^{28}P ε decay 1996Og01,1982Wa05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 114, 1189 (2013)	1-Apr-2013

Parent: ^{28}P: E=0; J$^{\pi}$=3^{+}; T$_{1/2}$=270.3 ms *5*; Q(ε)=14345.1 *12*; %ε+%β^{+} decay=100.0

Others: 1979Ho27, 1972De28, 1972Wi23, 1968Ar03.

Sum of decay energies of this dataset is 14344 keV *71* cf. 14345.1 keV *12* obtained from ^{28}P ε decay Q(g.s.) and branching.

1996Og01: ^{28}P was produced bombarding natural Si target with proton beams, ^{28}Si(p,n), E=28 and 45 MeV; helium jet transport, particle telescope; measured delayed proton and α spectrum; deduced β^{+} feeding to ^{28}Si levels.

1982Wa05: ^{28}P was produced from ^{28}Si(p,n) reaction, E=18 MeV; γ rays were measured using Ge(Li) and NaI(Tl) escape-suppressed spectrometer; Measured Eγ, Iγ and deduced β^{+} feeding to ^{28}Si levels.

^{28}Si Levels

E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡	E(level)†	J$^{\pi}$‡
0.0	0^{+}	7415.9 *5*	2^{+}	9795.8 *10*	(2^{+})	12443 *1*	(2^{+})
1779.030 *11*	2^{+}	7799.21 *15*	3^{+}	10208.8 *15*	(3^{+})	12550 *1*	(4^{+})
4617.53 *14*	4^{+}	7933.52 *21*	2^{+}	10667.99 *23*	(2 to 4)$^{+}$	12573 *1*	(2^{+})
4980.0 *3*	0^{+}	8259.0 *4*	2$^{(+)}$	11515 *1*	(2^{+})	12714 *1*	(0^{+},1^{+})
6276.40 *15*	3^{+}	8588.80 *17*	3^{+}	11657 *1*	(2^{+})	12725 *1*	(2^{+})
(6878.79 *8*)	3^{-}	9315.78 *19*	3^{+}	11931 *1*	5	12899 *1*	(4^{+})
(6887.65 *10*)	4^{+}	9381.2 *4*	2^{+}	12071 *1*	(2^{+})	13093 *4*	(4^{+})
(7380.59 *9*)	2^{+}	9479.1 *9*	(2^{+})	12289 *1*	(2^{+})		

† From a least-squares fit to γ-ray energies, except otherwise noted. Expected γ-ray energies are calculated, recoil energy subtracted, after the least-squares fit. Level energies 11515 keV and above are from 1996Og01.

‡ From Adopted Levels.

ε,β^{+} radiations

E(decay)	E(level)	Iβ^{+} †	Iε†	Log *ft*	I(ε+β^{+})†	Comments
(1252 *4*)	13093	2.9×10^{-6} *15*	2.0×10^{-5} *10*	4.87 *23*	0.23×10^{-4} *12*	av Eβ=92.3 *17*; εK=0.796 *7*; εL=0.0722 *6*; εM+=0.00699 *6*
(1446.1 *16*)	12899	9.×10^{-5} *3*	7.2×10^{-5} *22*	4.44 *14*	1.6×10^{-4} *5*	av Eβ=169.78 *64*; εK=0.407 *3*; εL=0.0369 *3*; εM+=0.00357 *3*
(1620.1 *16*)	12725	0.00015 *5*	3.8×10^{-5} *12*	4.81 *14*	1.9×10^{-4} *6*	av Eβ=241.48 *66*; εK=0.1842 *13*; εL=0.01671 *12*; εM+=0.001618 *12*
(1631.1 *16*)	12714	2.2×10^{-5} *6*	5.2×10^{-6} *14*	5.68 *12*	2.7×10^{-5} *7*	av Eβ=246.08 *66*; εK=0.1754 *12*; εL=0.01592 *11*; εM+=0.001541 *11*
(1772.1 *16*)	12573	0.00034 *8*	4.1×10^{-5} *10*	4.86 *11*	3.8×10^{-4} *9*	av Eβ=305.62 *67*; εK=0.0980 *6*; εL=0.00889 *6*; εM+=0.000861 *6*
(1795.1 *16*)	12550	6.4×10^{-5} *6*	7.0×10^{-6} *7*	5.64 *5*	7.1×10^{-5} *7*	av Eβ=315.44 *67*; εK=0.0898 *6*; εL=0.00814 *5*; εM+=0.000789 *5*
(1902.1 *16*)	12443	0.0011 *3*	8.1×10^{-5} *20*	4.63 *11*	1.2×10^{-3} *3*	av Eβ=361.45 *68*; εK=0.0612 *4*; εL=0.00555 *3*; εM+=0.000538 *3*
(2056.1 *16*)	12289	0.00068 *17*	2.9×10^{-5} *7*	5.13 *11*	7.1×10^{-4} *18*	av Eβ=428.61 *69*; εK=0.03766 *18*; εL=0.003416 *16*; εM+=0.0003308 *1*
(2274.1 *16*)	12071	8.7×10^{-5} *21*	2.1×10^{-6} *5*	6.37 *11*	8.9×10^{-5} *22*	av Eβ=525.30 *70*; εK=0.02107 *8*; εL=0.001910 *8*; εM+=0.0001850 *7*
(2414.1 *16*)	11931	<0.0009	<2.×10^{-5}	>5.6	<9×10^{-4}	av Eβ=588.24 *71*; εK=0.01526 *6*; εL=0.001384 *5*; εM+=0.0001340 *5*
(2688.1 *16*)	11657	0.00024 *6*	2.3×10^{-6} *6*	6.47 *11*	2.4×10^{-4} *6*	av Eβ=712.87 *72*; εK=0.00884 *3*; εL=0.0008019 *2*; εM+=7.764×10^{-5} *22*

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^{28}P ε decay 1996Og01,1982Wa05 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(2830.1 *16*)	11515	7.6×10^{-5} *20*	5.8×10^{-7} *15*	7.11 *12*	7.7×10^{-5} *20*	av Eβ=778.27 *73*; εK=0.006906 *18*; εL=0.0006261 *1*; εM+=6.062×10^{-5} *16*
(3677.1 *12*)	10667.99	0.30 *1*	0.00072 *2*	4.250 *15*	0.30 *1*	av Eβ=1175.80 *58*; εK=0.002177 *3*; εL=0.0001973 *3*; εM+=1.910×10^{-5} *3*
(4136.3 *19*)	10208.8	0.029 *4*	4.3×10^{-5} *6*	5.57 *6*	0.029 *4*	av Eβ=1394.99 *93*; εK=0.0013521 *2*; εL=0.00012254; εM+=1.1863×10^{-5} *2*
(4549.3 *16*)	9795.8	0.053 *7*	5.4×10^{-5} *7*	5.56 *6*	0.053 *7*	av Eβ=1593.69 *76*; εK=0.0009332 *1*; εL=8.457×10^{-5} *12*; εM+=8.187×10^{-6} *11*
(4866.0 *15*)	9479.1	0.065 *7*		5.64 *5*	0.065 *7*	av Eβ=1746.84 *73*
(4963.9 *13*)	9381.2	0.59 *3*		4.728 *23*	0.59 *3*	av Eβ=1794.30 *62*
(5029.3 *12*)	9315.78	11.3 *4*	0.0079 *3*	3.478 *16*	11.3 *4*	av Eβ=1826.05 *59*; εK=0.0006387 *6*; εL=5.788×10^{-5} *6*; εM+=5.603×10^{-6} *5*
(5756.3 *12*)	8588.80	3.64 *11*	0.00156 *5*	4.303 *14*	3.64 *11*	av Eβ=2180.14 *60*; εK=0.0003894 *3*; εL=3.528×10^{-5} *3*; εM+=3.416×10^{-6} *3*
(6086.1 *13*)	8259.0	0.537 *11*		5.269 *9*	0.537 *11*	av Eβ=2341.45 *62*
(6411.6 *12*)	7933.52	2.84 *20*		4.67 *3*	2.84 *20*	av Eβ=2500.98 *60*
(6545.9 *12*)	7799.21	2.44 *9*		4.787 *16*	2.44 *9*	av Eβ=2566.90 *60*
(6929.2 *13*)	7415.9	0.19 *6*		6.03 *14*	0.19 *6*	av Eβ=2755.88 *64*
(8068.7 *12*)	6276.40	7.6 *4*	0.0010 *1*	4.788 *23*	7.6 *4*	av Eβ=3317.06 *60*; εK=0.000120; εL=1.0850×10^{-5} *6*; εM+=1.0504×10^{-6} *6*
(9727.6 *12*)	4617.53	1.29 *18*		5.99 *6*	1.29 *18*	av Eβ=4138.17 *60*
(12566.1 *12*)	1779.030	69.1 *7*	0.00210 *3*	4.851 *5*	69.1 *7*	av Eβ=5548.46 *60*; εK=2.7685×10^{-5} *9*; εL=2.5076×10^{-6} *8*; εM+=2.4276×10^{-7} *8*

† Absolute intensity per 100 decays.

$\gamma(^{28}Si)$

E$_\gamma$†	I$_\gamma$†‡	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
(611.24)	<0.0004	(6887.65)	4$^+$	6276.40	3$^+$
(911.53)	0.004 *CA*	7799.21	3$^+$	6887.65?	4$^+$
1352.15 *15*	0.140 *2*	10667.99	(2 to 4)$^+$	9315.78	3$^+$
1516.5 *4*	0.204 *14*	9315.78	3$^+$	7799.21	3$^+$
1522.78 *10*	0.86 *3*	7799.21	3$^+$	6276.40	3$^+$
1657.1	0.40 *17*	7933.52	2$^+$	6276.40	3$^+$
1658.81#	0.80 *17*	6276.40	3$^+$	4617.53	4$^+$
1778.969 *11*	97.5 *5*	1779.030	2$^+$	0.0	0$^+$
(2063.04)	0.0003 *CA*	9479.1	(2$^+$)	7415.9	2$^+$
(2098.34)	0.0004 *CA*	9479.1	(2$^+$)	7380.59?	2$^+$
(2261.07)	<0.0003	(6878.79)	3$^-$	4617.53	4$^+$
(2269.92)	<0.0005	(6887.65)	4$^+$	4617.53	4$^+$
2312.3 *1*	0.196 *6*	8588.80	3$^+$	6276.40	3$^+$
(2400.37)	<0.0001	(7380.59)	2$^+$	4980.0	0$^+$
(2734.19)	0.003 *CA*	10667.99	(2 to 4)$^+$	7933.52	2$^+$
2838.29 *15*	2.35 *5*	4617.53	4$^+$	1779.030	2$^+$
2953.35 *25*	0.081 *3*	7933.52	2$^+$	4980.0	0$^+$
3039.16 *17*	2.70 *7*	9315.78	3$^+$	6276.40	3$^+$
3104.4 *4*	0.024 *4*	9381.2	2$^+$	6276.40	3$^+$
3181.3 *4*	0.032 *3*	7799.21	3$^+$	4617.53	4$^+$
3200.7 *5*	0.186 *9*	4980.0	0$^+$	1779.030	2$^+$
3252.6 *7*	0.032 *3*	10667.99	(2 to 4)$^+$	7415.9	2$^+$

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^{28}P ε decay 1996Og01,1982Wa05 (continued)

$\gamma(^{28}Si)$ (continued)

E_γ [†]	I_γ [†‡]	E_i(level)	J_i^π	E_f	J_f^π
3278.8 *5*	0.098 *4*	8259.0	$2^{(+)}$	4980.0	0^+
(3286.99)	0.006 *CA*	10667.99	$(2\ to\ 4)^+$	7380.59?	2^+
3315.6 *4*	0.101 *6*	7933.52	2^+	4617.53	4^+
(3641.0)	0.002 *CA*	8259.0	$2^{(+)}$	4617.53	4^+
(3779.80)	0.02 *CA*	10667.99	$(2\ to\ 4)^+$	6887.65?	4^+
3970.9	0.116 *24*	8588.80	3^+	4617.53	4^+
(4390.86)	0.015 *CA*	10667.99	$(2\ to\ 4)^+$	6276.40	3^+
4496.92 *25*	11.0 *3*	6276.40	3^+	1779.030	2^+
(4498.33)	0.003 *CA*	9479.1	(2^+)	4980.0	0^+
(4860.67)	0.004 *CA*	9479.1	(2^+)	4617.53	4^+
(5098.77)	<0.005	(6878.79)	3^-	1779.030	2^+
(5107.63)	<0.042	(6887.65)	4^+	1779.030	2^+
(5600.37)	<0.027	(7380.59)	2^+	1779.030	2^+
(5635.66)	0.01 *CA*	7415.9	2^+	1779.030	2^+
6019.47 *25*	1.75 *8*	7799.21	3^+	1779.030	2^+
6154.2 *4*	0.112 *10*	7933.52	2^+	1779.030	2^+
6479.1 *6*	0.385 *8*	8259.0	$2^{(+)}$	1779.030	2^+
6808.9 *4*	3.33 *11*	8588.80	3^+	1779.030	2^+
(6876.99)	<0.009	(6878.79)	3^-	0.0	0^+
(7378.52)	<0.015	(7380.59)	2^+	0.0	0^+
7415.6 *7*	0.21 *6*	7415.9	2^+	0.0	0^+
7535.7 *4*	8.5 *3*	9315.78	3^+	1779.030	2^+
7601.3 *6*	0.55 *3*	9381.2	2^+	1779.030	2^+
(7697.81)	0.002 *CA*	9479.1	(2^+)	1779.030	2^+
7932.1 *4*	2.15 *11*	7933.52	2^+	0.0	0^+
8015.5 *10*	0.040 *6*	9795.8	(2^+)	1779.030	2^+
8257.8 *6*	0.052 *6*	8259.0	$2^{(+)}$	0.0	0^+
8428.4 *15*	0.029 *4*	10208.8	(3^+)	1779.030	2^+
8887.3 *8*	0.086 *8*	10667.99	$(2\ to\ 4)^+$	1779.030	2^+
9380.4 *20*	0.0202 *25*	9381.2	2^+	0.0	0^+
9477.4 *9*	0.055 *7*	9479.1	(2^+)	0.0	0^+
9791 [#] *4*	0.013 *3*	9795.8	(2^+)	0.0	0^+

† From 1982Wa05, 1972De28, and 1972Wi23. γ-ray intensities are converted for 100 ^{28}P ε decay. γ-ray intensities for expected γ rays are calculated from γ-ray branchings and intensity balance of the deexciting level.

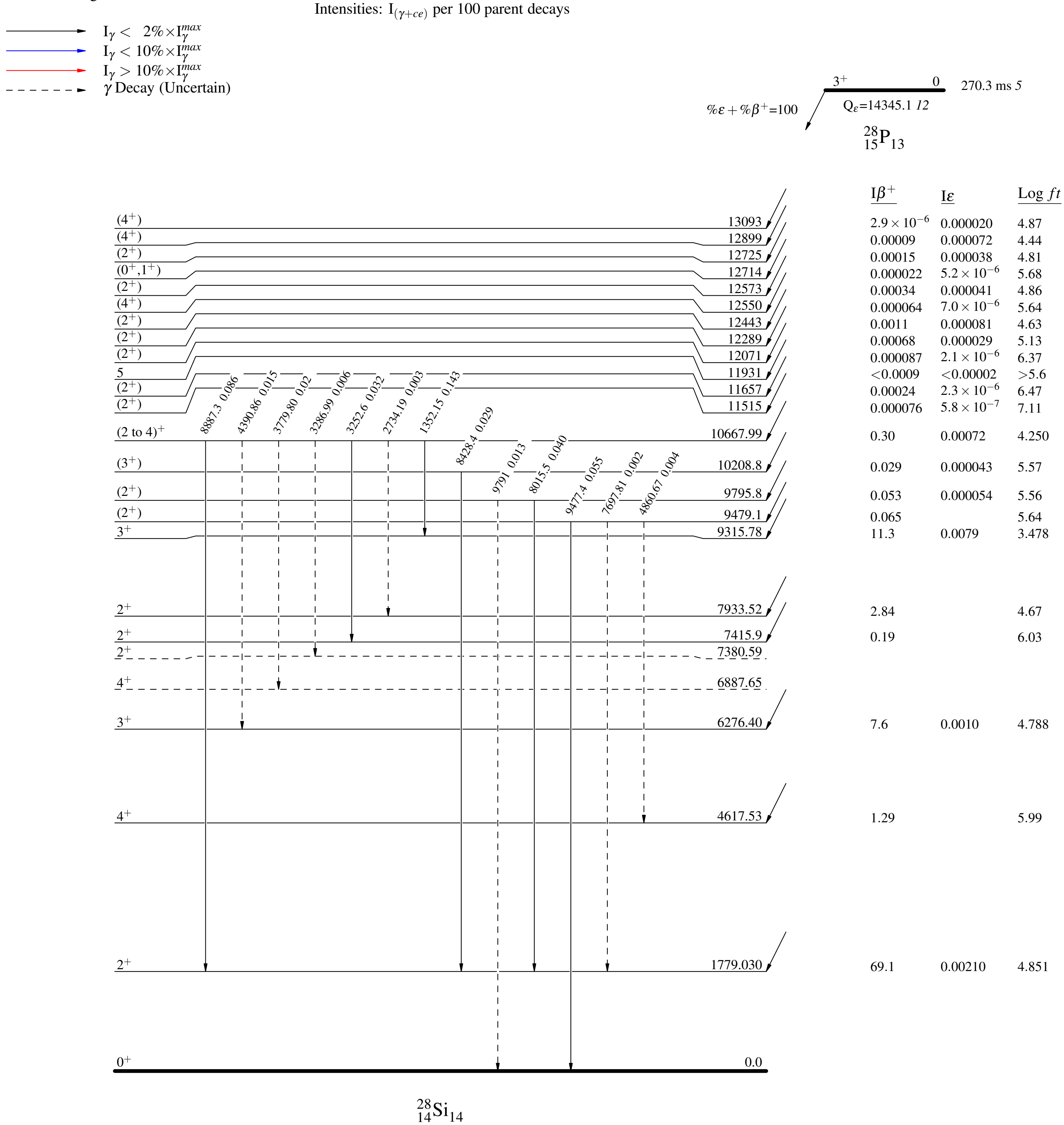
‡ Absolute intensity per 100 decays.

Placement of transition in the level scheme is uncertain.

^{28}P ε decay 1996Og01,1982Wa05

Decay Scheme

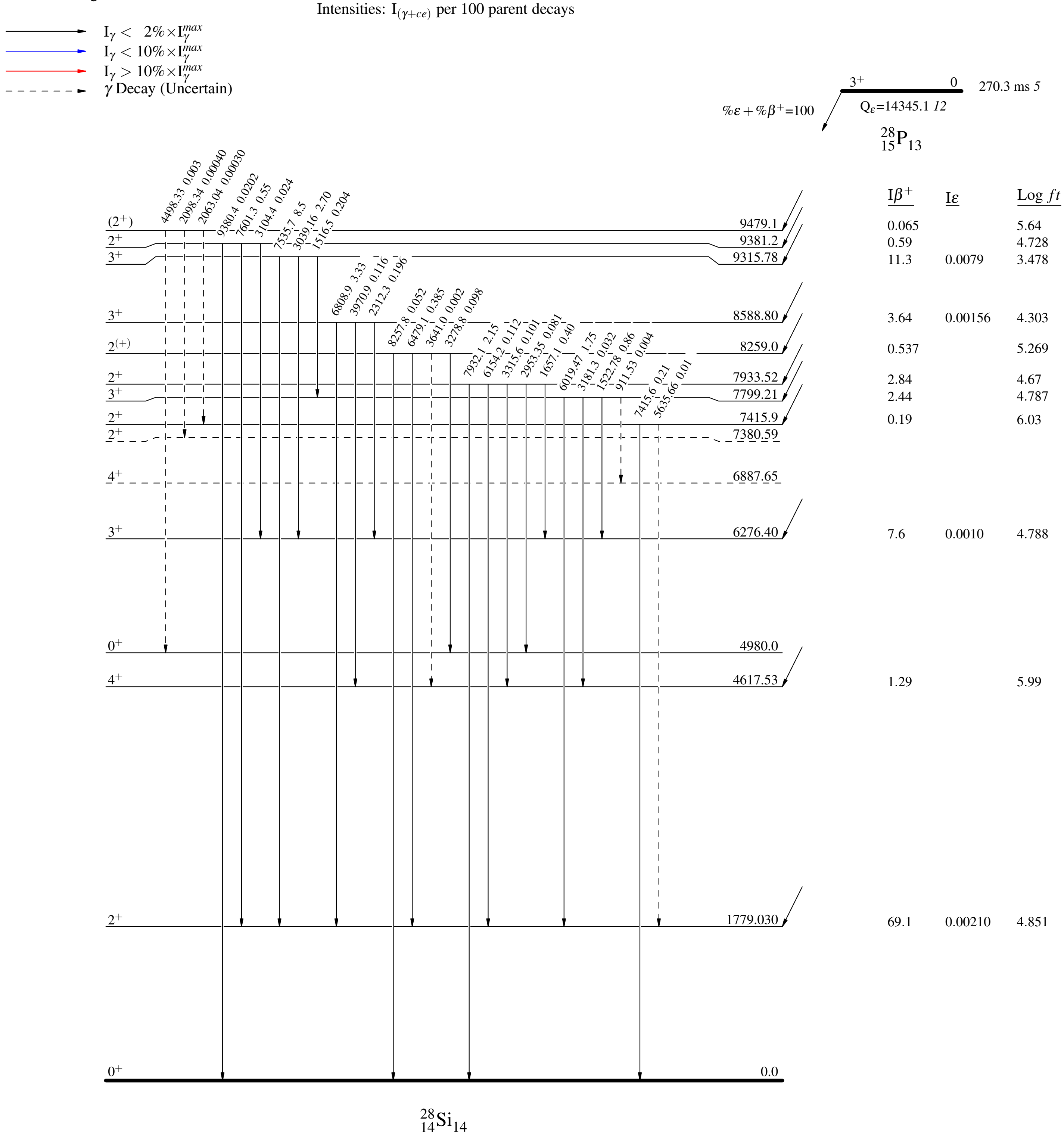
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{28}P ε decay 1996Og01,1982Wa05

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



^{28}P ε decay 1996Og01,1982Wa05

Decay Scheme (continued)