

Adopted Levels, Gammas

$Q(\beta^-)=3988.4$ 19; $S(n)=8380.4$ 20; $S(p)=12155.1$ 20; $Q(\alpha)=-12332.0$ 29 2021Wa16

$S(2n)=14663.1$ 22, $S(2p)=30938$ 7 (2021Wa16).

Mass measurements: $^{34}\text{S}(^{18}\text{O},^{17}\text{F})$ and $^{37}\text{Cl}(^{11}\text{B},^{13}\text{N})$ (1988Or01), $^{36}\text{S}(^6\text{Li},^7\text{Be})$ (1985Dr06), $^{36}\text{S}(d,^3\text{He})$ (1985Kh04), $^{36}\text{S}(^{14}\text{C},^{15}\text{N})$ (1984Ma49).

First identification: $^{232}\text{Th}(^{40}\text{Ar},\text{X})$ (1971Ar32).

1971Gr53: ^{35}P activity produced by the $^{37}\text{Cl}(\gamma,2p)$ reaction. Measured E_γ . Deduced $T_{1/2}$ (45 s 2).

1972Ap01: ^{35}P β^- decay, ^{35}P activity produced by bombardment LiCl and NaCl using 16-MeV tritons at the Los Alamos tandem van de Graaff. Measured E_γ and I_γ . Deduced $T_{1/2}$ (47.4 s 8) and masses.

1972Go31: ^{35}P activity produced by the $^{18}\text{O}(^{19}\text{F},2p)$ and $^{36}\text{S}(t,\alpha)$ reactions from the second tandem of the Brookhaven National Laboratory tandem van de Graaff facility. Measured E_γ and $\beta\gamma$ -coin. Deduced $T_{1/2}$ (48.1 s 14) and $\log ft$.

1997Vo03: $^{56}\text{Fe}(p,\text{X})$ reaction using an 800-proton beam at the Weapons Neutron Research facility at the Los Alamos National Laboratory. Measured γ radiation. Deduced nuclide production cross sections.

1999Ai02: Products from ^{55}Mn fragmentation on Si target at the National Superconducting Cyclotron Laboratory at Michigan State University. Measured cross section. Deduced strong absorption radii.

2007No13: $^9\text{Be}(^{40}\text{Ar},\text{X})$ and $^{181}\text{Ta}(^{40}\text{Ar},\text{X})$ at 100-MeV/nucleon at the RIKEN Accelerator Research Facility. Measured momentum distribution and production cross sections.

1987Wa10: shell-model calculations for ^{35}Si β^- decay scheme, ^{35}P levels, decay branching ratios, $\log ft$, and Gamow-Teller transition strengths.

1986Wo02: shell-model calculations for ^{35}P levels and single nucleon transfer spectroscopic factors.

2012BoZT: shell-model calculations for ^{35}P levels, J , π , and lifetimes.

Theoretical calculations (binding energies, dipole moments, quadrupole moments, radii, levels, J^π , etc.): 2009No01, 2004Kh16, 2003Sm02, 1999Du05, 1988Wa04, 1983Wi08, 1975JeZX.

 ^{35}P LevelsCross Reference (XREF) Flags

A	^{35}Si β^- decay (0.78 s)	E	$^9\text{Be}(^{36}\text{S},^{35}\text{P}\gamma)$	I	$^{37}\text{Cl}(^{11}\text{B},^{13}\text{N})$
B	^{36}Si β^-n decay (503 ms)	F	$^{34}\text{S}(^{18}\text{O},^{17}\text{F})$	J	$^{160}\text{Gd}(^{37}\text{Cl},\text{X}\gamma)$
C	$^1\text{H}(^{34}\text{Si},p)$:resonances	G	$^{36}\text{S}(d,^3\text{He})$	K	$^{208}\text{Pb}(^{36}\text{S},\text{X}\gamma)$
D	$^2\text{H}(^{36}\text{S},^3\text{He})$	H	$^{36}\text{S}(\text{pol } d,^3\text{He})$		

$E(\text{level})^\dagger$	J^π	$T_{1/2}$ or $\Gamma^\#$	XREF	Comments
0 1	$1/2^+$	47.3 s 8	A DEFGHIJK	$\% \beta^- = 100$ J^π : L(pol d, ^3He)=0 from 0^+ and analyzing power. $T_{1/2}$: weighted average of 45 s 2 (1971Gr53), 47.4 s 8 (1972Ap01), and 48.1 s 14 (1972Go31).
2386.9 11	$3/2^+$	<0.69 ps	A DEF HI K	XREF: F(2420) J^π : L(pol d, ^3He)=2 from 0^+ and L-1/2 transfer from analyzing power.
3860.4 11	$5/2^+$	<0.69 ps	A DE GHIJK	J^π : L(pol d, ^3He)=2 from 0^+ and L+1/2 transfer from analyzing power.
4101.7 11	$(7/2^-)^\ddagger$	>69 ps	A E JK	
4250 20			I	
4382.0 12	$(5/2^-)$		A E K	XREF: A(?) J^π : possibly allowed β^- feeding from $7/2^-$ parent; 1994.9 γ to $3/2^+$.
4494.1 12	$(7/2^-)^\ddagger$	2.29 ps 49	A E H JK	XREF: H(4474) J^π : L($^{36}\text{S},^{35}\text{P}$)=(3) from 0^+ .
4666.2 16	$5/2^+$		DE GHI	XREF: I(4640) J^π : L(pol d, ^3He)=2 from 0^+ and L+1/2 transfer from analyzing power.
4767.0 13	$(9/2^-)^\ddagger$		E K	
4869.6 12	$(5/2^-, 7/2^-)$		A K	J^π : possibly allowed β^- feeding from $7/2^-$ parent; 1009.7 γ to $5/2^+$.
4962.8 12	$(9/2^-)^\ddagger$		A E K	XREF: A(?)
5010 20			I	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{35}P Levels (continued)				
E(level) [†]	J ^π	T _{1/2} or Γ [#]	XREF	Comments
5090.2 13	(11/2 ⁻) [‡]		EF K	XREF: F(5070)
5199.3 16	5/2 ⁺		DE GHI	XREF: I(5220)
				J ^π : L(pol d, ^3He)=2 from 0 ⁺ and L+1/2 transfer from analyzing power.
5487.9 13				
5561.0 13	(5/2 ⁻)		A K	J ^π : possibly allowed β ⁻ feeding from 7/2 ⁻ parent; 3173.5γ to 3/2 ⁺ .
5709.5 23	(1/2 ⁻)		DE	J ^π : L(^{36}S , ^{35}P)=(1) from 0 ⁺ ; interpreted as the deeply bound 1p _{1/2} proton removal from 0 ⁺ by (^{36}S , ^{35}P); 5709γ to 1/2 ⁺ .
5.86×10 ³ 5			F I	XREF: F(5890)I(5840)
				E(level): weighted average of 5890 70 from (^{18}O , ^{17}F) and 5840 50 from (^{11}B , ^{13}N).
6222.7 13	(7/2 ⁻ , 9/2, 11/2 ⁻)		K	J ^π : 1132γ to (11/2 ⁻) and 1729γ to (7/2 ⁻).
6440 60			F	
7050 60			F	
7440 60			F	
7526.9 23	(1/2 ⁻)		E H	XREF: H(7520)
				J ^π : L(^{36}S , ^{35}P)=(1) from 0 ⁺ ; interpreted as the deeply bound 1p _{1/2} proton removal from 0 ⁺ by (^{36}S , ^{35}P); 7526γ to 1/2 ⁺ .
7590 20			I	
7920 60			F	
8390 40			I	
8.60×10 ³ 10			F	
9290 50			F	
14938 24		<12.7 keV	C	
15161 3		<4.4 keV	C	
15306 24		<30.4 keV	C	
15964 18		84 keV 25	C	
16145 36		0.35 MeV 9	C	
16605 44		0.22 MeV 15	C	
17254 12		<11.6 keV	C	
17355 15		32 keV 22	C	

[†] From a least-squares fit to γ-ray energies for levels connected with γ transitions, from particle-transfer reactions for other levels, or from proton elastic scattering for resonances.

[‡] Comparisons with shell-model calculations (2019Gr08).

[#] T_{1/2} from the differential recoil-distance method (2019Gr08) in (^{36}S , Xγ) and widths from the R-matrix analysis of (^{34}Si , p) for resonances, unless otherwise noted.

Adopted Levels, Gammas (continued)

$\gamma(^{35}\text{P})$									
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	δ	$\alpha^\#$	Comments
2386.9	3/2 ⁺	2386.3 6	100	0	1/2 ⁺	[M1,E2]		0.00046 5	E_γ : weighted average of 2386.4 6 from ³⁵ Si β^- decay, 2386 2 from (³⁶ S, ³⁵ P γ), and 2386 1 from (³⁶ S,X γ). B(M1)(W.u.)>0.0023 if M1, B(E2)(W.u.)>1.6 if E2.
3860.4	5/2 ⁺	1473.5 5	15.6 14	2386.9	3/2 ⁺	[M1,E2]		8.3×10 ⁻⁵ 13	E_γ : weighted average of 1473.4 5 from ³⁵ Si β^- decay, 1473 2 from (³⁶ S, ³⁵ P γ), and 1474 1 from (³⁶ S,X γ). I_γ : weighted average of 14.1 33 from ³⁵ Si β^- decay and 15.9 14 from (³⁶ S,X γ). B(M1)(W.u.)>0.0012 if M1, B(E2)(W.u.)>2.1 if E2. B(E2)(W.u.)>0.12
		3860.2 10	100.0 32	0	1/2 ⁺	[E2]		1.12×10 ⁻³ 2	E_γ : weighted average of 3859.5 10 from ³⁵ Si β^- decay, 3860 2 from (³⁶ S, ³⁵ P γ), and 3861 1 from (³⁶ S,X γ). I_γ : from (³⁶ S,X γ). Other: 100 7 from ³⁵ Si β^- decay.
4101.7	(7/2 ⁻)	241.3 5	100 [†] 7	3860.4	5/2 ⁺	[E1]		0.000665 10	B(E1)(W.u.)<4.4×10 ⁻⁴
		1714.8 6	6.6 [†] 17	2386.9	3/2 ⁺	[M2]		7.93×10 ⁻⁵ 11	E_γ : weighted average of 241.4 3 from ³⁵ Si β^- decay, 237 2 from (³⁶ S, ³⁵ P γ), and 241 1 from (³⁶ S,X γ). I_γ : other: 100 4 from ³⁵ Si β^- decay. B(M2)(W.u.)<0.16
		4101.4 10	54 [†] 8	0	1/2 ⁺	[E3]		0.000924 13	E_γ : weighted average of 1714.7 6 from ³⁵ Si β^- decay and 1715 1 from (³⁶ S,X γ). I_γ : other: 22 5 from ³⁵ Si β^- decay. B(E3)(W.u.)<4.8
4382.0	(5/2 ⁻)	1994.9 6	100	2386.9	3/2 ⁺				E_γ : weighted average of 4100.8 10 from ³⁵ Si β^- decay and 4102 1 from (³⁶ S,X γ). I_γ : other: 135 8 from ³⁵ Si β^- decay.
									E_γ : weighted average of 1994.8 6 from ³⁵ Si β^- decay, 1995 2 from (³⁶ S, ³⁵ P γ), and 1995 1 from (³⁶ S,X γ). Placement by 1988DuZS, 2008Wi09, and 2016Mu03. 1988DuZT and 1987Wa10 placed this γ as the 6096→4101 transition. 1988Or01 placed this γ as the 6488→4493 transition.
4494.1	(7/2 ⁻)	392.3 3	100 5	4101.7	(7/2 ⁻)	[M1+E2]	<0.22	0.000199 12	B(M1)(W.u.)=0.117 +42-29
		633.6 5	34 5	3860.4	5/2 ⁺	[E1]		4.64×10 ⁻⁵ 7	E_γ : weighted average of 392.3 3 from ³⁵ Si β^- decay, 391 2 from (³⁶ S, ³⁵ P γ), and 392 1 from (³⁶ S,X γ). I_γ : from ³⁵ Si β^- decay. Other: 100 17 from (³⁶ S,X γ). δ : deduced by evaluators from RUL=100 for B(E2)(W.u.). B(E1)(W.u.)=2.8×10 ⁻⁴ +8-6
									E_γ : weighted average of 633.7 5 from ³⁵ Si β^- decay, 634 2 from (³⁶ S, ³⁵ P γ), and 633 1 from (³⁶ S,X γ).

Adopted Levels, Gammas (continued)

$\gamma(^{35}\text{P})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Comments
I _γ : weighted average of 38 5 from ³⁵ Si β ⁻ decay and 27 7 from (³⁶ S,Xγ).						
4666.2	5/2 ⁺	804 [‡] 2		3860.4	5/2 ⁺	
		2279 [‡] 2		2386.9	3/2 ⁺	
		4668 [‡] 2		0	1/2 ⁺	
4767.0	(9/2 ⁻)	273 1	40.0 [†] 25	4494.1	(7/2 ⁻)	E _γ : weighted average of 274 2 from (³⁶ S, ³⁵ Pγ) and 273 1 from (³⁶ S,Xγ).
		664 1	100 [†] 47	4101.7	(7/2 ⁻)	E _γ : weighted average of 666 2 from (³⁶ S, ³⁵ Pγ) and 664 1 from (³⁶ S,Xγ).
4869.6	(5/2 ⁻ ,7/2 ⁻)	374 [†] 1	60 [†] 20	4494.1	(7/2 ⁻)	
		487 [†] 1	<40 [†]	4382.0	(5/2 ⁻)	
		767.9 4	100 [†] 20	4101.7	(7/2 ⁻)	E _γ : weighted average of 768.0 4 from ³⁵ Si β ⁻ decay and 767 1 from (³⁶ S,Xγ).
						I _γ : other: 100 18 from ³⁵ Si β ⁻ decay.
		1009.7 5	<20 [†]	3860.4	5/2 ⁺	E _γ : weighted average of 1009.9 5 from ³⁵ Si β ⁻ decay and 1009 1 from (³⁶ S,Xγ).
						I _γ : other: 152 32 from ³⁵ Si β ⁻ decay.
4962.8	(9/2 ⁻)	468.9 4	100 [†] 8	4494.1	(7/2 ⁻)	E _γ : weighted average of 468.9 4 from ³⁵ Si β ⁻ decay, 469 2 from (³⁶ S, ³⁵ Pγ), and 468 2 from (³⁶ S,Xγ).
		859 [†] 3	66 [†] 9	4101.7	(7/2 ⁻)	
5090.2	(11/2 ⁻)	128 1	50 [†] 25	4962.8	(9/2 ⁻)	E _γ : weighted average of 127 2 from (³⁶ S, ³⁵ Pγ) and 128 1 from (³⁶ S,Xγ).
		322 1	100 [†] 35	4767.0	(9/2 ⁻)	E _γ : weighted average of 321 2 from (³⁶ S, ³⁵ Pγ) and 322 1 from (³⁶ S,Xγ).
5199.3	5/2 ⁺	1337 [‡] 2		3860.4	5/2 ⁺	
		2811 [‡] 2		2386.9	3/2 ⁺	
		5202 [‡] 2		0	1/2 ⁺	
5487.9		993 [†] 1	100 [†] 20	4494.1	(7/2 ⁻)	
		1387 [†] 1	60 [†] 20	4101.7	(7/2 ⁻)	
5561.0	(5/2 ⁻)	1459.4 7	34 12	4101.7	(7/2 ⁻)	E _γ : weighted average of 1459.7 5 from ³⁵ Si β ⁻ decay and 1458 1 from (³⁶ S,Xγ).
						I _γ : from ³⁵ Si β ⁻ decay.
		3173.5 10	100 17	2386.9	3/2 ⁺	3173.5γ is not observed in (³⁶ S,Xγ), but the weaker 1459γ deexciting the same level is observed in (³⁶ S,Xγ). Further experiments are needed to resolve the discrepancy.
						E _γ ,I _γ : from ³⁵ Si β ⁻ decay.
5709.5	(1/2 ⁻)	5709 [‡] 2		0	1/2 ⁺	
6222.7	(7/2 ⁻ ,9/2,11/2 ⁻)	1132 [†] 1	<25 [†]	5090.2	(11/2 ⁻)	
		1260 [†] 1	100 [†] 25	4962.8	(9/2 ⁻)	
		1729 [†] 1	100 [†] 25	4494.1	(7/2 ⁻)	
7526.9	(1/2 ⁻)	7526 2		0	1/2 ⁺	

Adopted Levels, Gammas (continued)

$\gamma(^{35}\text{P})$ (continued)

[†] From ($^{36}\text{S}, X\gamma$).
[‡] From ($^{36}\text{S}, ^{35}\text{P}\gamma$).
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with “Frozen Orbitals” approximation based on γ -ray energies, assigned
multipolarities, and mixing ratios, unless otherwise specified.

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

