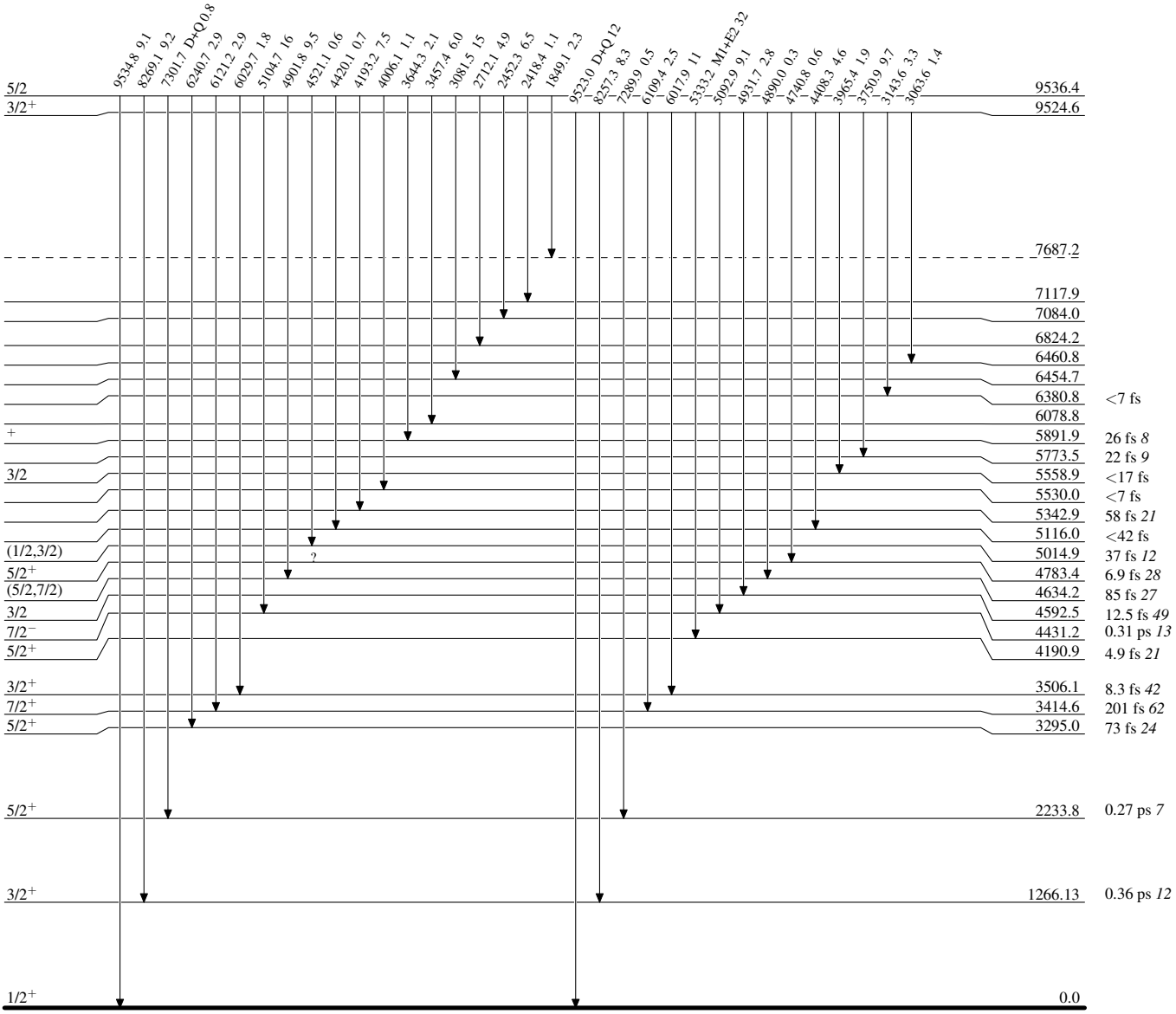


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

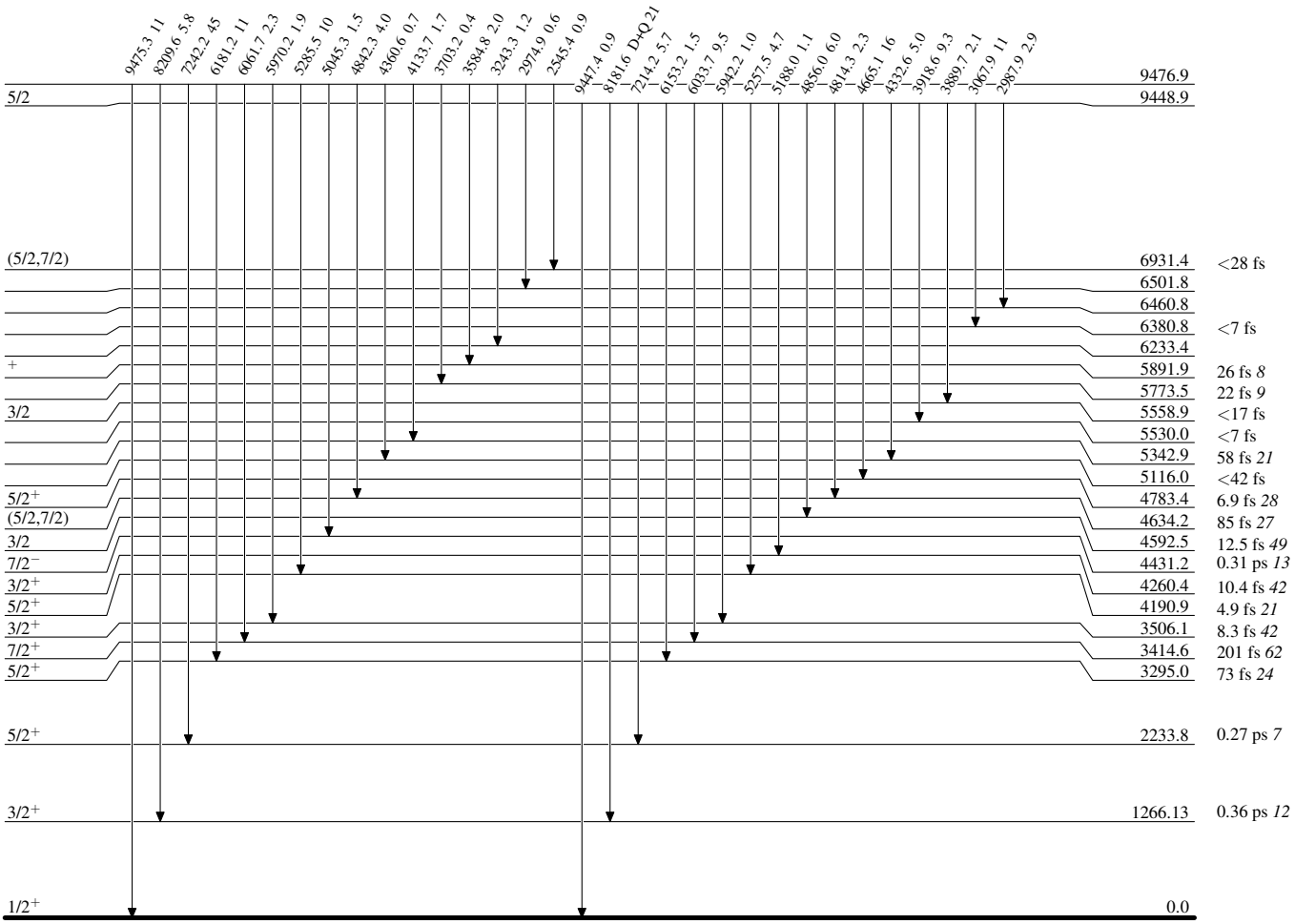


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

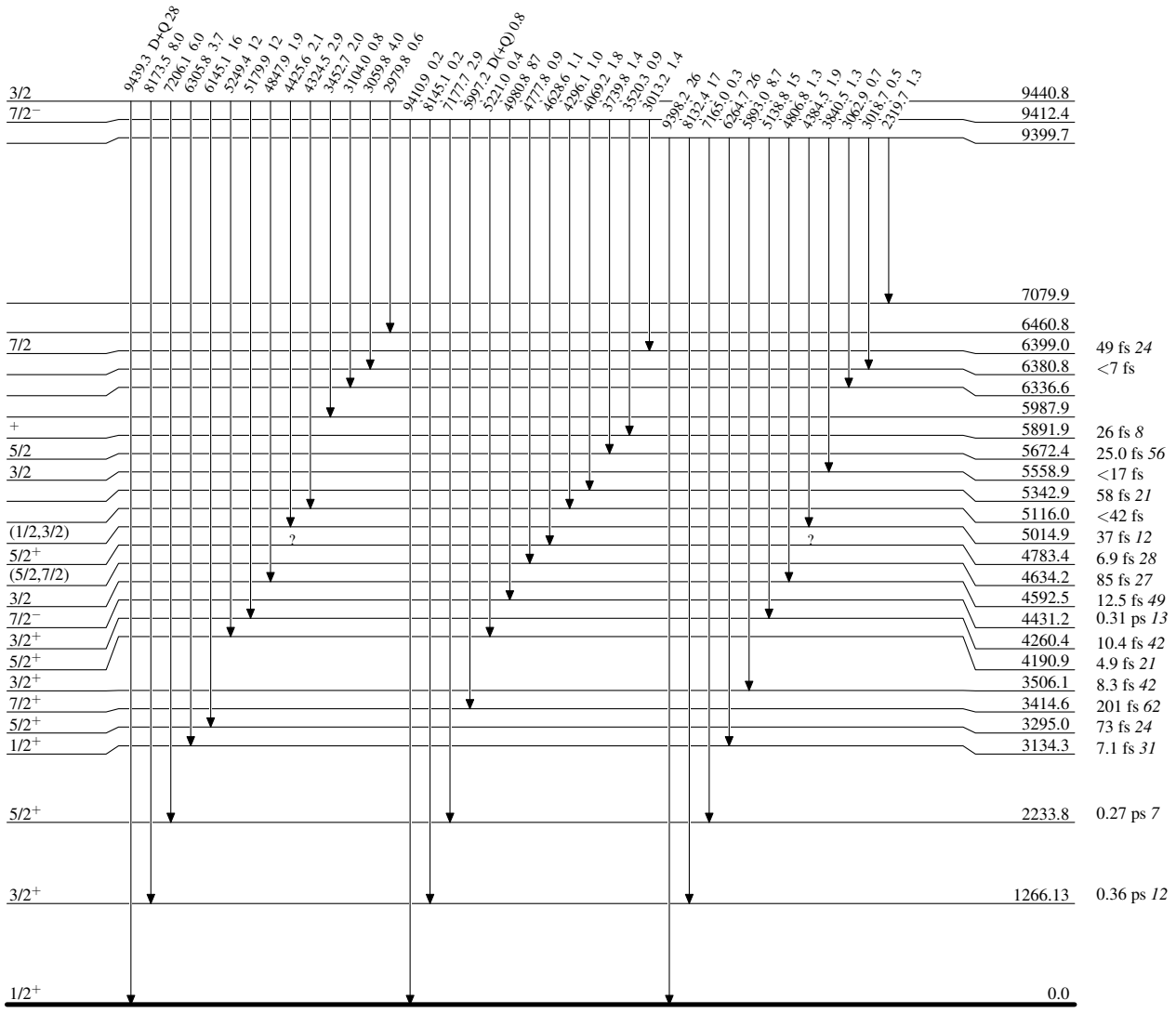


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

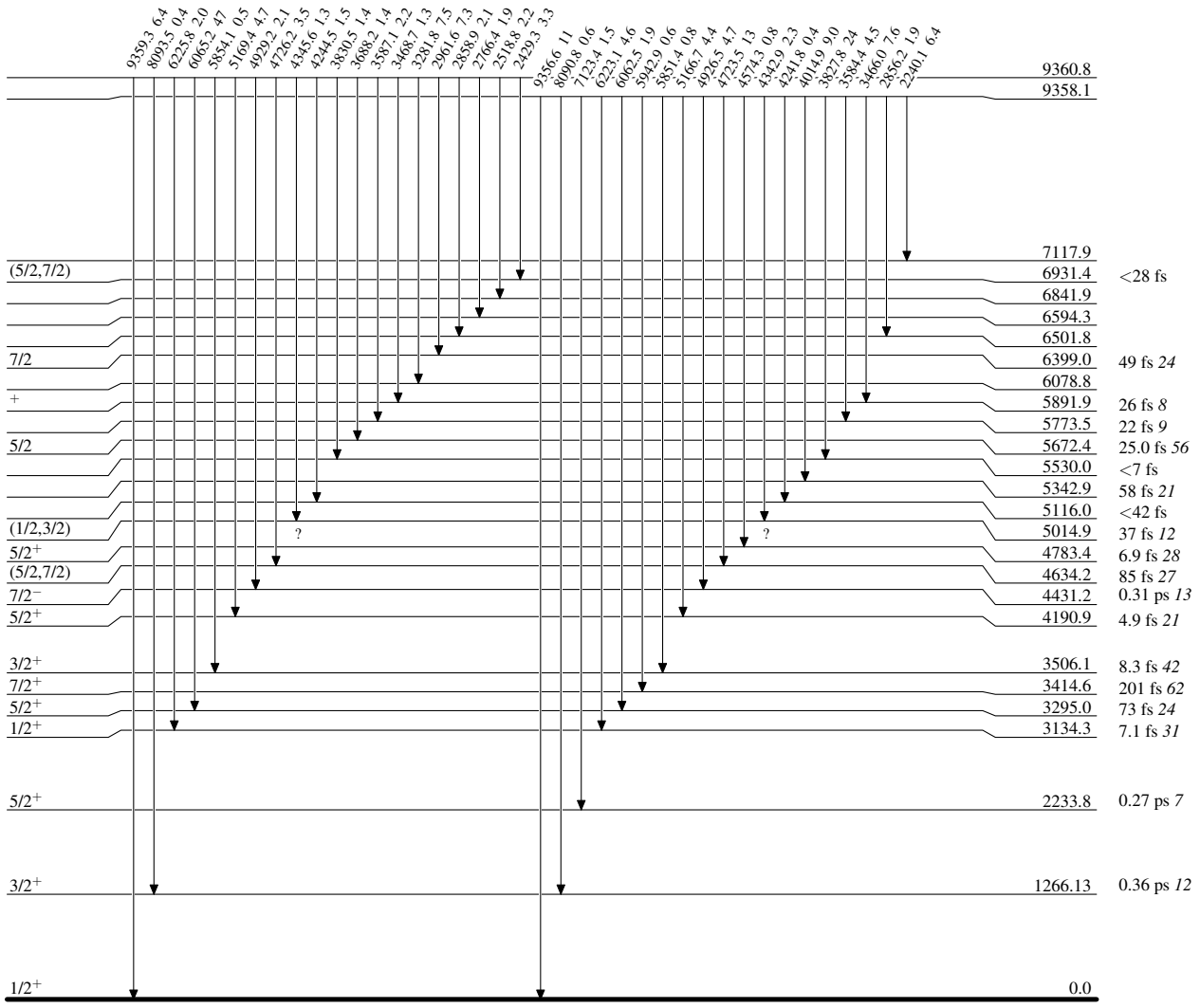


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

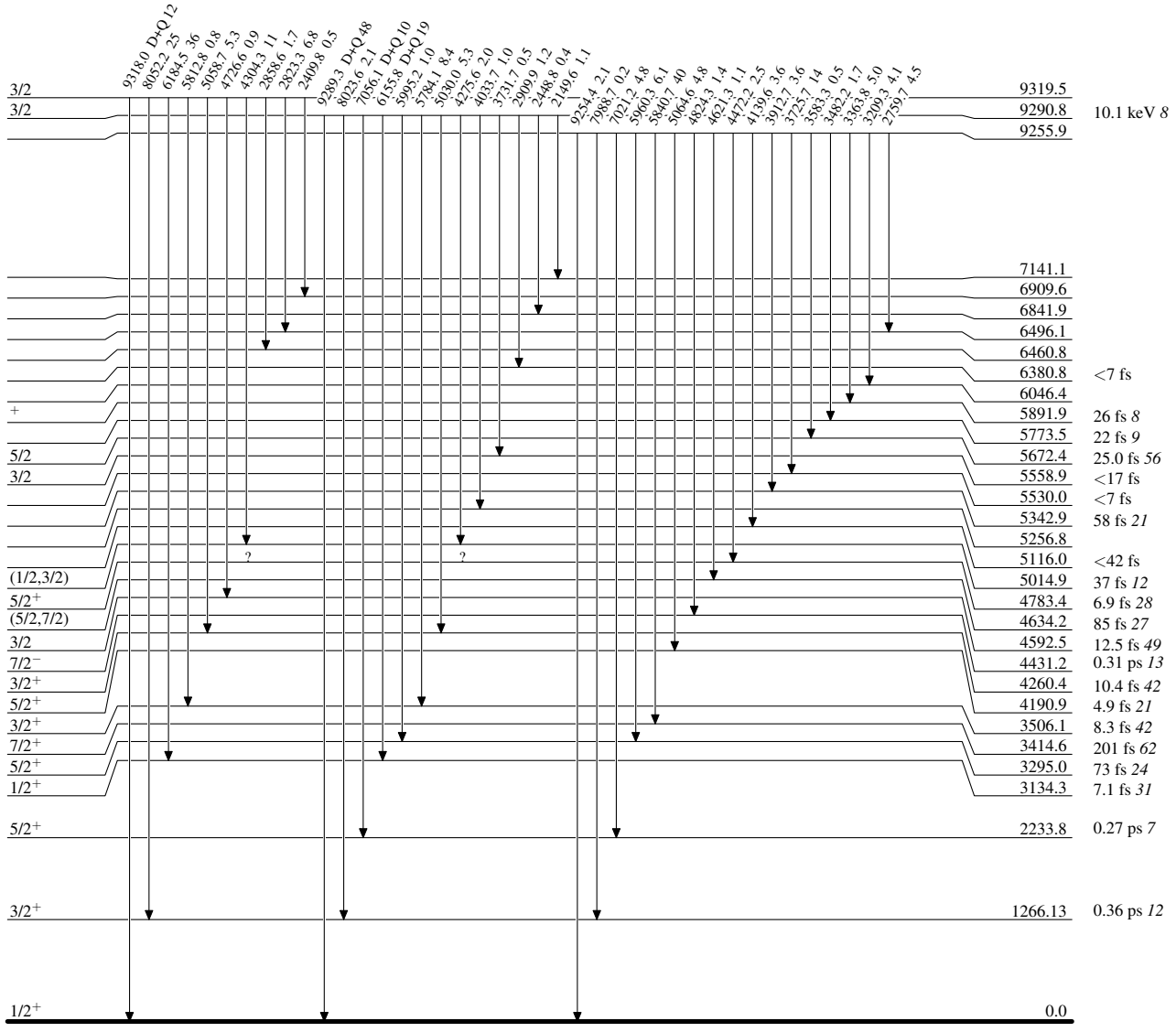


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

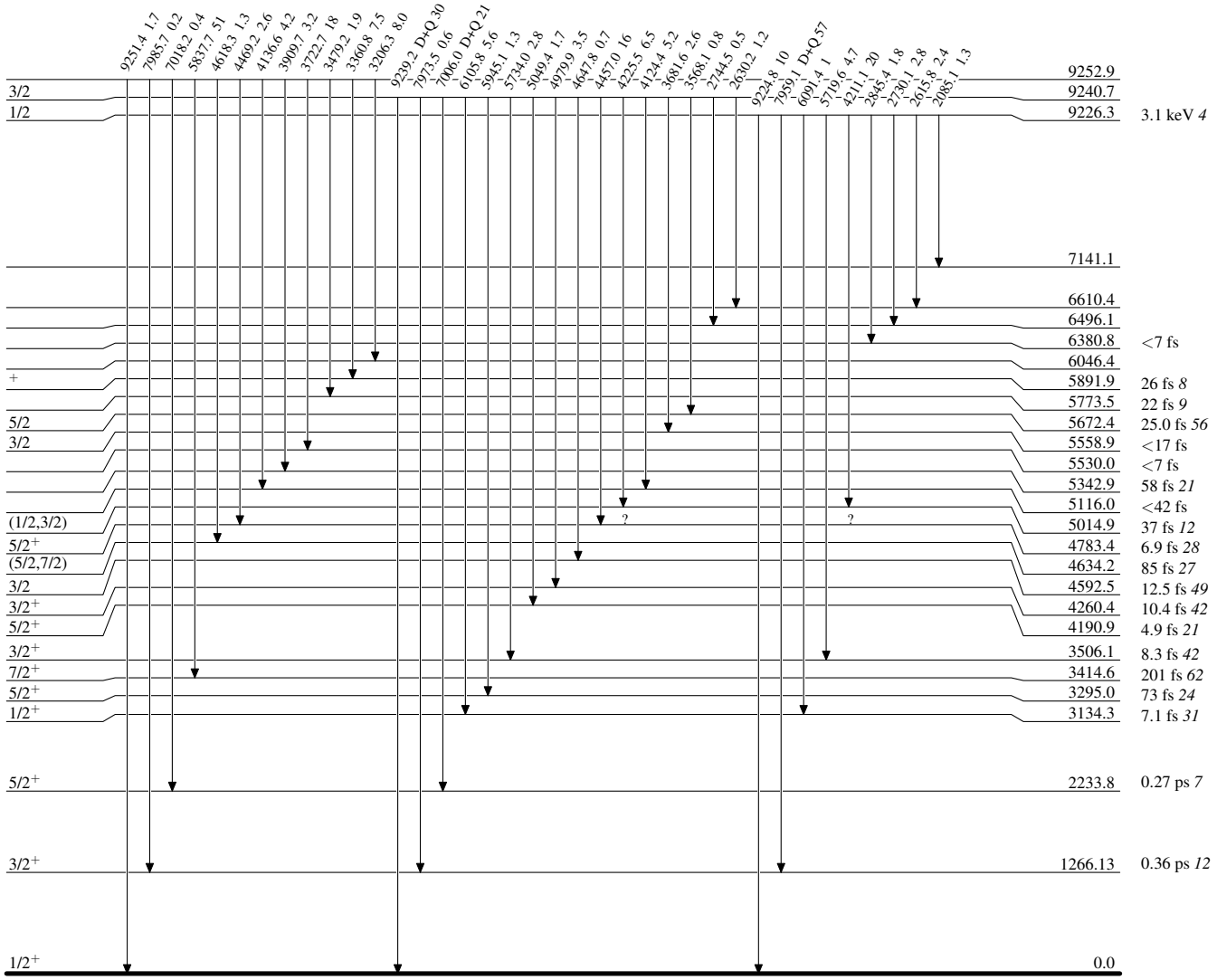


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

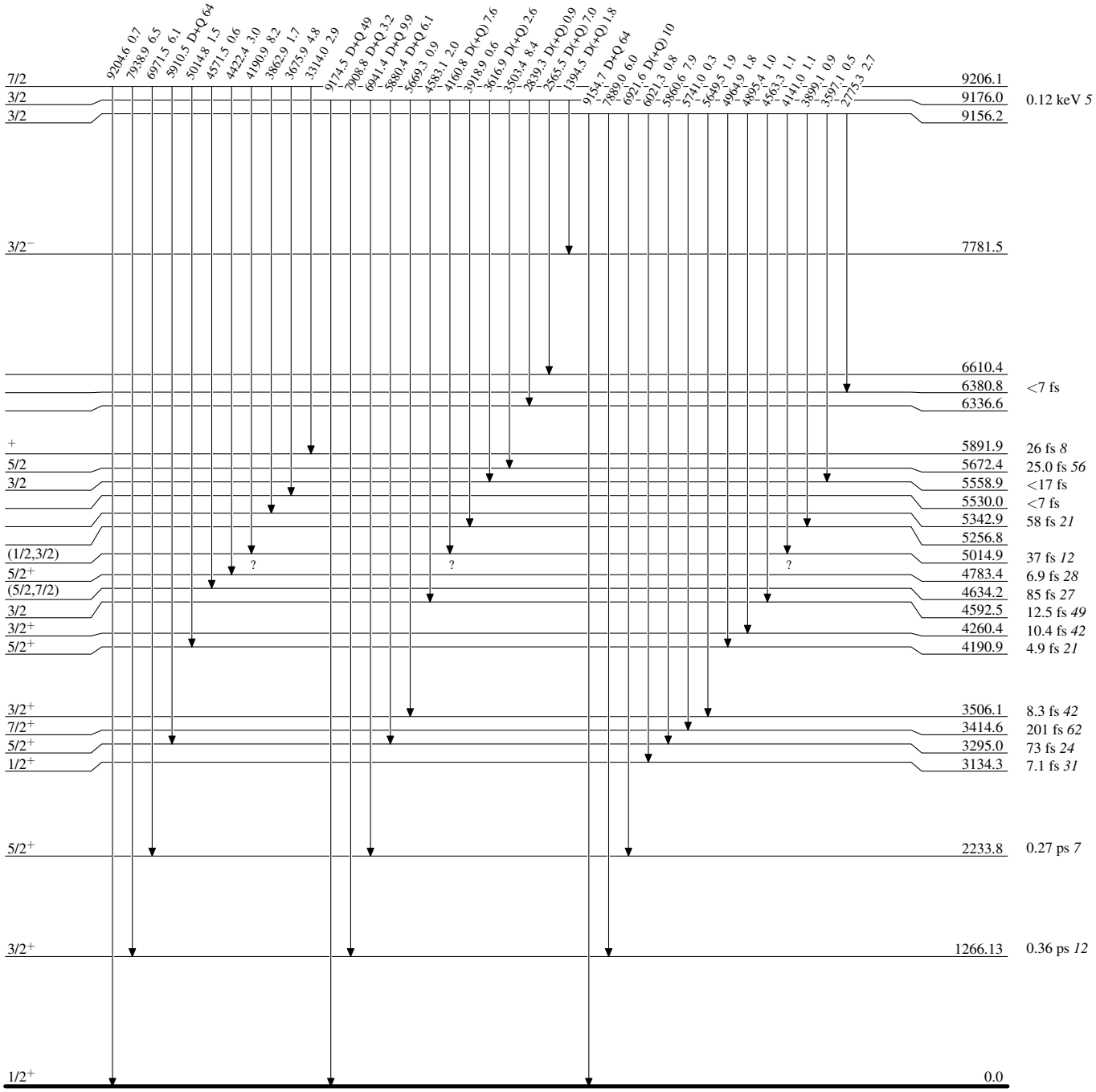


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

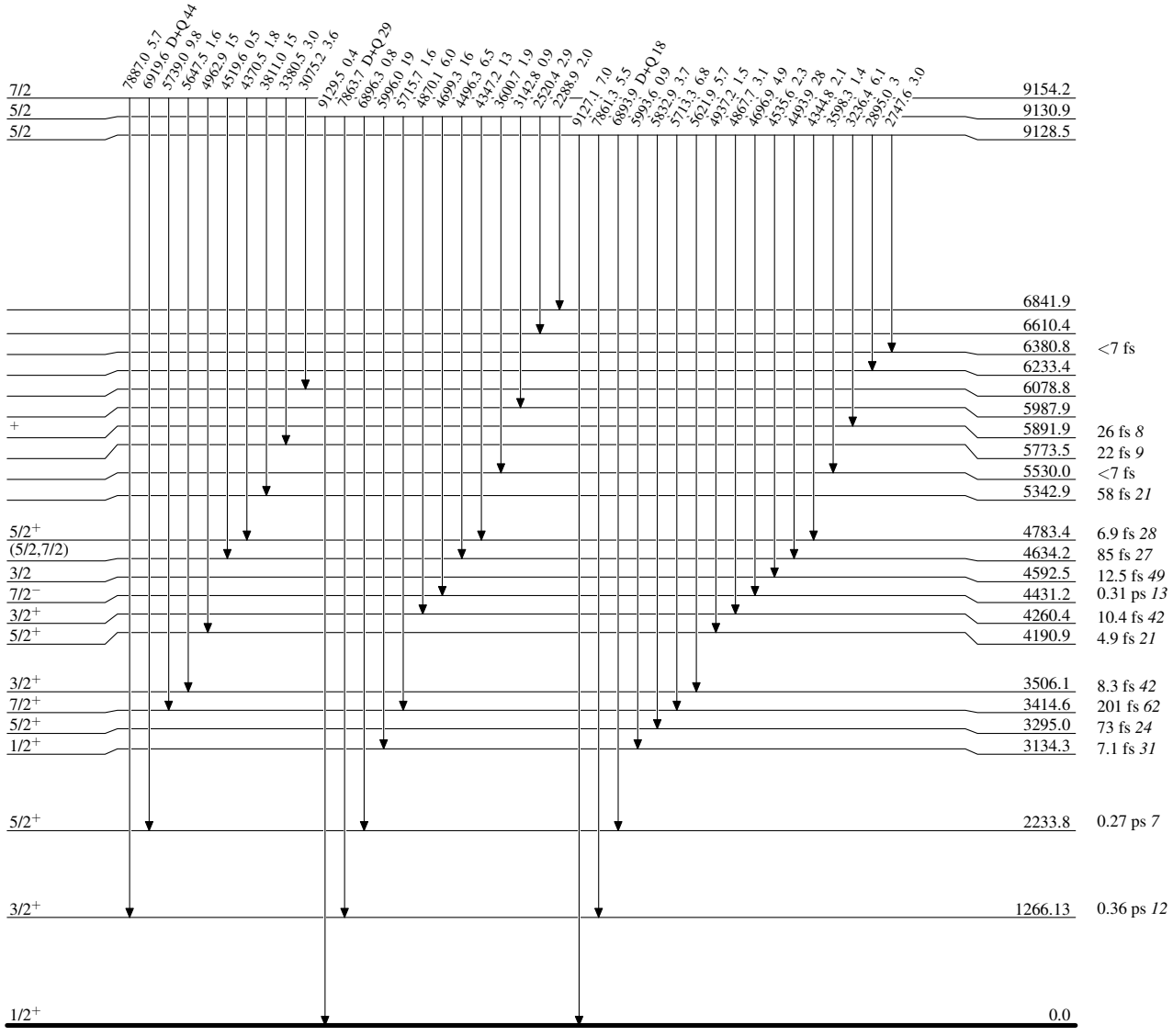


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

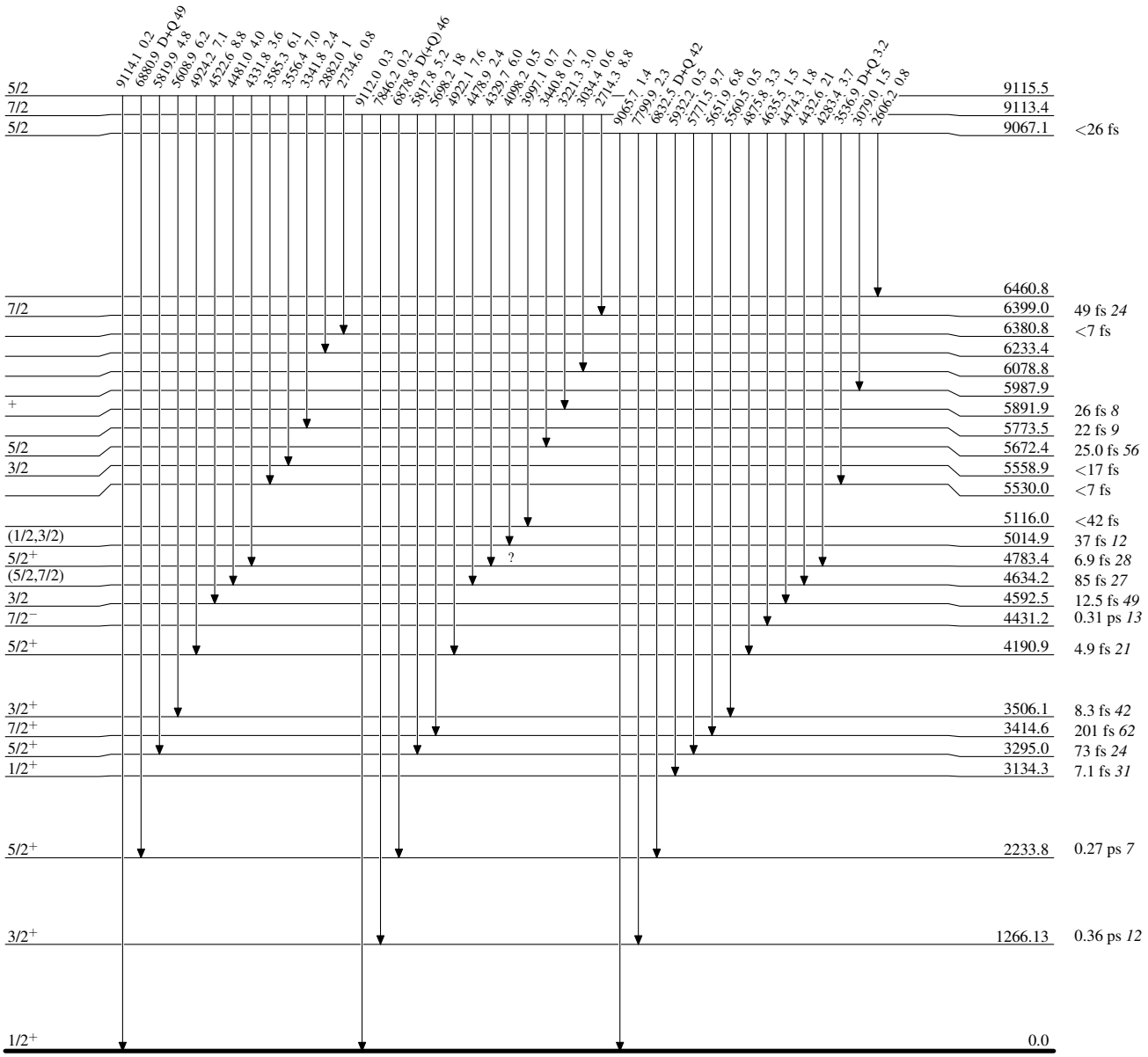


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

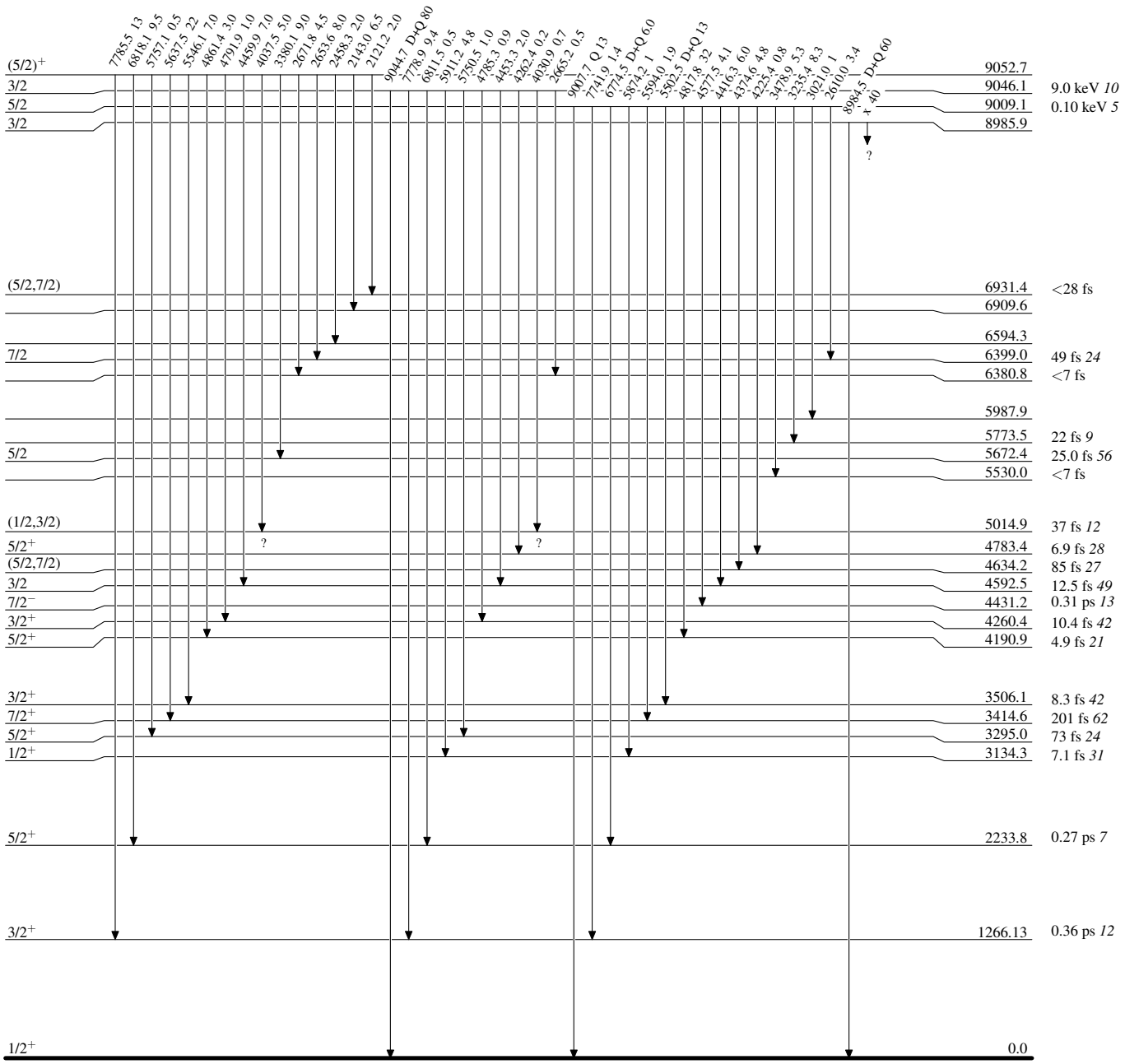


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

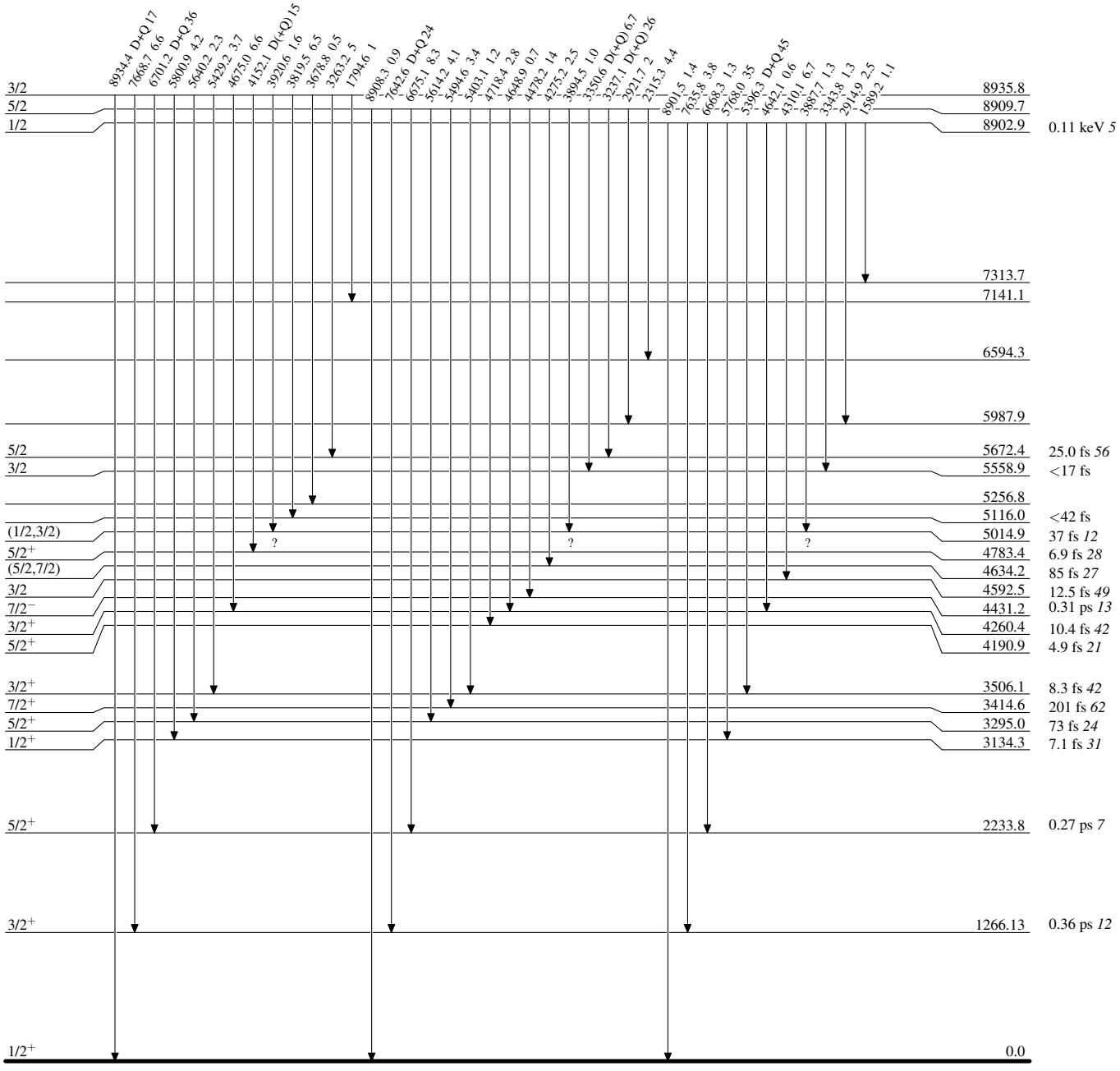


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

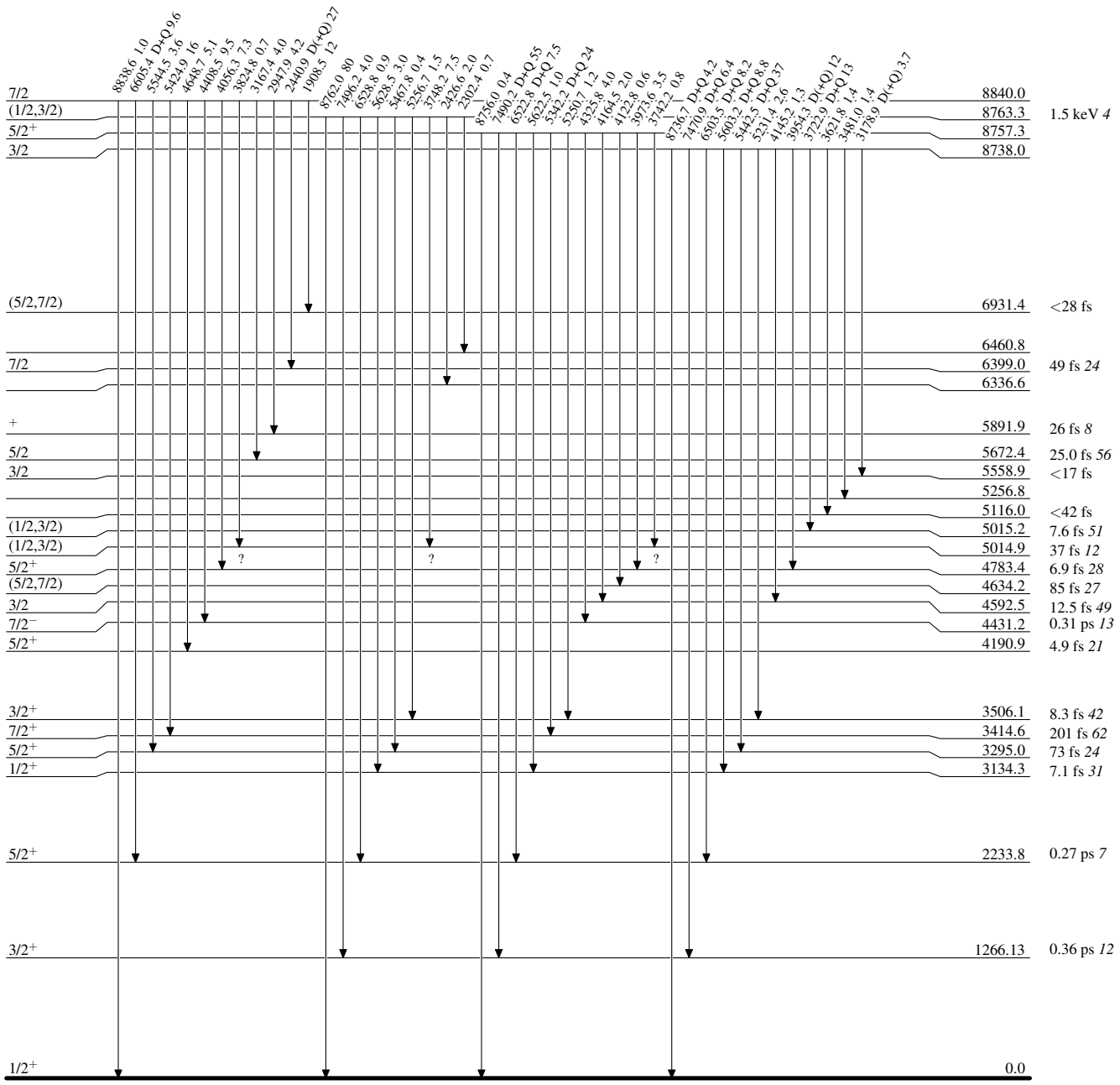


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level



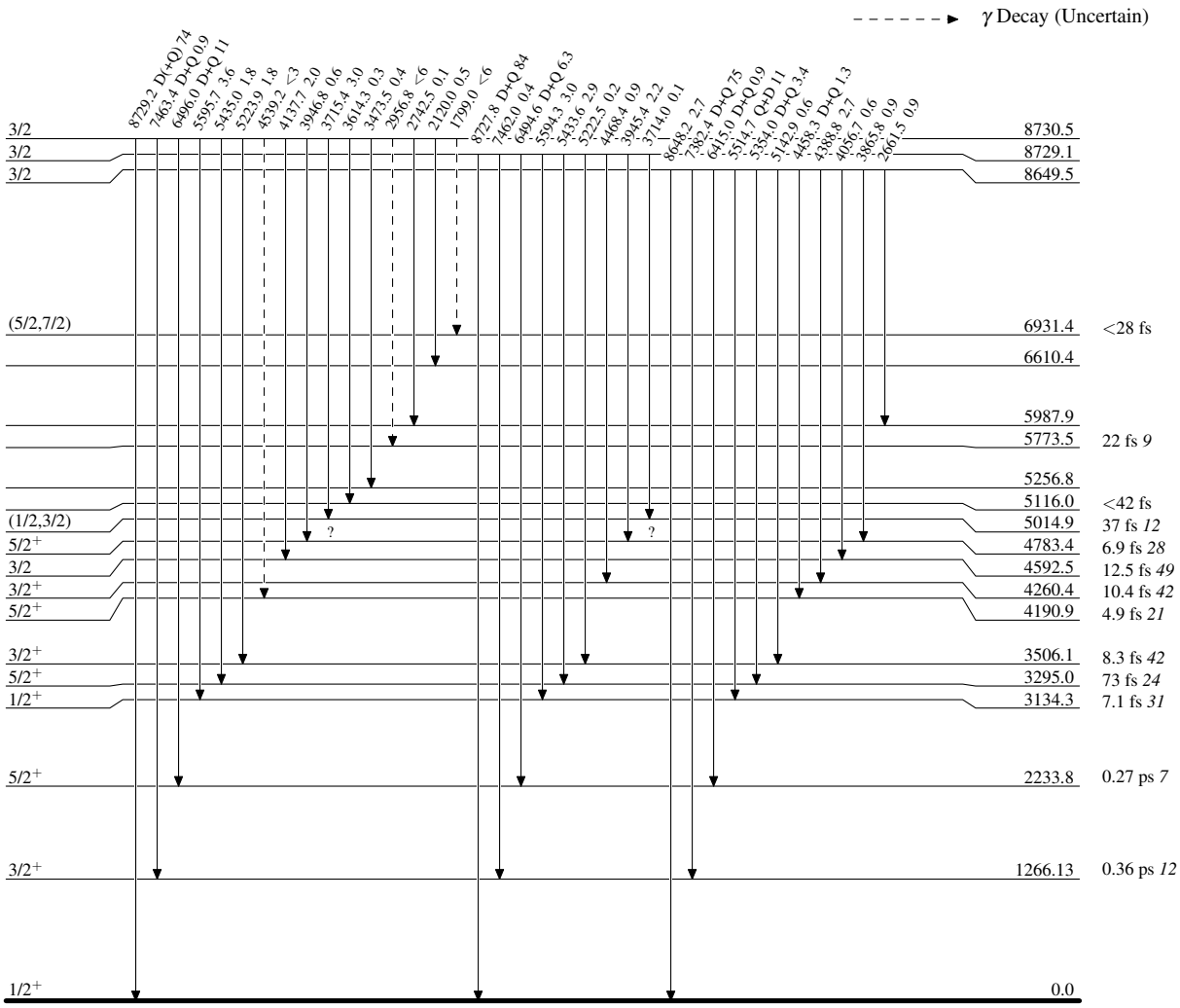
$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level



$^{31}_{15}P_{16}$

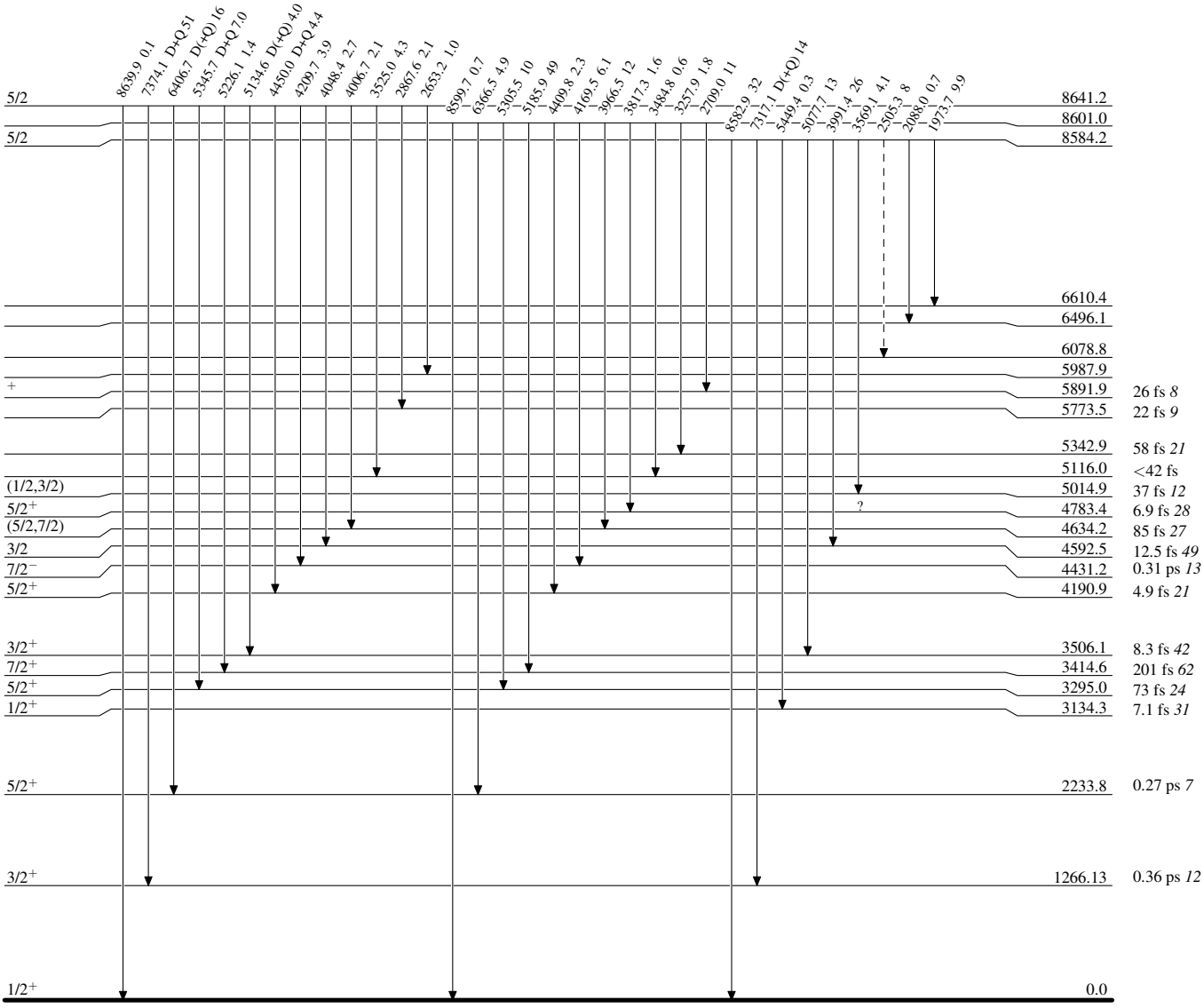
^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{31}_{15}P_{16}$

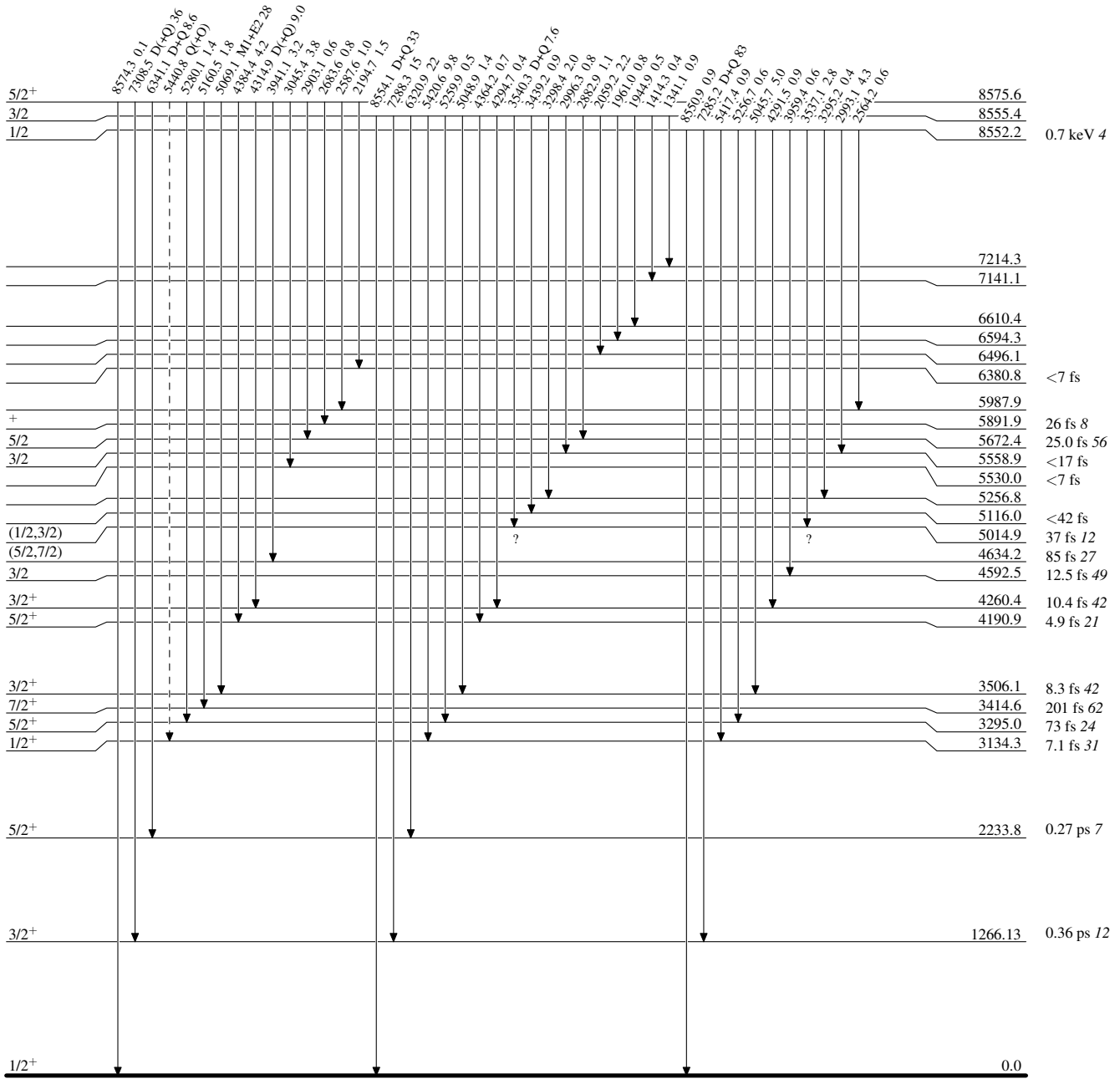
^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)

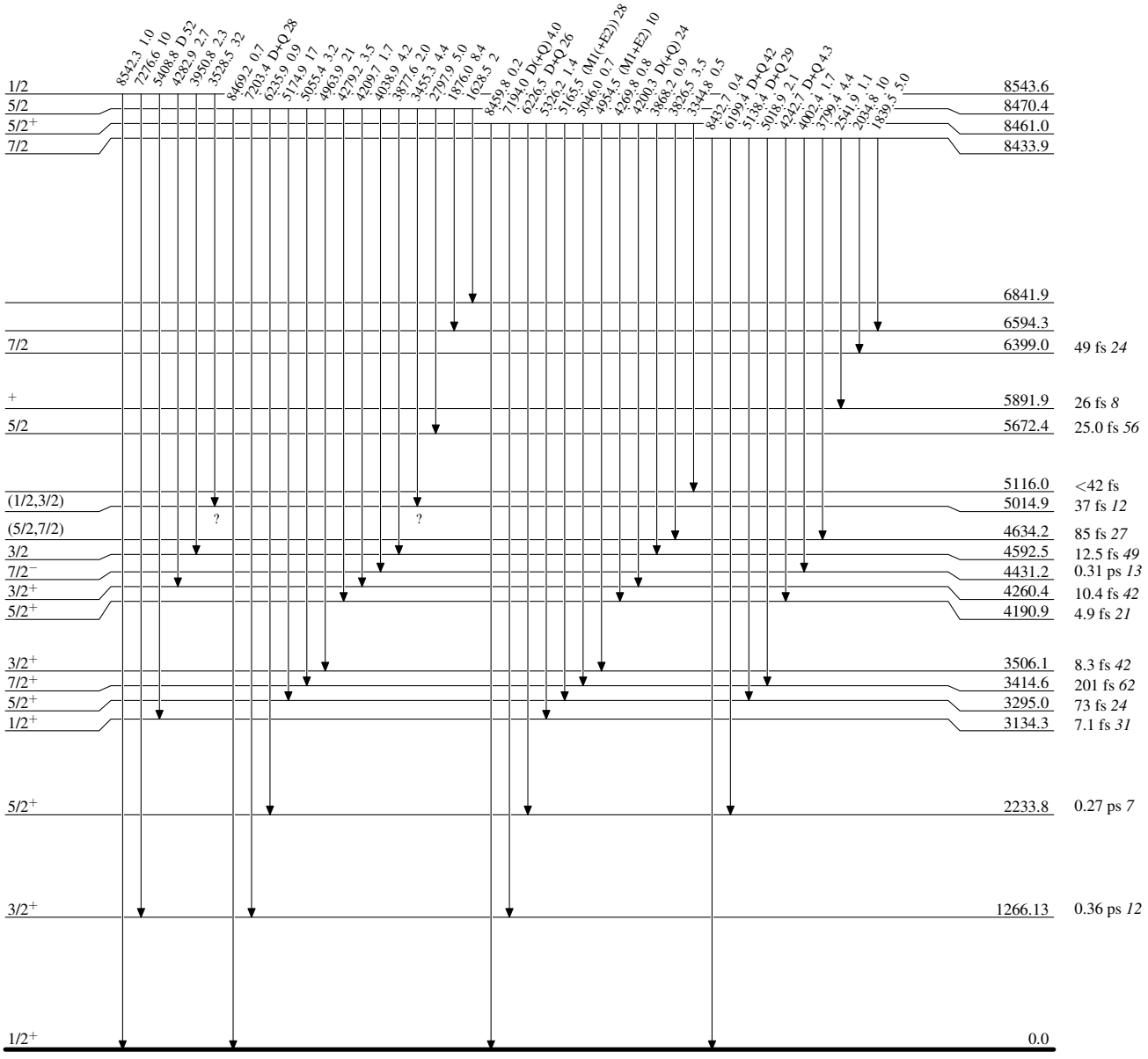


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

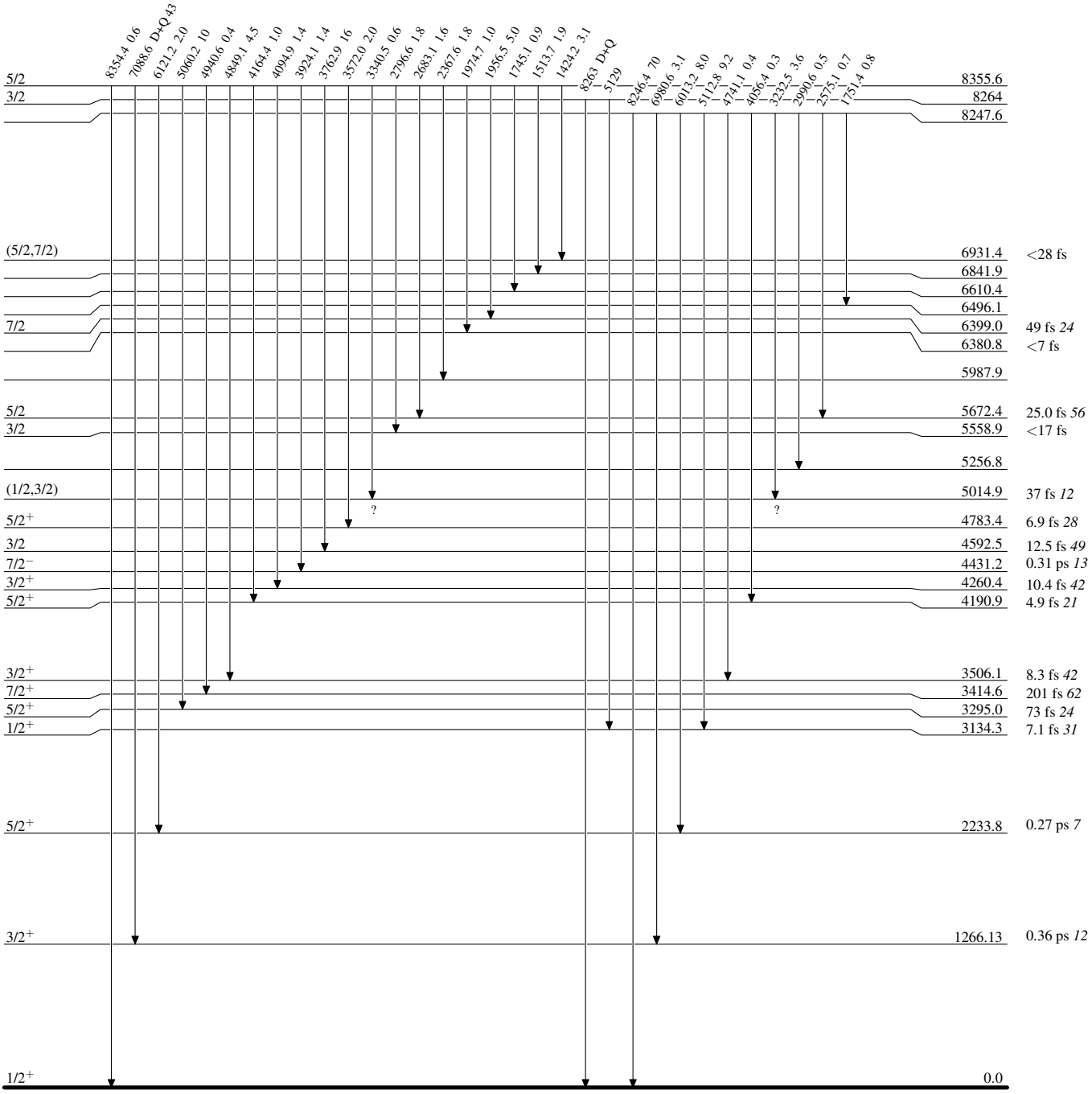


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

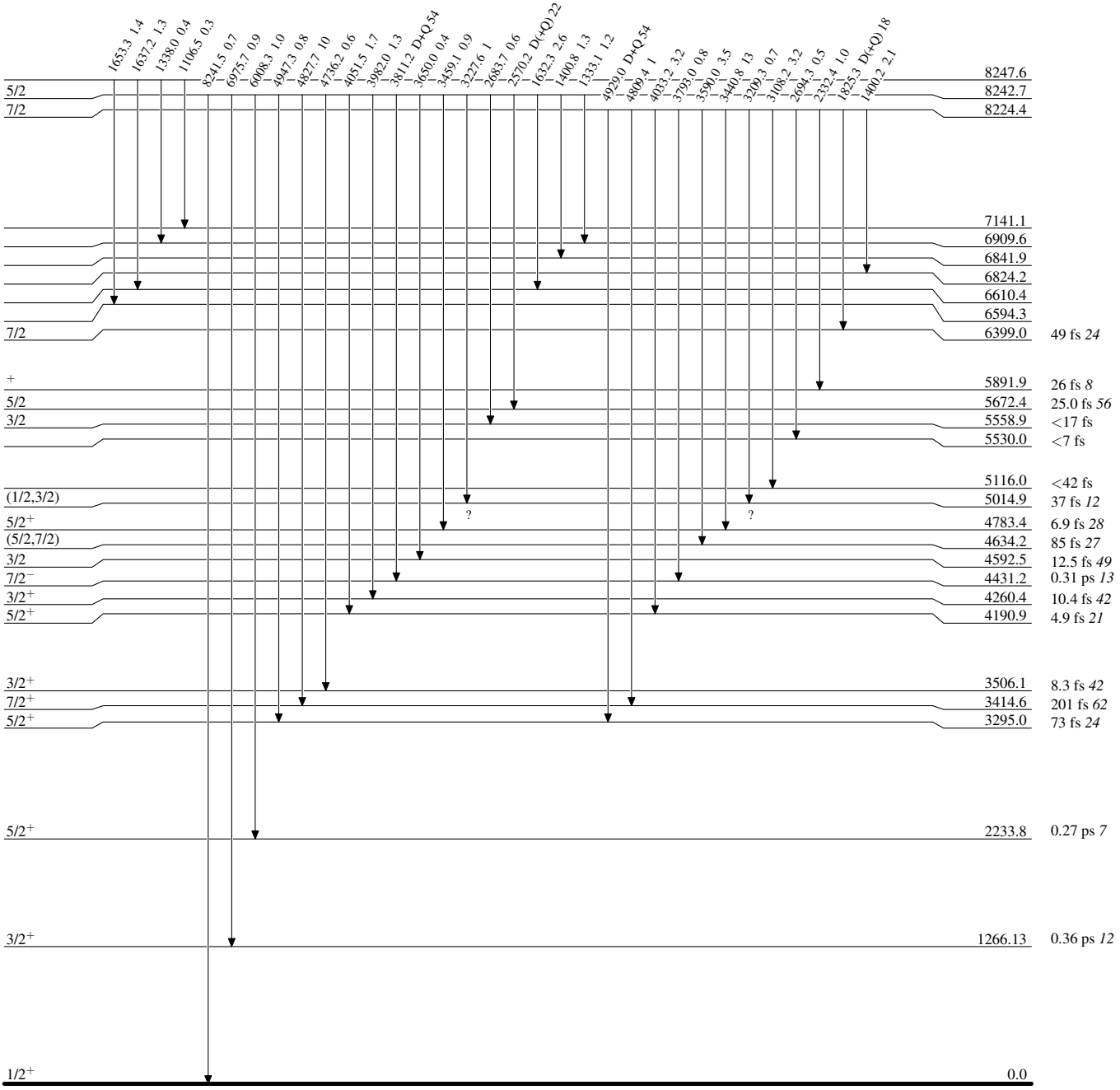


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

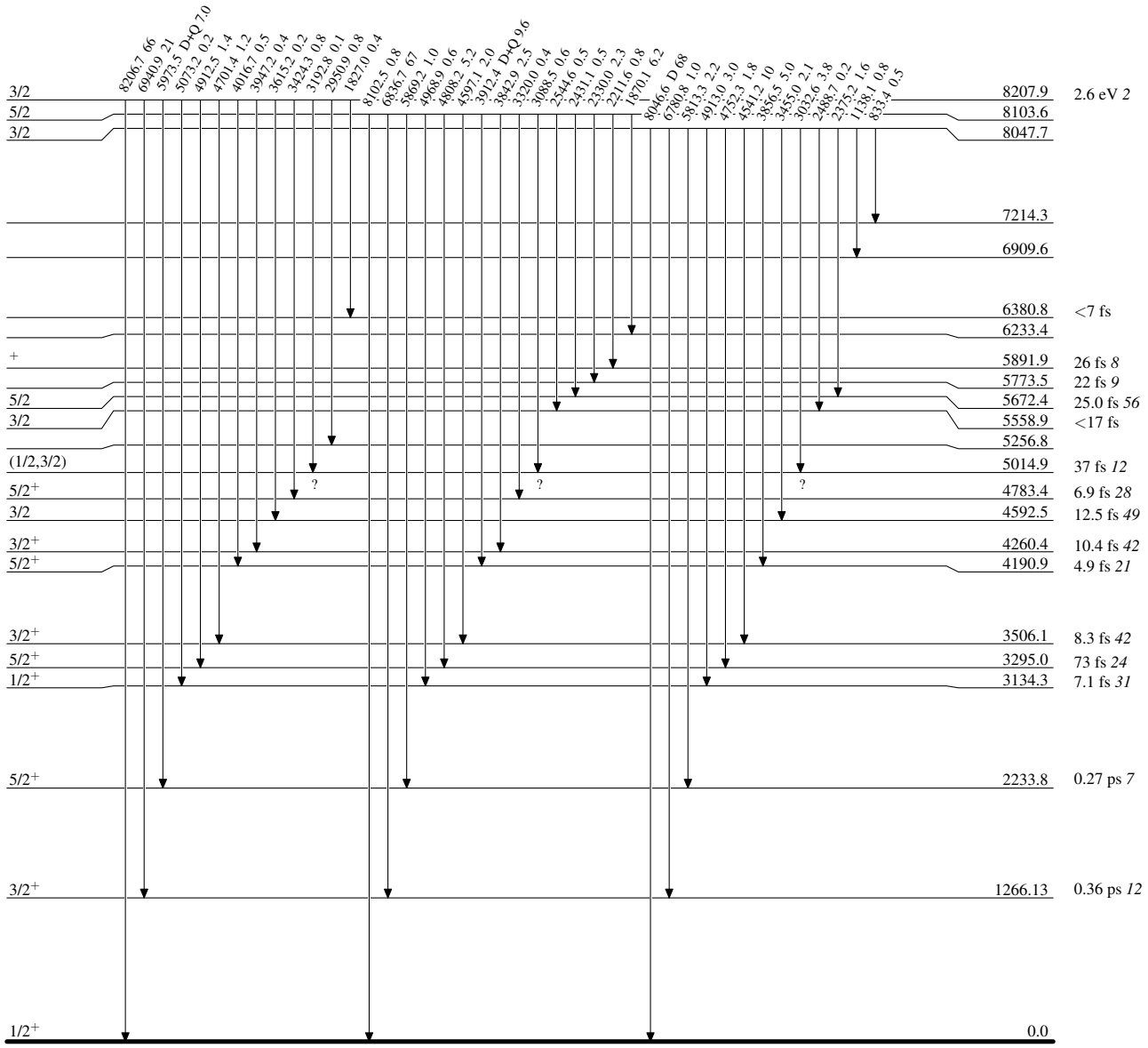


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

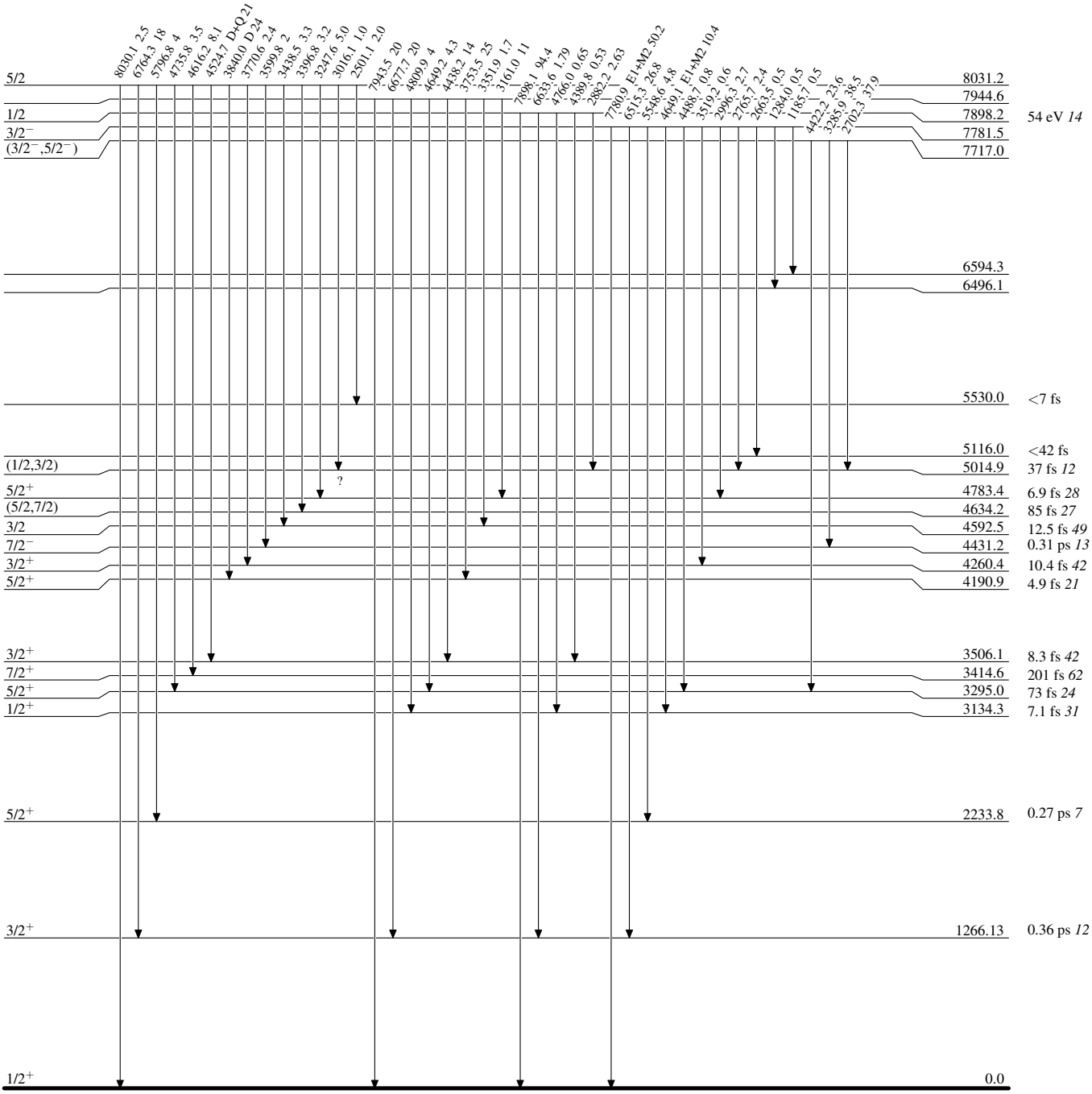


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level



$^{31}_{15}P_{16}$

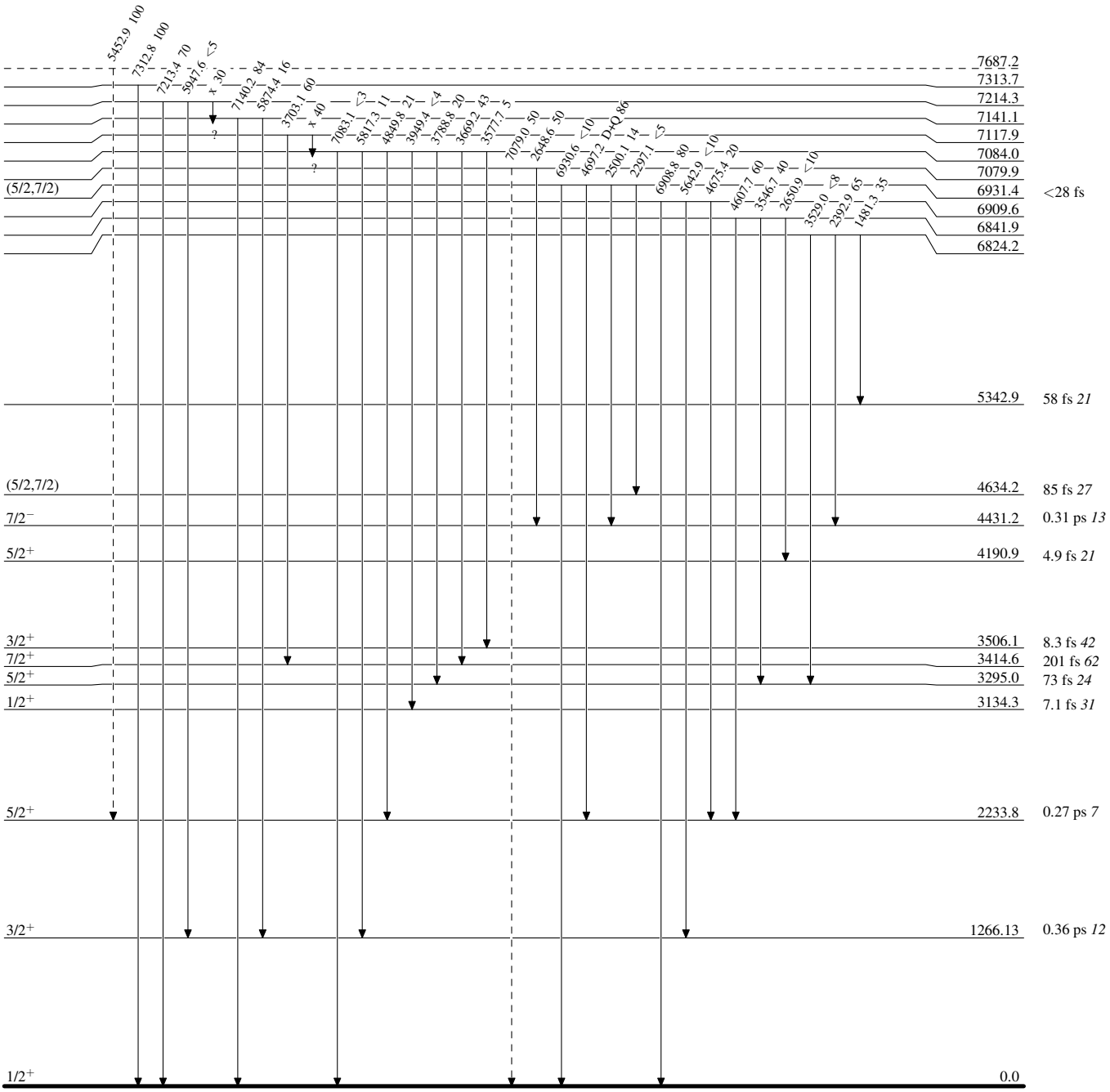
^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{31}_{15}P_{16}$

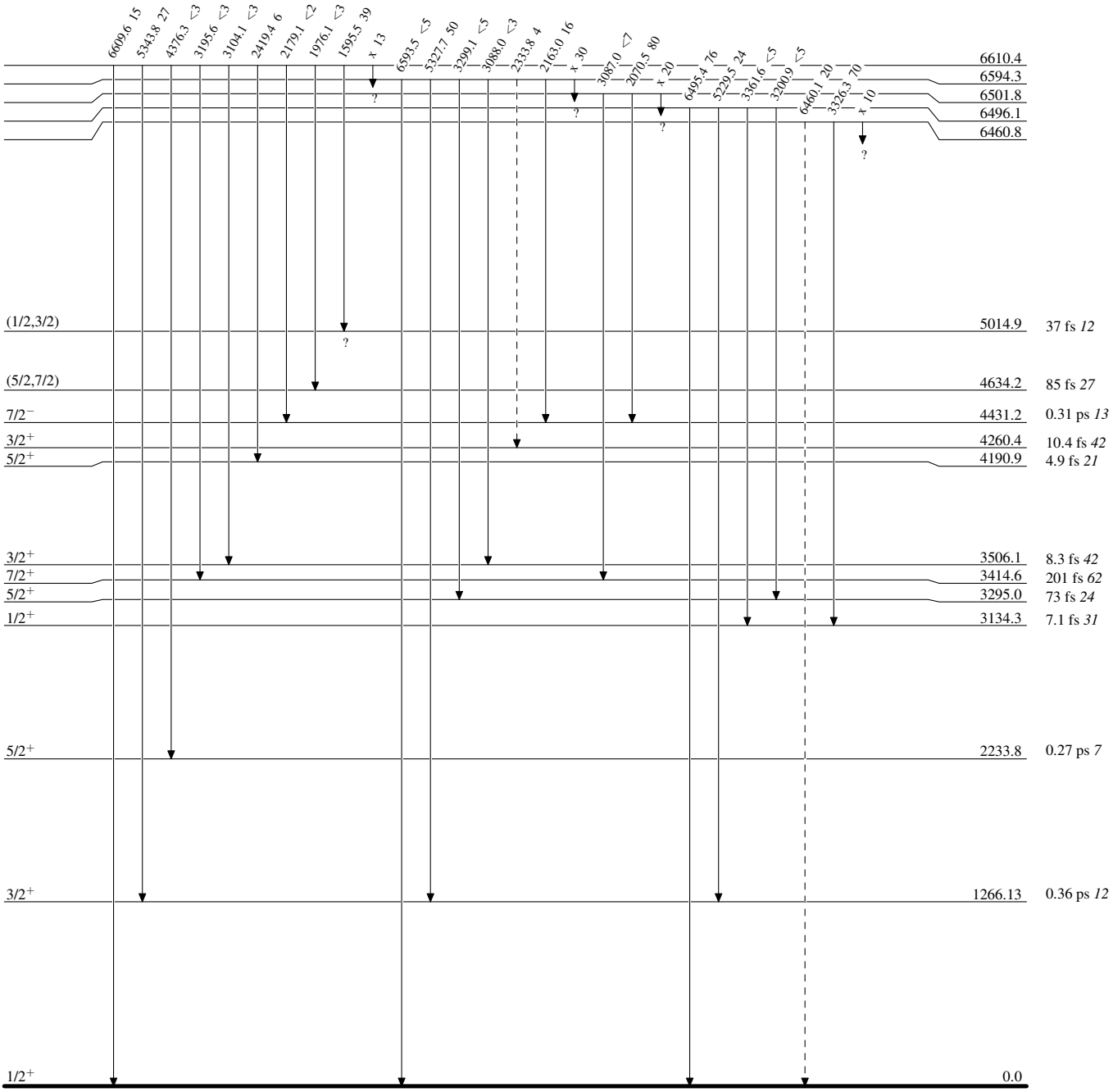
^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



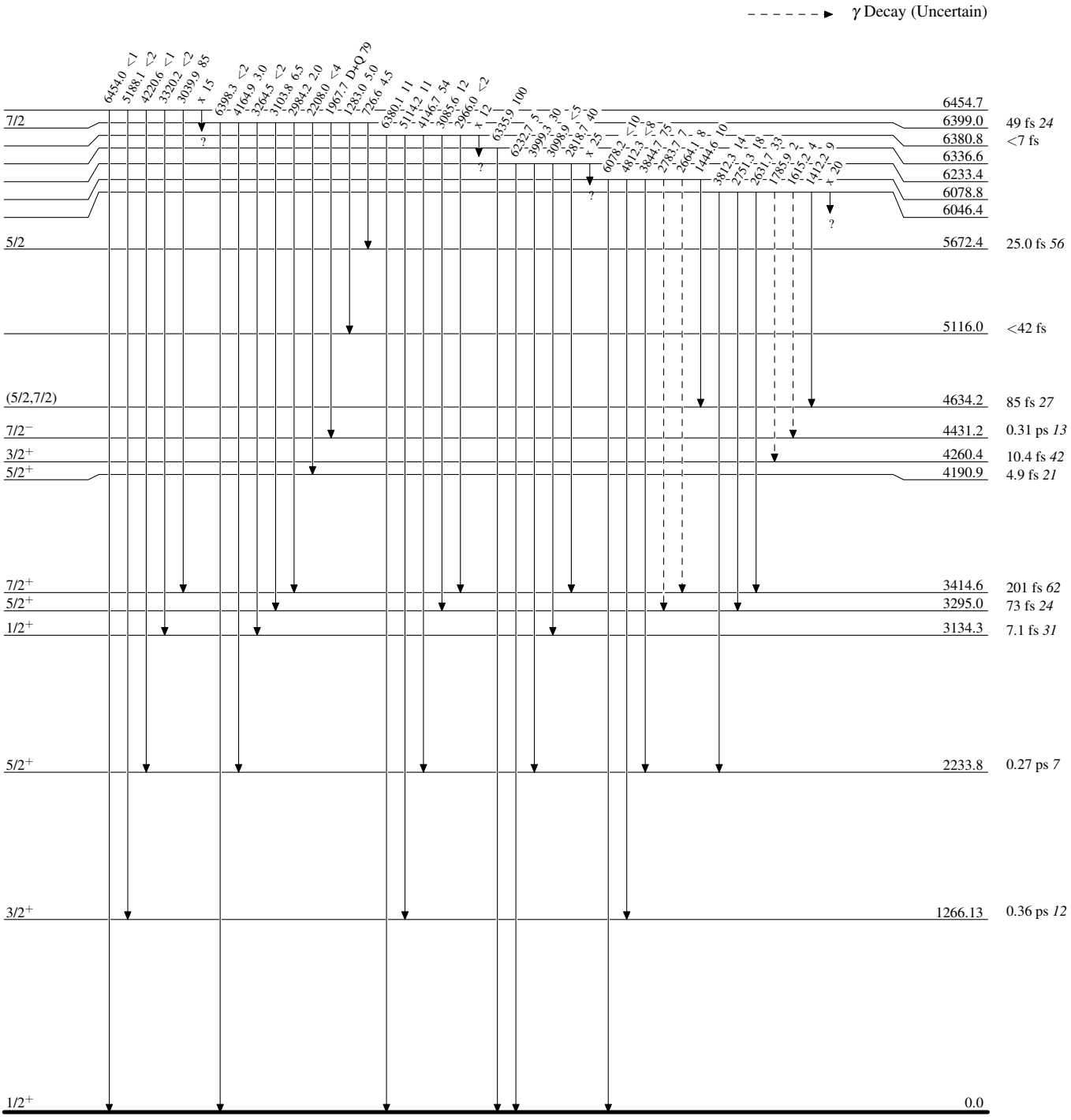
$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level



$^{31}_{15}P_{16}$

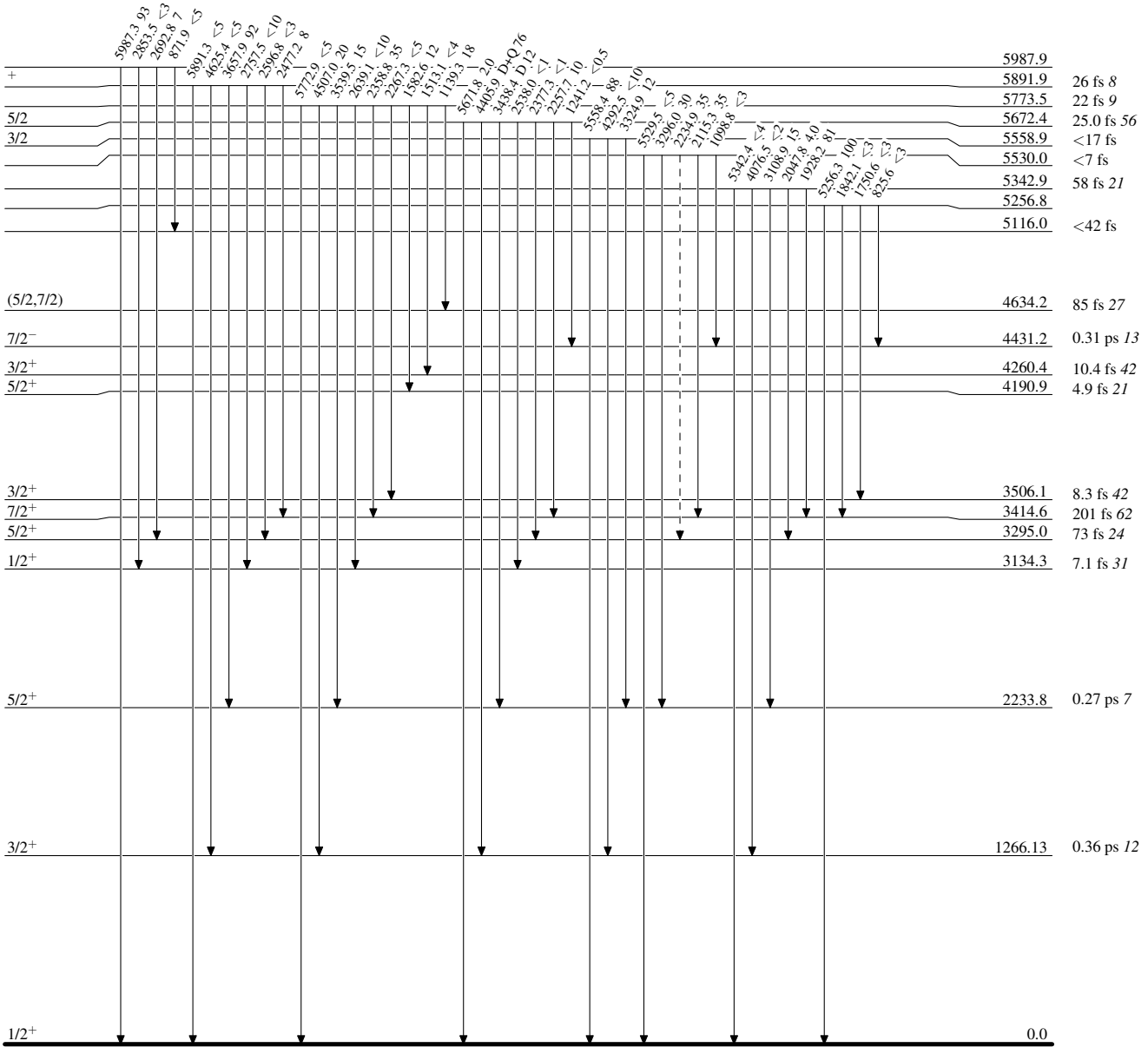
^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)

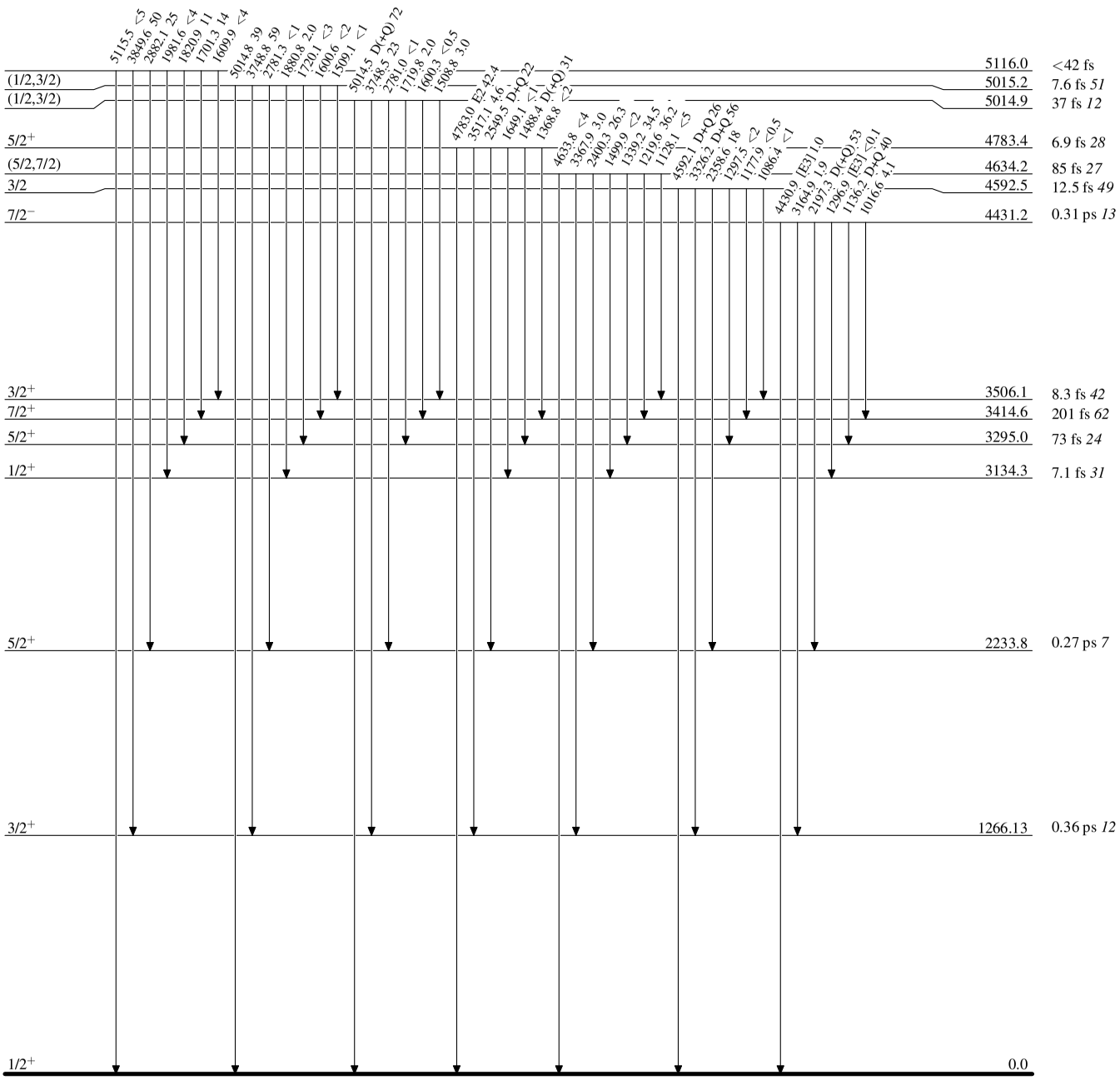


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level

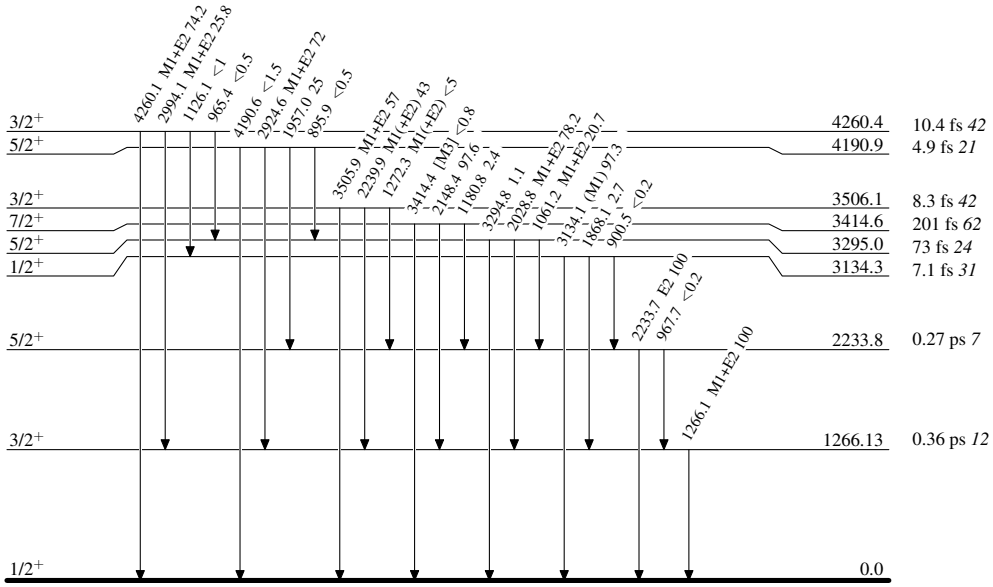


$^{31}_{15}P_{16}$

^{30}Si(p,γ) 1975De31,1967Wi10,1968Wo01

Level Scheme (continued)

Intensities: % photon branching from each level



$^{31}_{15}P_{16}$