^{23}Al $\varepsilon+\beta^+$ decay:XUNDL-20 2025Go00

Parent: ^{23}Al: E=0; $J^\pi=5/2^+$; $T_{1/2}$=452 ms *4*; Q(ε)=12221.7 *30*; %ε+%β^+ decay=100
^{23}Al-J^π: From Adopted Levels of ^{23}Al in ENSDF database.
^{23}Al-$T_{1/2}$: From decay time distribution (2025Go00).
^{23}Al-Q($\varepsilon+\beta^+$): from 2021Wa16.
Compiled (unevaluated) dataset from 2025Go00: Phys Rev C xxx, xx43xx (2025).
Compiled by L. J. Sun (FRIB, MSU), November 24, 2024.
2025Go00: ^{23}Al εp decay – measured E_γ, I_γ, E_p, I_p, pγ-coin, $\gamma\gamma$-coin, decay-time distribution using the Gaseous Detector with Germanium Tagging system. Normalized I_p relative to I_p (839 keV (lab)) of 2011Sa15.

^{23}Mg Levels

E(level)	J^π	Comments
0.0 *0*	$3/2^+$	
450.75 *23*	$5/2^+$	
2050.75 *12*	$7/2^+$	
2357.69 *34*	$1/2^+$	
2713.96 *26*	$9/2^+$	
2769.9 *6*	$1/2^-$	
2904.41 *14*	$3/2^+$	
3859.9 *4*	$3/2^+,5/2^+$	
4681.34 *24*	$7/2^+$	
5288.4 *5*	$3/2^+,5/2^+$	
5654.4 *7*	$5/2^+$	
5691.5 *4*	$(1/2to9/2)^+$	
5711.1 *7*	$1/2^+,3/2^+,5/2^+$	
6129.7 *8*	$7/2^-$	
6239.0 *11*	$9/2^+$	
6515.0 *6*	$7/2^+$	
6544.7 *5*	$3/2^+,5/2^+$	
6574.31 *32*	$5/2^+$	
6907.0 *6*	$5/2^+$	
6987.0 *4*	$5/2^+$	
7787.2 *5*	$3/2^+,5/2^+$	E(p)(c.m.)=204 *20* (2025Go00).
7803.3 *4*	$5/2^+$	J^π: IAS of ^{23}Al g.s.
7856.15 *34*	$7/2^+$	E(p)(c.m.)=275 *20* (2025Go00).
8163.10 *12*	$5/2^+$	E(p)(c.m.)=583 *20* (2025Go00).
8449	$3/2^+,5/2^+$	E(p)(c.m.)=869 *20* (2025Go00).
8578	$3/2^+,5/2^+,7/2^+$	E(p)(c.m.)=869 *20* (2025Go00).
8762	$3/2^+$	E(p)(c.m.)=595 *20* (2025Go00).
8793	$(7/2^+)$	
8840	$3/2^+,5/2^+,7/2^+$	
8908	$(5/2^+)$	
9022	$3/2^+,5/2^+,7/2^+$	
9102	$3/2^+,5/2^+,7/2^+$	
9135	$3/2^+,5/2^+,7/2^+$	
9325	$3/2^+,5/2^+,7/2^+$	
9374	$7/2^+$	E(p)(c.m.)=898 *20* (2025Go00).
9421	$3/2^+,5/2^+,7/2^+$	
9468	$3/2^+,5/2^+,7/2^+$	
9604	$3/2^+,5/2^+,7/2^+$	
9673	$3/2^-$	

^{23}Al $\varepsilon+\beta^+$ decay:XUNDL-20 2025Go00 (continued)

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(2548.7 *33*)	9673	8.2×10^{-4} *21*	6.4×10^{-6} *17*	6.0 *1*	8.3×10^{-4} *21*	
(2617.7 *33*)	9604	0.00255 *31*	1.73×10^{-5} *23*	5.60 *6*	0.00257 *31*	
(2753.7 *33*)	9468	0.0085 *7*	4.5×10^{-5} *4*	5.23 *4*	0.0085 *7*	
(2800.7 *33*)	9421	0.0215 *12*	1.05×10^{-4} *6*	4.87 *3*	0.0216 *12*	
(2847.7 *33*)	9374	0.129 *15*	5.8×10^{-4}	4.15 *6*	0.130 *15*	
(2896.7 *33*)	9325	0.0060 *5*	2.5×10^{-5} *2*	5.53 *4*	0.0060 *5*	
(3086.7 *33*)	9135	0.0174 *11*	5.4×10^{-5} *4*	5.25 *3*	0.0174 *11*	
(3119.7 *33*)	9102	0.0032 *6*	9×10^{-6} *2*	6.0 *1*	0.0032 *6*	
(3199.7 *33*)	9022	0.00318 *32*	8.4×10^{-6}	6.08 *5*	0.00319 *32*	
(3313.7 *33*)	8908	0.0170 *10*	3.8×10^{-5} *2*	5.45 *3*	0.0170 *10*	
(3381.7 *33*)	8840	0.0059 *5*	1.2×10^{-5} *1*	5.97 *4*	0.0059 *5*	
(3428.7 *33*)	8793	0.0131 *8*	2.6×10^{-5} *2*	5.66 *3*	0.0131 *8*	
(3459.7 *33*)	8762	0.206 *15*	3.9×10^{-4} *3*	4.49 *3*	0.206 *15*	
(3643.7 *33*)	8578	0.0064 *5*	9.7×10^{-6} *8*	6.13 *4*	0.0064 *5*	
(3772.7 *33*)	8449	0.285 *23*	3.7×10^{-4} *3*	4.58 *4*	0.285 *23*	
(4058.6 *32*)	8163.10	0.078 *7*		5.33 *4*	0.078 *7*	
(4365.6 *32*)	7856.15	0.45 *5*	3.3×10^{-4} *4*	4.76 *5*	0.45 *5*	%Ip=0.121 *8* (2025Go00).
(4418.4 *32*)	7803.3	14.9 *10*	0.0104 *7*	3.27 *3*	14.9 *10*	
(4434.5 *32*)	7787.2	3.99 *27*	0.00275 *19*	3.85 *3*	3.99 *27*	%Ip=0.026 *3* (2025Go00), Ip=0.0257 *17* (2020Fr04).
(5234.7 *32*)	6987.0	4.44 *32*	0.00164 *12*	4.22 *3*	4.44 *32*	
(5314.7 *32*)	6907.0	0.38 *6*	1.3×10^{-4} *2*	5.3 *1*	0.38 *6*	
(5647.4 *32*)	6574.31	3.72 *27*	0.00104 *8*	4.49 *3*	3.72 *27*	
(5677.0 *32*)	6544.7	0.52 *7*	1.4×10^{-4} *2*	5.4 *1*	0.52 *7*	
(5706.7 *32*)	6515.0	2.36 *21*	6.4×10^{-4} *6*	4.71 *4*	2.36 *21*	
(5982.7 *34*)	6239.0	0.056 *15*		8.3 *+2−1*	0.056 *15*	
(6092.0 *33*)	6129.7	0.058 *12*		6.5 *1*	0.058 *12*	
(6510.6 *33*)	5711.1	0.19 *6*		6.1 *+2−1*	0.19 *6*	
(6530.2 *32*)	5691.5	1.34 *16*	2.2×10^{-4} *3*	5.28 *6*	1.34 *16*	
(6567.3 *33*)	5654.4	0.39 *4*		5.83 *5*	0.39 *4*	
(6933.3 *32*)	5288.4	0.85 *9*	1.2×10^{-4} *1*	5.62 *5*	0.85 *9*	
(7540.4 *32*)	4681.34	0.47 *6*		6.1 *1*	0.47 *6*	
(8361.8 *32*)	3859.9	0.11 *4*		7.0 *2*	0.11 *4*	
(9317.3 *32*)	2904.41	1.93 *20*		5.96 *5*	1.93 *20*	
(9451.8 *32*)	2769.9	0.051 *11*		9.8[1u] *1*	0.051 *11*	
(9507.7 *32*)	2713.96			0.0	0.0 *0*	
(9864.0 *32*)	2357.69	0.18 *4*		9.4 *1*	0.18 *4*	
(10171.0 *32*)	2050.75	3.9 *5*	1.4×10^{-4} *2*	5.9 *1*	3.9 *5*	
(11771.0 *32*)	450.75	22.7 *26*	5.2×10^{-4} *7*	5.43 *6*	22.7 *26*	
(12221.7 *32*)	0.0	36.3 *16*	7.4×10^{-4} *3*	5.31 *2*	36.3 *16*	

† Absolute intensity per 100 decays.

$\gamma(^{23}Mg)$

E_γ	I_γ†	E_i(level)	J_i^π	E_f	J_f^π
450.74 *23*	44.3 *25*	450.75	$5/2^+$	0.0	$3/2^+$
662.97 *20*	0.125 *22*	2713.96	$9/2^+$	2050.75	$7/2^+$
1599.50 *12*	5.6 *4*	2050.75	$7/2^+$	450.75	$5/2^+$
1831.6 *6*	0.058 *15*	5691.5	$(1/2\text{to}9/2)^+$	3859.9	$3/2^+,5/2^+$
1906.72 *29*	0.120 *18*	2357.69	$1/2^+$	450.75	$5/2^+$
1966.9 *5*	0.080 *16*	4681.34	$7/2^+$	2713.96	$9/2^+$

Continued on next page (footnotes at end of table)

^{23}Al $\varepsilon+\beta^+$ decay:XUNDL-20 2025Go00 (continued)

$\gamma(^{23}Mg)$ (continued)

E_γ	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
2050.77 *14*	0.80 *6*	2050.75	$7/2^+$	0.0	$3/2^+$
2263.26 *24*	0.218 *23*	2713.96	$9/2^+$	450.75	$5/2^+$
2358.3 *9*	0.056 *19*	2357.69	$1/2^+$	0.0	$3/2^+$
2453.52 *17*	1.16 *8*	2904.41	$3/2^+$	450.75	$5/2^+$
2630.83 *30*	0.130 *15*	4681.34	$7/2^+$	2050.75	$7/2^+$
2685.3 *4*	0.066 *12*	6544.7	$3/2^+,5/2^+$	3859.9	$3/2^+,5/2^+$
2769.7 *6*	0.051 *11*	2769.9	$1/2^-$	0.0	$3/2^+$
2904.21 *21*	1.73 *12*	2904.41	$3/2^+$	0.0	$3/2^+$
3047.2 *7*	0.040 *11*	6907.0	$5/2^+$	3859.9	$3/2^+,5/2^+$
3174.37 *35*	0.048 *11*	7856.15	$7/2^+$	4681.34	$7/2^+$
3238.19 *33*	0.199 *19*	5288.4	$3/2^+,5/2^+$	2050.75	$7/2^+$
3415.4 *7*	0.058 *13*	6129.7	$7/2^-$	2713.96	$9/2^+$
3640.9 *6*	0.101 *15*	5691.5	$(1/2to9/2)^+$	2050.75	$7/2^+$
3669.9 *6*	0.106 *16*	6574.31	$5/2^+$	2904.41	$3/2^+$
3859.6 *4*	0.270 *24*	3859.9	$3/2^+,5/2^+$	0.0	$3/2^+$
4082.4 *4*	0.76 *6*	6987.0	$5/2^+$	2904.41	$3/2^+$
4187.8 *10*	0.056 *15*	6239.0	$9/2^+$	2050.75	$7/2^+$
4230.2 *5*	0.310 *27*	4681.34	$7/2^+$	450.75	$5/2^+$
4465.6 *14*	0.083 *17*	6515.0	$7/2^+$	2050.75	$7/2^+$
4836.4 *5*	0.54 *5*	5288.4	$3/2^+,5/2^+$	450.75	$5/2^+$
4898.1 *11*	0.091 *20*	7803.3	$5/2^+$	2904.41	$3/2^+$
4935.9 *6*	0.43 *4*	6987.0	$5/2^+$	2050.75	$7/2^+$
5141.7 *8*	0.29 *4*	7856.15	$7/2^+$	2713.96	$9/2^+$
5242.1 *15*	0.28 *7*	5691.5	$(1/2to9/2)^+$	450.75	$5/2^+$
5260.9 *12*	0.082 *27*	5711.1	$1/2^+,3/2^+,5/2^+$	450.75	$5/2^+$
5289.3 *11*	0.114 *26*	5288.4	$3/2^+,5/2^+$	0.0	$3/2^+$
5653.6 *7*	0.39 *4*	5654.4	$5/2^+$	0.0	$3/2^+$
5689.7 *7*	0.90 *7*	5691.5	$(1/2to9/2)^+$	0.0	$3/2^+$
5709.0 *11*	0.110 *27*	5711.1	$1/2^+,3/2^+,5/2^+$	0.0	$3/2^+$
5735.8 *6*	0.79 *6*	7787.2	$3/2^+,5/2^+$	2050.75	$7/2^+$
5751.7 *7*	0.55 *5*	7803.3	$5/2^+$	2050.75	$7/2^+$
6062.3 *8*	2.15 *18*	6515.0	$7/2^+$	450.75	$5/2^+$
6122.4 *7*	2.08 *16*	6574.31	$5/2^+$	450.75	$5/2^+$
6513.0 *12*	0.130 *33*	6515.0	$7/2^+$	0.0	$3/2^+$
6534.8 *8*	1.07 *9*	6987.0	$5/2^+$	450.75	$5/2^+$
6543.0 *10*	0.45 *6*	6544.7	$3/2^+,5/2^+$	0.0	$3/2^+$
6573.3 *8*	1.54 *11*	6574.31	$5/2^+$	0.0	$3/2^+$
6905.7 *10*	0.34 *5*	6907.0	$5/2^+$	0.0	$3/2^+$
6985.7 *9*	2.17 *16*	6987.0	$5/2^+$	0.0	$3/2^+$
7335.1 *9*	3.17 *22*	7787.2	$3/2^+,5/2^+$	450.75	$5/2^+$
7351.2 *9*	4.76 *33*	7803.3	$5/2^+$	450.75	$5/2^+$
7802.5 *9*	9.5 *7*	7803.3	$5/2^+$	0.0	$3/2^+$

[†] Absolute intensity per 100 decays.

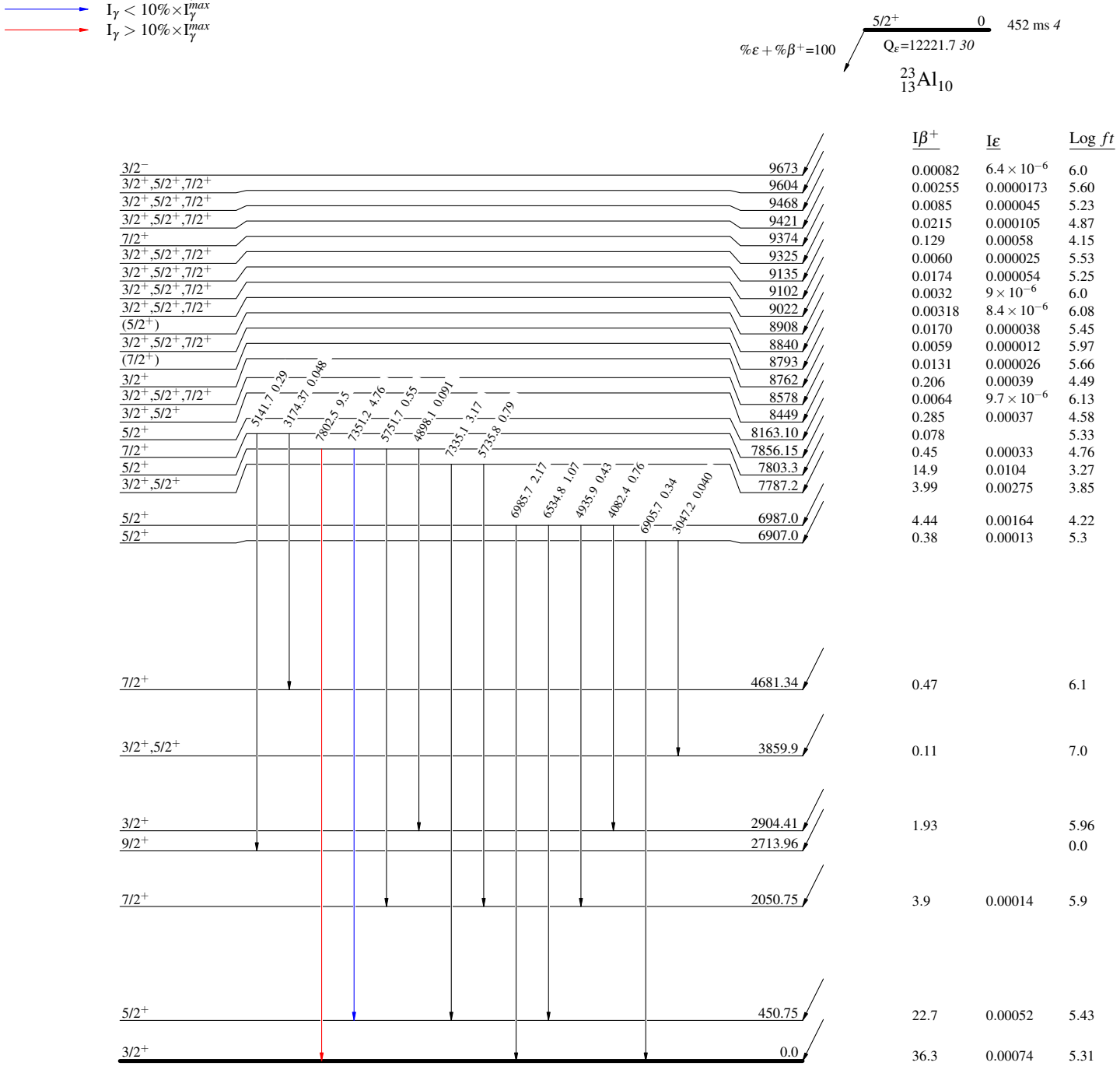
^{23}Al ε decay:XUNDL-20 2025Go00

Decay Scheme

Intensities: I_γ per 100 parent decays

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

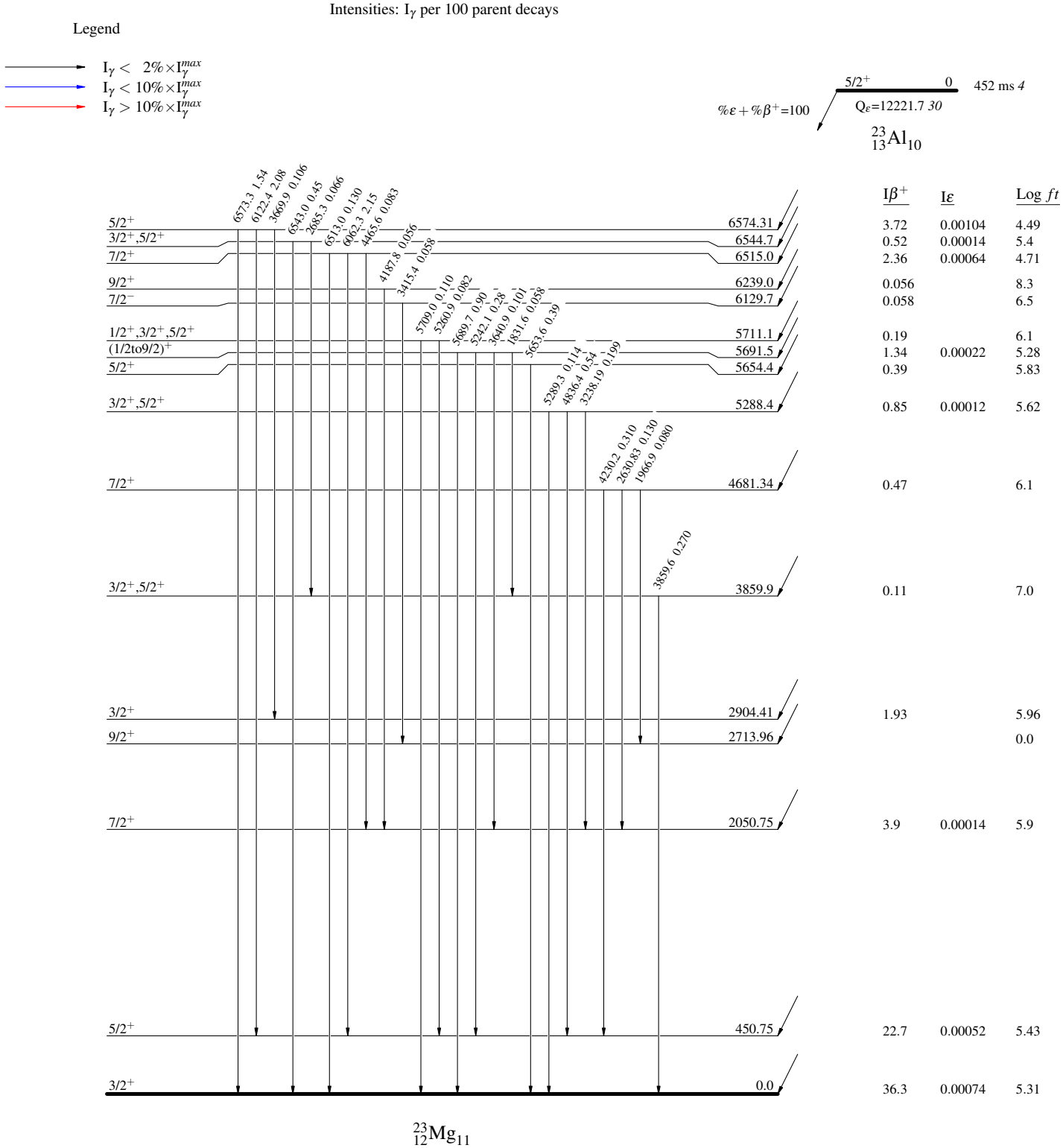


$I\beta^+$	$I\varepsilon$	Log *ft*
0.00082	6.4×10^{-6}	6.0
0.00255	0.0000173	5.60
0.0085	0.000045	5.23
0.0215	0.000105	4.87
0.129	0.00058	4.15
0.0060	0.000025	5.53
0.0174	0.000054	5.25
0.0032	9×10^{-6}	6.0
0.00318	8.4×10^{-6}	6.08
0.0170	0.000038	5.45
0.0059	0.000012	5.97
0.0131	0.000026	5.66
0.206	0.00039	4.49
0.0064	9.7×10^{-6}	6.13
0.285	0.00037	4.58
0.078		5.33
0.45	0.00033	4.76
14.9	0.0104	3.27
3.99	0.00275	3.85
4.44	0.00164	4.22
0.38	0.00013	5.3
0.47		6.1
0.11		7.0
1.93		5.96
		0.0
3.9	0.00014	5.9
22.7	0.00052	5.43
36.3	0.00074	5.31

^{23}Al ε decay:XUNDL-20 2025Go00

Decay Scheme (continued)

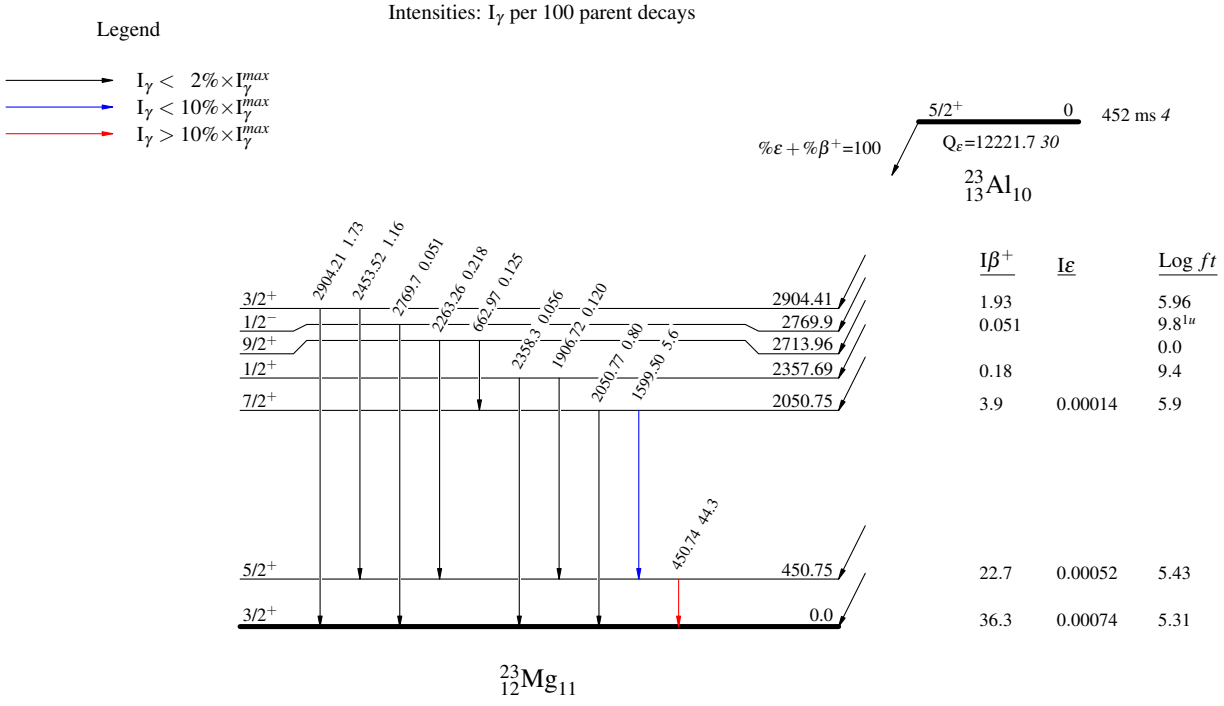
Intensities: I_γ per 100 parent decays



^{23}Al ε decay:XUNDL-20 2025Go00

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays



	Iβ+	Iε	Log *ft*
2904.41	1.93		5.96
2769.9	0.051		9.8[1u]
2713.96			0.0
2357.69	0.18		9.4
2050.75	3.9	0.00014	5.9
450.75	22.7	0.00052	5.43
0.0	36.3	0.00074	5.31