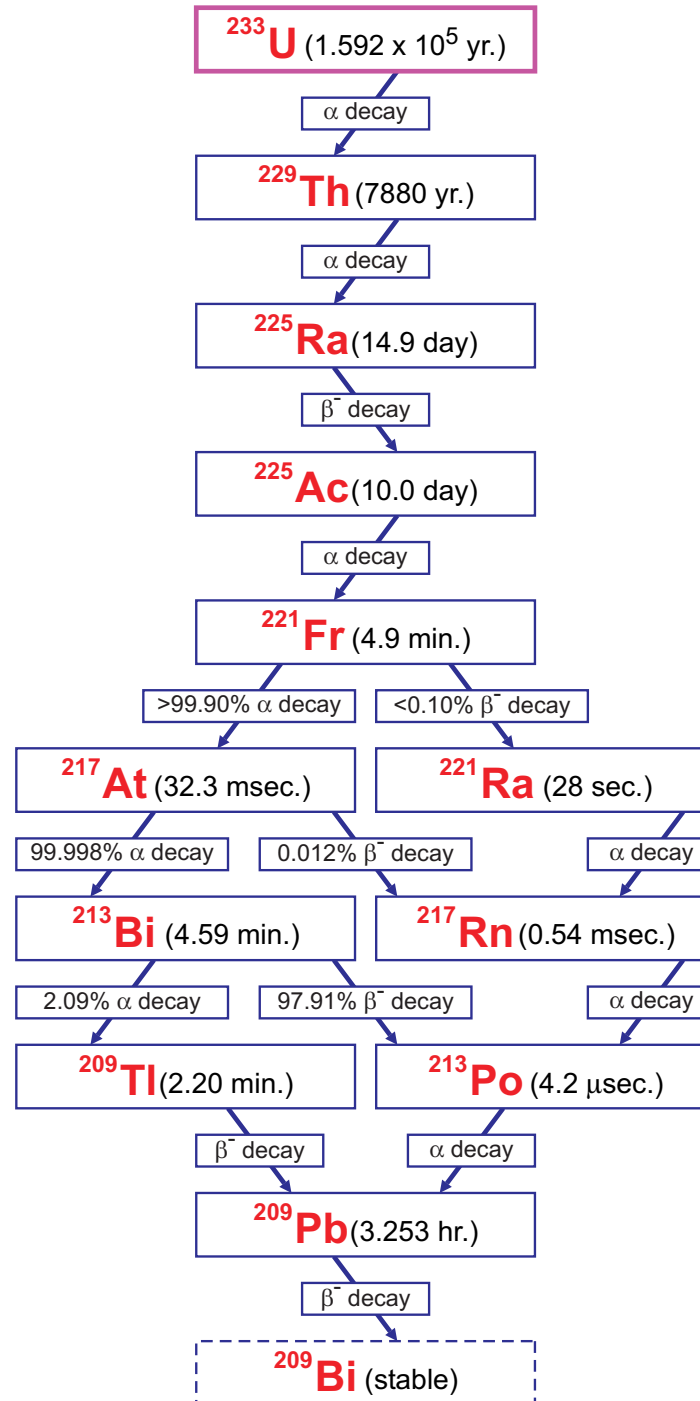


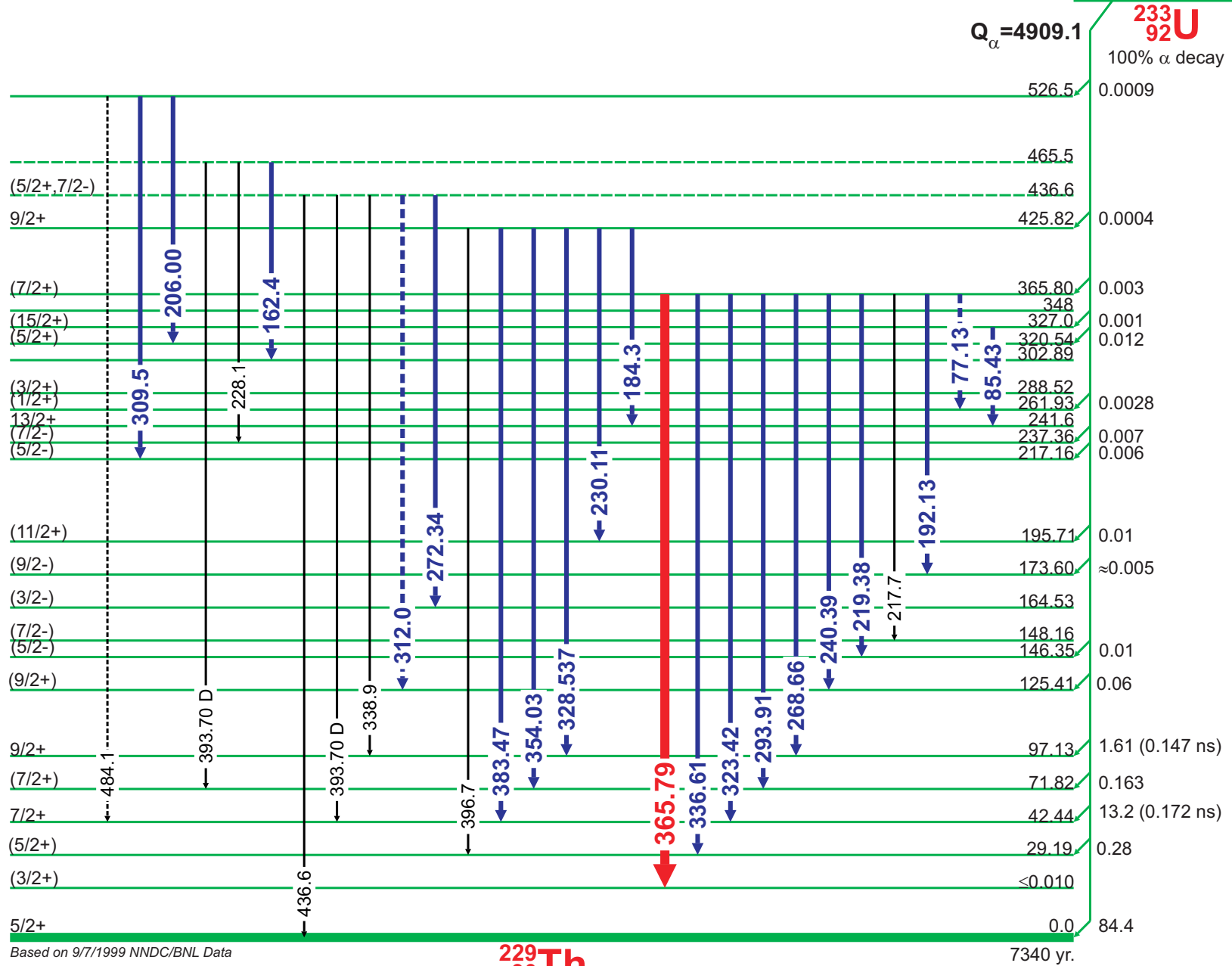
²³³U Decay Chain



²³³U (1.59 x 10⁵ yr.) Decay Scheme

Part 1 of 4

1.592x10⁵ yr.
5/2+ 0.0



²²⁹90Th

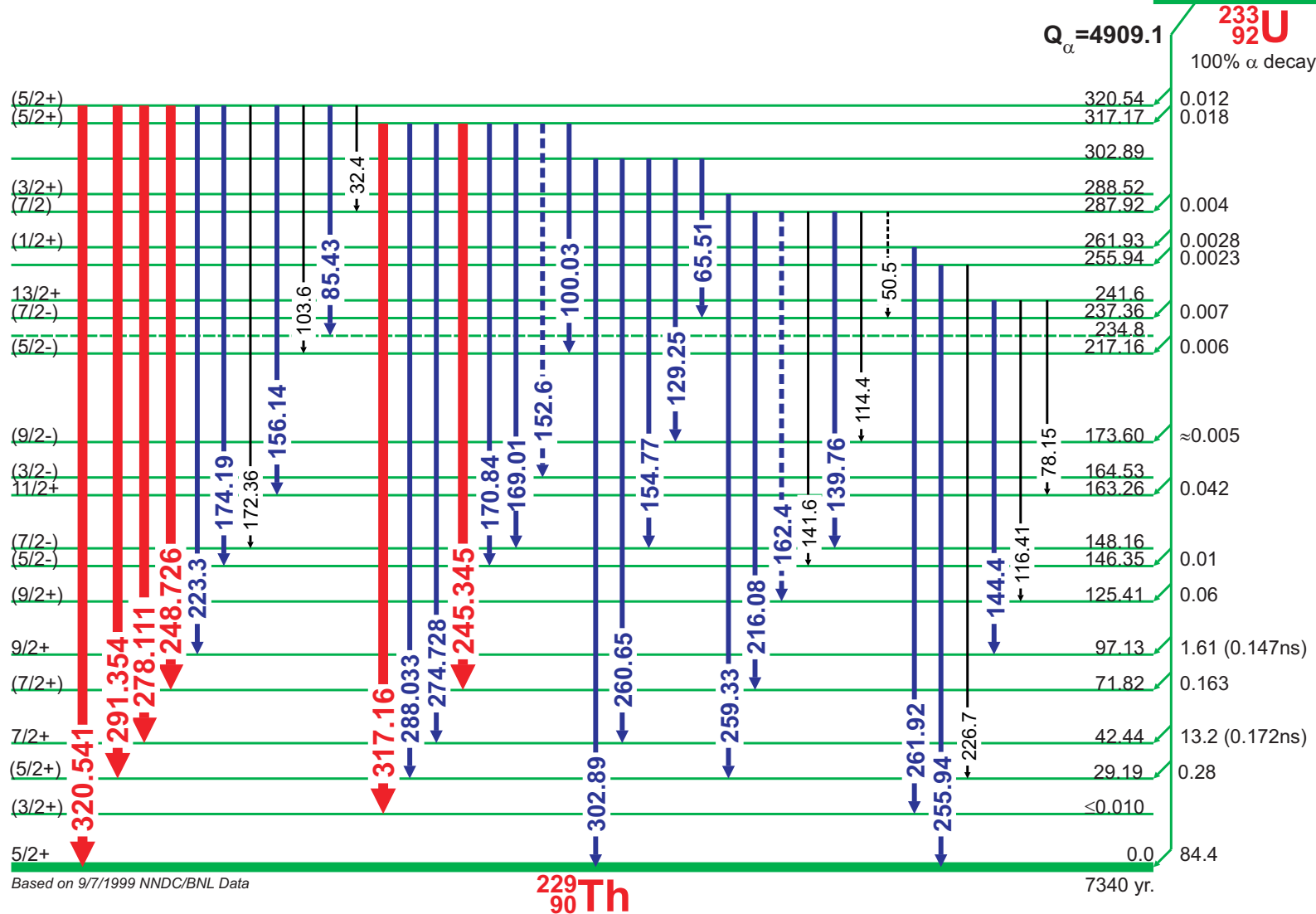
7340 yr.



²³³U (1.59 x 10⁵ yr.) Decay Scheme

Part 2 of 4

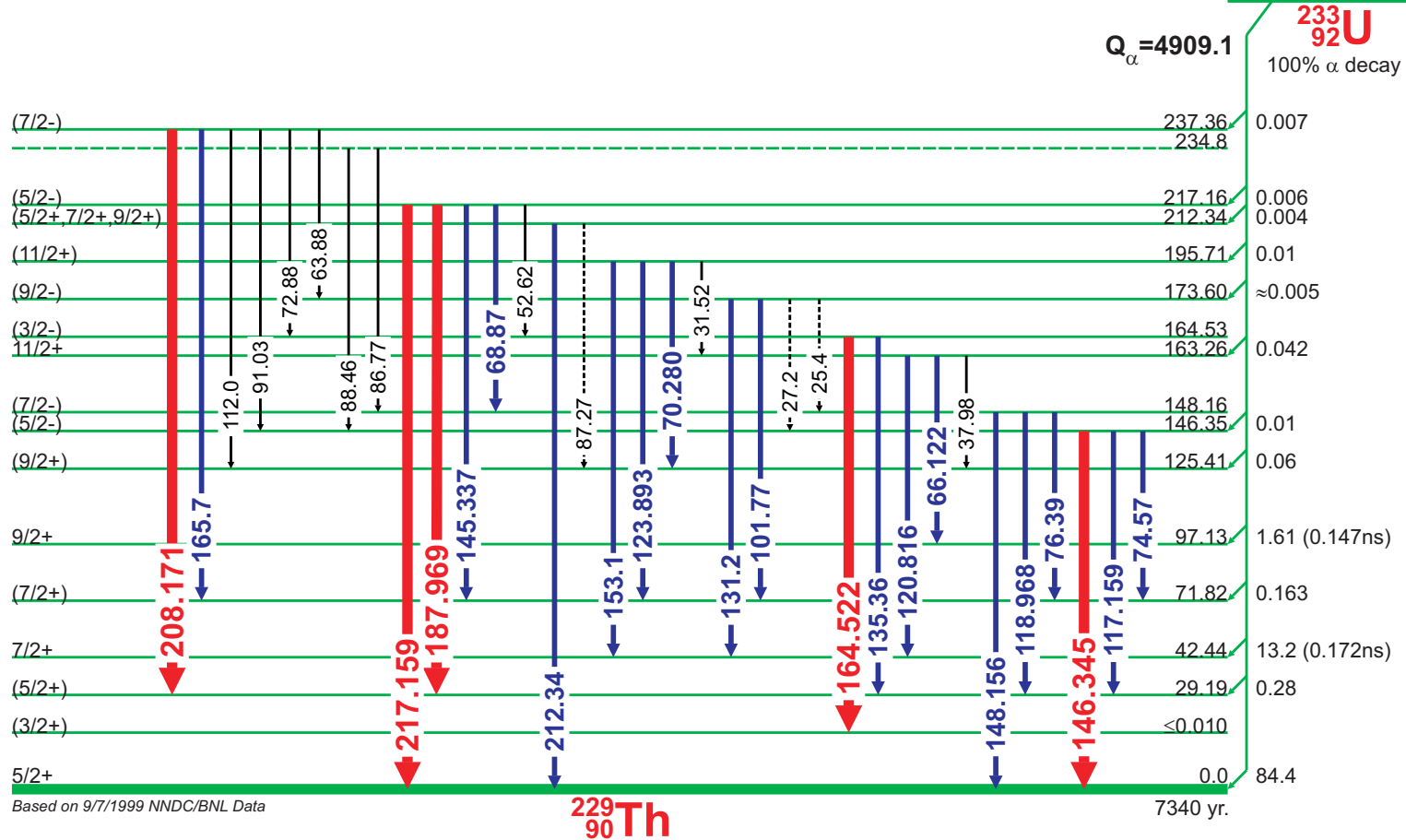
1.592x10⁵ yr.
5/2+ 0.0



²³³U (1.59 x 10⁵ yr.) Decay Scheme

Part 3 of 4

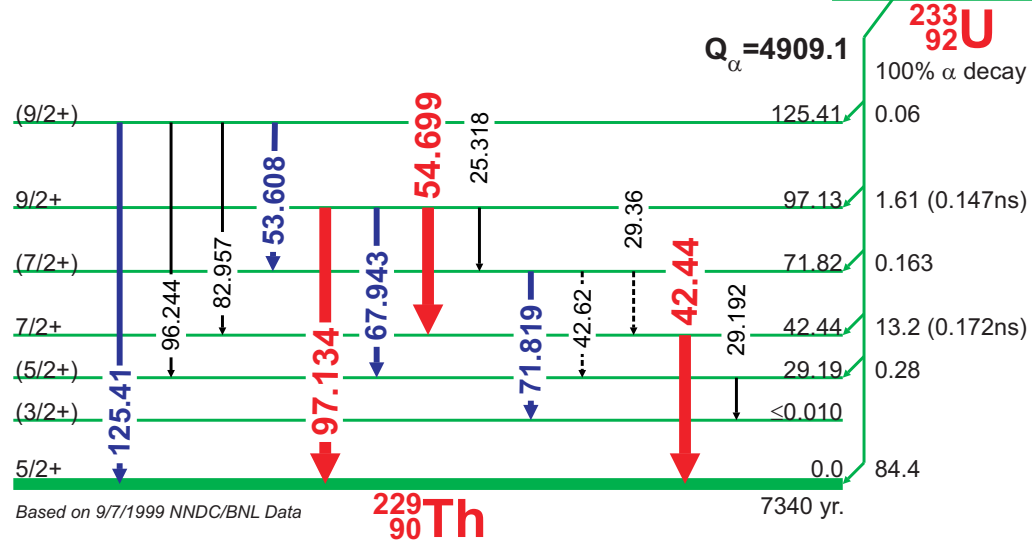
1.592x10⁵ yr.
5/2+ 0.0



²³³U (1.59 x 10⁵ yr.) Decay Scheme

Part 4 of 4

1.592x10⁵ yr.
5/2+ 0.0



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 3)

Nuclide: **²³³U**E_γ σE_γ I_γ σI_γ Levels- from ENSDF Database as of September 7, 1999

Half Life: 159200(2) yr.

E _γ (keV)	σ E _γ	I _γ	σ I _γ	Level		E _γ (keV)	σ E _γ	I _γ	σ I _γ	Level	
25.318	0.004	0.001 11	0.000 17	97.13	α	97.134	0.001	0.020 3	0.003 0	97.13	α
25.4				173.60	α	100.03	0.05	0.000 050	0.000 008	317.17	α
27.2				173.60	α	101.77	0.07	0.000 082	0.000 013	173.60	α
29.192	0.001	0.012 0	0.000 3	29.19	α	103.6	0.2	0.000 092	0.000 014	320.54	α
29.36				71.82	α	109.5	0.1	0.000 30	0.000 03		α
31.52	0.04	0.000 25	0.000 04	195.71	α	112.0	0.1	0.000 45	0.000 05	237.36	α
32.4	0.2	0.000 91	0.000 14	320.54	α	114.4	0.3	0.000 23	0.000 04	287.92	α
37.98	0.12	0.000 33	0.000 05	163.26	α	116.41	0.07	0.000 19	0.000 03	241.6	α
42.44	0.02	0.086 2	0.001 3	42.44	α	117.159	0.002	0.002 3	0.000 4	146.35	α
42.62				71.82	α	118.968	0.002	0.004 06	0.000 04	148.16	α
50.5				287.92	α	120.816	0.001	0.003 32	0.000 03	163.26	α
52.62	0.10	0.000 23	0.000 04	217.16	α	123.893	0.005	0.000 59	0.000 09	195.71	α
53.608	0.002	0.004 1	0.000 3	125.41	α	125.41	0.06	0.000 060	0.000 009	125.41	α
54.699	0.001	0.018 2	0.000 3	97.13	α	129.25	0.15	0.000 064	0.000 010	302.89	α
63.88	0.15	0.000 03		237.36	α	131.2	0.2	0.000 030	0.000 003	173.60	α
65.51	0.18			302.89	α	135.36	0.03	0.002 32	0.000 02	164.53	α
66.122	0.005	0.000 77	0.000 12	163.26	α	138.5		0.000 014	≈		α
67.943	0.006	0.000 29	0.000 05	97.13	α	139.76	0.06	0.000 096	0.000 015	287.92	α
68.87	0.05	0.000 098	0.000 015	217.16	α	141.6				287.92	α
70.280	0.004	0.000 55	0.000 08	195.71	α	144.4	0.2	0.000 27	0.000 04	241.6	α
71.819	0.002	0.002 4	0.000 4	71.82	α	145.337	0.004	0.001 5	0.000 3	217.16	α
72.88	0.07	0.000 54	0.000 08	237.36	α	146.345	0.002	0.006 57	0.000 06	146.35	α
74.57	0.05	0.001 50	0.000 23	146.35	α	148.156	0.008	0.000 33	0.000 05	148.16	α
76.39	0.08	0.000 36	0.000 06	148.16	α	149.83	0.12	0.000 117	0.000 018		α
77.13	0.04	0.000 66	0.000 10	365.80	α	152.6				317.17	α
78.15	0.10	0.000 055	0.000 009	241.6	α	153.1	0.2	0.000 050	0.000 008	195.71	α
82.957	0.030	0.000 16	0.000 02	125.41	α	154.77	0.12	0.000 14	0.000 02	302.89	α
84.5	0.2	0.000 07	0.000 03		α	156.14	0.16	0.000 053	0.000 008	320.54	α
85.43				320.54	α	162.4				287.92	α
85.43	0.02	0.000 17	0.000 03	327.0	α	162.4	0.2	0.000 069	0.000 011	465.5	α
86.77	0.15	0.000 12	0.000 03	234.8	α	164.522	0.002	0.006 23	0.000 05	164.53	α
87.27	0.11	0.000 17	0.000 03	212.34	α	165.7	0.1	0.000 35	0.000 06	237.36	α
88.46	0.08	0.000 40	0.000 06	234.8	α	169.01	0.05	0.000 062	0.000 010	317.17	α
91.03	0.10	0.000 30	0.000 05	237.36	α	170.84	0.05	0.000 13	0.000 02	317.17	α
96.244	0.002	0.001 27	0.000 19	125.41	α	172.36	0.12	0.000 032	0.000 005	320.54	α

① These I_γ are per 100 Decays of ²³³U.

② Normalization factor is 0.001, and its uncertainty is taken to be 0.0.

GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 3)

Nuclide: **²³³U**E_γ σE_γ I_γ σI_γ Levels- from ENSDF Database as of September 7, 1999

Half Life: 159200(2) yr.

E _γ (keV)	σ E _γ	^① I _γ	^② σ I _γ	Level		E _γ (keV)	σ E _γ	^① I _γ	^② σ I _γ	Level	
174.19	0.05	0.000 21	0.000 04	320.54	α	291.354	0.004	0.005 37	0.000 05	320.54	α
176.13	0.07	0.000 036	0.000 006		α	293.91	0.04	0.000 13	0.000 02	365.80	α
177.81	0.06	0.000 018	0.000 003		α	295.2	0.5	0.000 021	0.000 005		α
184.3	0.2	0.000 023	0.000 004	425.82	α	302.89	0.10	0.000 064	0.000 010	302.89	α
185.81	0.02	0.000 037	0.000 006		α	309.5	0.2	0.000 066	0.000 010	526.5	α
187.969	0.002	0.001 9	0.000 3	217.16	α	312.0	0.5	0.000 025	0.000 010	436.6	α
192.13	0.04	0.000 037	0.000 006	365.80	α	317.16	0.01	0.007 76	0.000 07	317.17	α
200.7	0.1	0.000 001			α	320.541	0.005	0.002 90	0.000 03	320.54	α
206.00	0.12	0.000 060	0.000 009	526.5	α	323.42	0.05	0.000 77	0.000 12	365.80	α
208.171	0.002	0.002 29	0.000 03	237.36	α	328.537	0.011	0.000 060	0.000 009	425.82	α
212.34	0.05	0.000 126	0.000 019	212.34	α	336.61	0.02	0.000 54	0.000 08	365.80	α
216.08	0.10	0.000 61	0.000 09	287.92	α	338.9	0.5	0.000 007	0.000 003	436.6	α
217.159	0.002	0.003 2	0.000 5	217.16	α	351.81	0.01	0.000 041	0.000 007		α
217.7		0.000 046	≈	365.80	α	354.03	0.03	0.000 053	0.000 008	425.82	α
219.38	0.05	0.000 14	0.000 03	365.80	α	365.79	0.01	0.000 75	0.000 12	365.80	α
223.3	0.2	0.000 030	0.000 004	320.54	α	383.47	0.08	0.000 087	0.000 013	425.82	α
225.0	0.3	0.000 009	0.000 002		α	384.0	0.5	0.000 014	0.000 002		α
226.7	0.3	0.000 009	0.000 002	255.94	α	393.70	0.15	0.000 007	0.000 003	436.6	α
228.1	0.1	0.000 020	0.000 002	465.5	α	393.70				465.5	α
230.11	0.02	0.000 062	0.000 010	425.82	α	396.7	0.1	0.000 008	0.000 001	425.82	α
236.42	0.21	0.000 046	0.000 007		α	402.4	0.2	0.000 008 0	0.000 000 8		α
240.39	0.06	0.000 35	0.000 06	365.80	α	406.7	0.3	0.000 005 0	0.000 000 5		α
245.345	0.002	0.003 62	0.000 03	317.17	α	416.4	0.2	0.000 009	0.000 003		α
248.726	0.006	0.001 43	0.000 21	320.54	α	436.6	0.4	0.000 004 6	0.000 000 7	436.6	α
252.53	0.11	0.000 034	0.000 005		α	449.5	0.2	0.000 009	0.000 003		α
255.94	0.04	0.000 039	0.000 006	255.94	α	459.8	0.2	0.000 008 0	0.000 000 8		α
259.33	0.04	0.000 16	0.000 03	288.52	α	471.1	0.2	0.000 014	0.000 002		α
260.65	0.22	0.000 098	0.000 015	302.89	α	478.6	0.2	0.000 014	0.000 002		α
261.92	0.05	0.000 28	0.000 05	261.93	α	484.1	0.2	0.000 004	0.000 001	526.5	α
268.66	0.03	0.000 23	0.000 04	365.80	α	514.0	0.5				α
272.34	0.05	0.000 057	0.000 009	436.6	α	537.6	0.5				α
274.728	0.010	0.000 40	0.000 06	317.17	α	540.3	0.2	0.000 005 0	0.000 000 5		α
278.111	0.008	0.001 08	0.000 17	320.54	α	545.1	0.3	0.000 002 3	0.000 000 2		α
284.25	0.15	0.000 010	0.000 001		α	562.8	0.5				α
288.033	0.005	0.000 97	0.000 15	317.17	α	569.4	0.2	0.000 003 6	0.000 000 4		α

① These I_γ are per 100 Decays of ²³³U.

② Normalization factor is 0.001, and its uncertainty is taken to be 0.0.

GAMMA-RAY ENERGIES AND INTENSITIES (page 3 of 3)

Nuclide: **²³³U**

Levels- from ENSDF Database as of September 7, 1999

Half Life: 159200(2) yr.

E_γ (keV)	σE_γ	I_γ	σI_γ	Level	
578.5	0.2	0.000 004 9	0.000 000 5		α
620.9	0.2	0.000 002 2	0.000 000 3		α
657.0	0.2	0.000 002 8	0.000 000 3		α
707.5	0.2	0.000 002 7	0.000 000 3		α
710.8	0.5				α
826.3	0.5				α

E_γ (keV)	σE_γ	I_γ	σI_γ	Level	
867.9	0.4	0.000 002 0	0.000 000 2		α
920.0	1.0				α
1,003.0	1.0	0.000 008 0	0.000 000 8		α
1,055.0	1.0				α
1,119.0	1.0	0.000 008 0	0.000 000 8		α

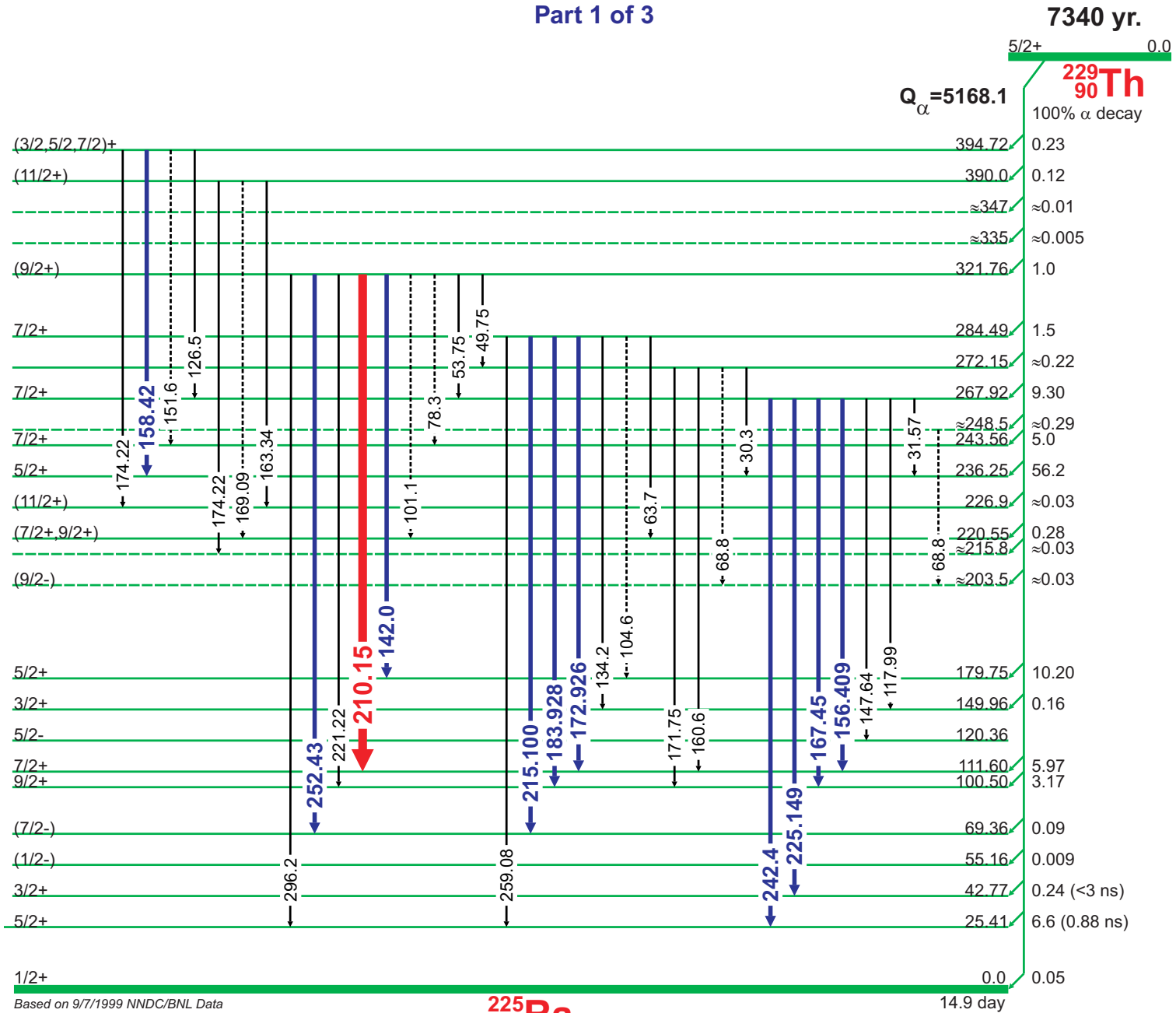
① These I_γ are per 100 Decays of ²³³U.

② Normalization factor is 0.001, and its uncertainty is taken to be 0.0.



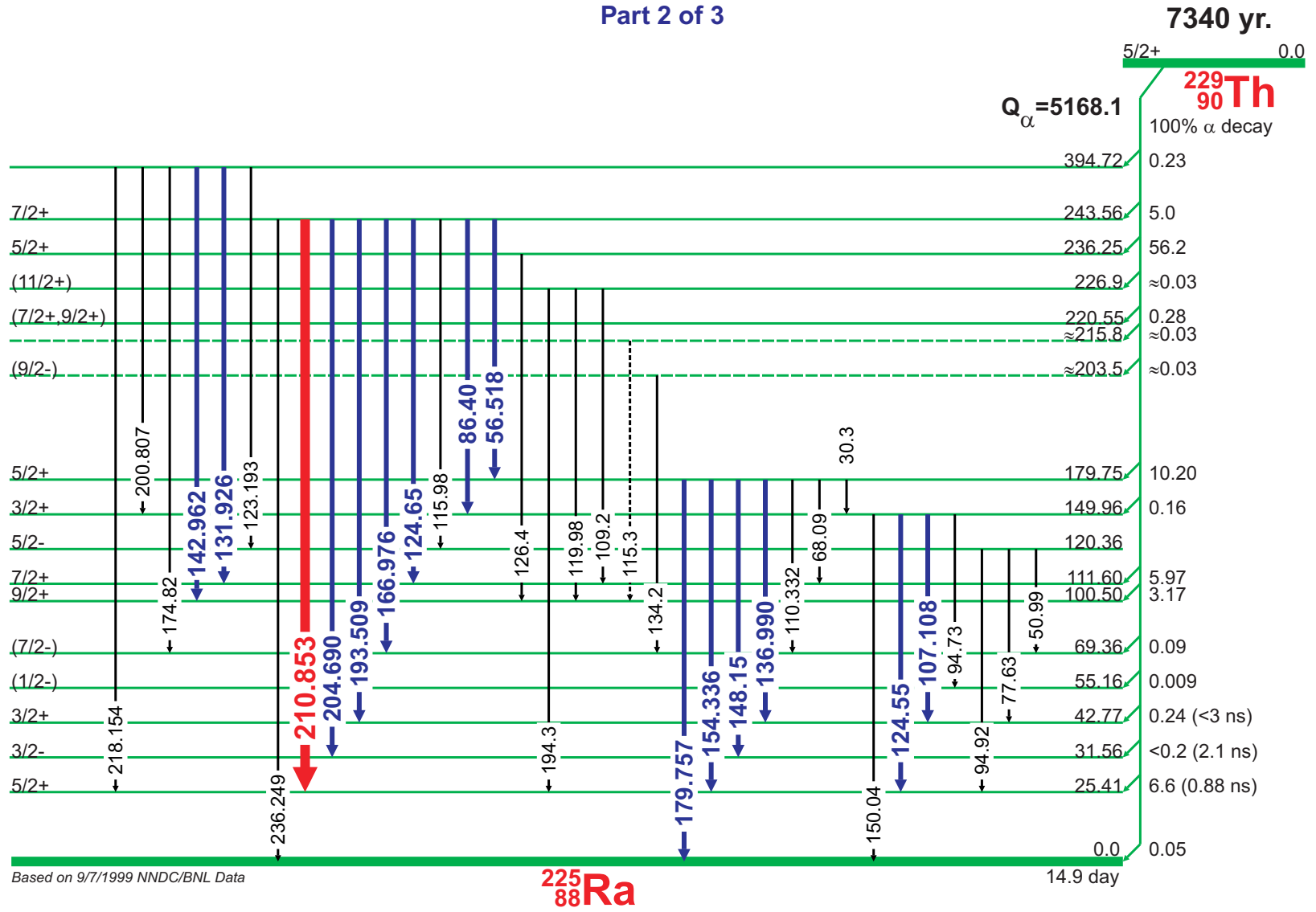
²²⁹Th (7340 yr.) Decay Scheme

Part 1 of 3



²²⁹Th (7340 yr.) Decay Scheme

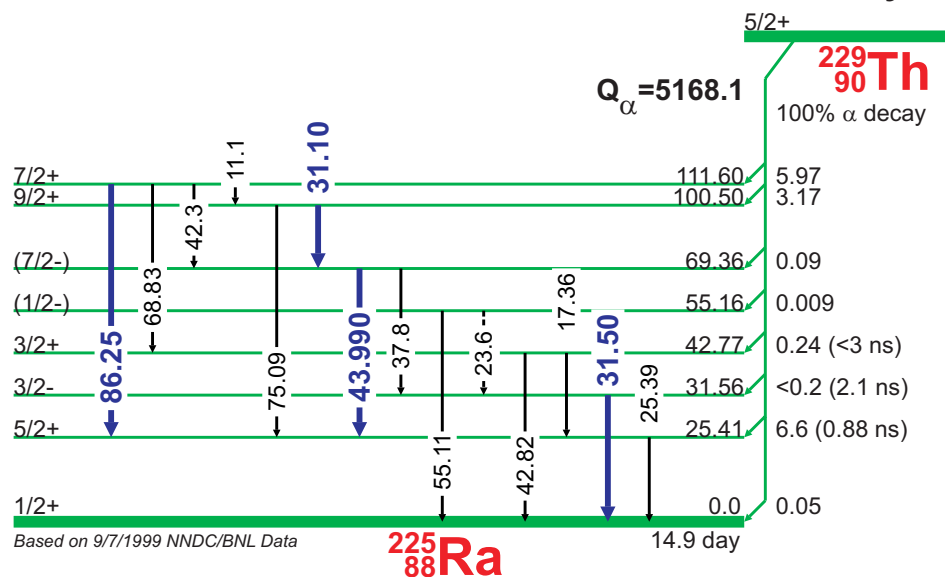
Part 2 of 3



^{229}Th (7340 yr.) Decay Scheme

Part 3 of 3

7340 yr.



GAMMA-RAY ENERGIES AND INTENSITIES (Page 1 of 2)

Nuclide: **²²⁹Th**E_γ, σE_γ, I_γ, σI_γ Levels- from ENSDF Database as of September 7, 1999

Half Life: 7340(160) yr.

E _γ (keV)	σ E _γ	I _γ	σ I _γ	Level	
11.1	0.1			111.60	α
17.36	0.03	0.18	0.09	42.77	α
21.58	0.02	0.007	0.010		α
23.6		0.0012	0.0001	55.16	α
25.39	0.02	0.008	0.004	25.41	α
27.50	0.02	0.035	0.017		α
30.3	0.1	0.038	0.013	179.75	α
30.3				272.15	α
31.10	0.05	0.84	0.08	100.50	α
31.50	0.05	1.19	0.04	31.56	α
31.57	0.09	0.068	0.010	267.92	α
37.8	0.1	0.0033	0.0016	69.36	α
42.3	0.1	0.082	0.008	111.60	α
42.82	0.05	0.16	0.01	42.77	α
43.990	0.010	0.66	0.03	69.36	α
46.52	0.04	0.021	0.002		α
49.75	0.08	0.022	0.002	321.76	α
50.99	0.04	0.017	0.004	120.36	α
53.2	0.1				α
53.75	0.20	0.011	0.003	321.76	α
55.11	0.03	0.0027	0.0004	55.16	α
56.518	0.005	0.29	0.02	236.25	α
63.7	0.2	0.005	0.002	284.49	α
68.09	0.04	0.069	0.010	179.75	α
68.8				272.15	α
68.8				248.5	α
68.83	0.03	0.136	0.013	111.60	α
72.739	0.010	0.14	0.02		α
75.09	0.07	0.61	0.13	100.50	α
75.3	0.1				α
77.63	0.05	0.045	0.006	120.36	α
78.3	0.2	0.008	0.002	321.76	α
86.25	0.04	1.3	0.1	111.60	α
86.40	0.05	2.6	0.1	236.25	α
88.43	0.08	0.027	0.006		α

E _γ (keV)	σ E _γ	I _γ	σ I _γ	Level	
94.73	0.02	0.27	0.02	149.96	α
94.92	0.08	0.013	0.003	120.36	α
101.1	0.2	0.018	0.003	321.76	α
104.6	0.2	0.009	0.003	284.49	α
107.108	0.008	0.81	0.04	149.96	α
109.2		0.044	0.008	220.55	α
110.332	0.008	0.124	0.012	179.75	α
115.3	0.4	0.028	0.004	215.8	α
115.98	0.10	0.017	0.003	236.25	α
117.99	0.15	0.013	0.004	267.92	α
119.98	0.02	0.05	0.02	220.55	α
123.193	0.013	0.151	0.007	243.56	α
124.55	0.05	0.69	0.06	149.96	α
124.65	0.05	0.74	0.06	236.25	α
126.4	0.2	0.02	0.01	226.9	α
126.5	0.3	0.011	0.005	394.72	α
129.04	0.03	0.016	0.010		α
131.926	0.005	0.336	0.012	243.56	α
132.6	0.1				α
134.2		0.003	≤	284.49	α
134.2	0.1	0.009	0.005	203.5	α
135.71	0.07				α
136.990	0.004	1.18	0.03	179.75	α
140.3	0.2				α
142.0	0.1	0.011	0.003	321.76	α
142.962	0.005	0.404	0.012	243.56	α
146.8		0.016	0.008		α
147.64	0.05	0.21	0.02	267.92	α
148.15	0.04	0.88	0.06	179.75	α
150.04	0.03	0.06	≤	149.96	α
151.6	0.3	0.026	≈	394.72	α
154.336	0.010	0.77	0.02	179.75	α
156.409	0.009	1.19	0.03	267.92	α
158.42	0.12	0.048	0.005	394.72	α
160.6				272.15	α

① These I_γ are per 100 Decays of ²²⁹Th.

② For total uncertainty add systematic component of 1.36% in quadrature, based on the normalization factor 1.026(14)

GAMMA-RAY ENERGIES AND INTENSITIES (Page 2 of 2)

Nuclide: **²²⁹Th**E_γ, σE_γ, I_γ, σI_γ Levels- from ENSDF Database as of September 7, 1999

Half Life: 7340(160) yr.

E _γ (keV)	σ E _γ	^① I _γ	^② σ I _γ	Level	
161.6	0.3				α
163.34	0.17	0.021	0.007	390.0	α
165.7	0.3				α
166.976	0.007	0.205	0.010	236.25	α
167.45	0.05	0.05	0.01	267.92	α
169.09	0.03			390.0	α
171.5	0.2	0.18	0.05		α
171.75	0.02	0.04	<	272.15	α
172.926	0.018	0.11	0.01	284.49	α
174.22	0.11	0.009	0.005	394.72	α
174.22	0.22	0.009	0.005	390.0	α
174.82	0.02	0.03	<	243.56	α
179.757	0.007	0.197	0.015	179.75	α
183.928	0.008	0.142	0.007	284.49	α
190.2	0.2				α
193.509	0.004	4.4		236.25	α
194.3	0.3	0.03	0.02	220.55	α
200.807	0.016	0.069	0.003	243.56	α

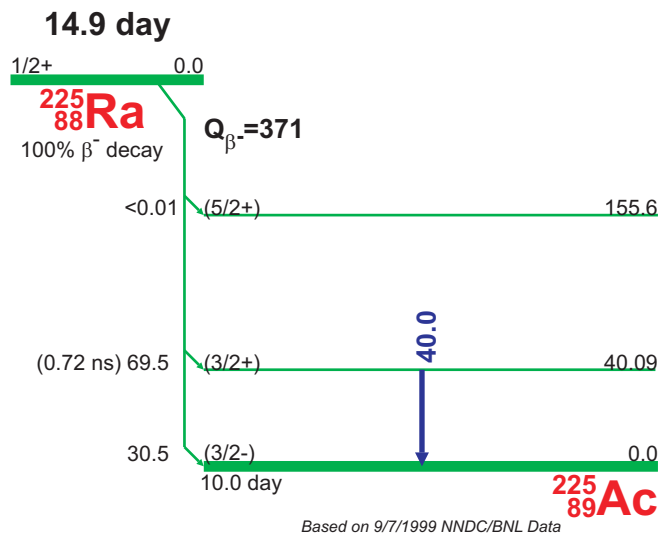
E _γ (keV)	σ E _γ	^① I _γ	^② σ I _γ	Level	
204.690	0.005	0.60	0.03	236.25	α
210.15	0.08	0.19	0.04	321.76	α
210.853	0.003	2.8	0.3	236.25	α
215.100	0.010	0.137	0.010	284.49	α
215.4					α
218.154	0.017	0.18	0.02	243.56	α
221.22	0.05	0.023	0.006	321.76	α
225.149	0.019	0.072	0.010	267.92	α
236.249	0.008	0.174	0.009	236.25	α
242.4	0.2	0.094	0.014	267.92	α
243.5	0.3				α
252.43	0.03	0.095	0.012	321.76	α
259.08	0.04	0.034	0.005	284.49	α
261.0	0.5				α
277.48	0.05				α
289.50	0.16	0.006	0.004		α
292.91	0.12				α
296.2	0.2	0.012	0.010	321.76	α

① These I_γ are per 100 Decays of ²²⁹Th.

② For total uncertainty add systematic component of 1.36% in quadrature, based on the normalization factor 1.026(14)



^{225}Ra (14.9 day) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{225}Ra

Half Life: 14.9(2) day

E_γ (keV)	σE_γ	I_γ	σI_γ	Level
40.0	1.0	30.0		40.09 β^-

E_γ , σE_γ , I_γ , σI_γ Levels from ENSDF Database as of September 7, 1999

① These I_γ are per 100 Decays of ^{225}Ra .

② For total uncertainty add 2.3% systematic component in quadrature, based on the normalization factor 0.300(7)



²²⁵Ac (10.0 day) Decay Scheme

Part 1 of 3

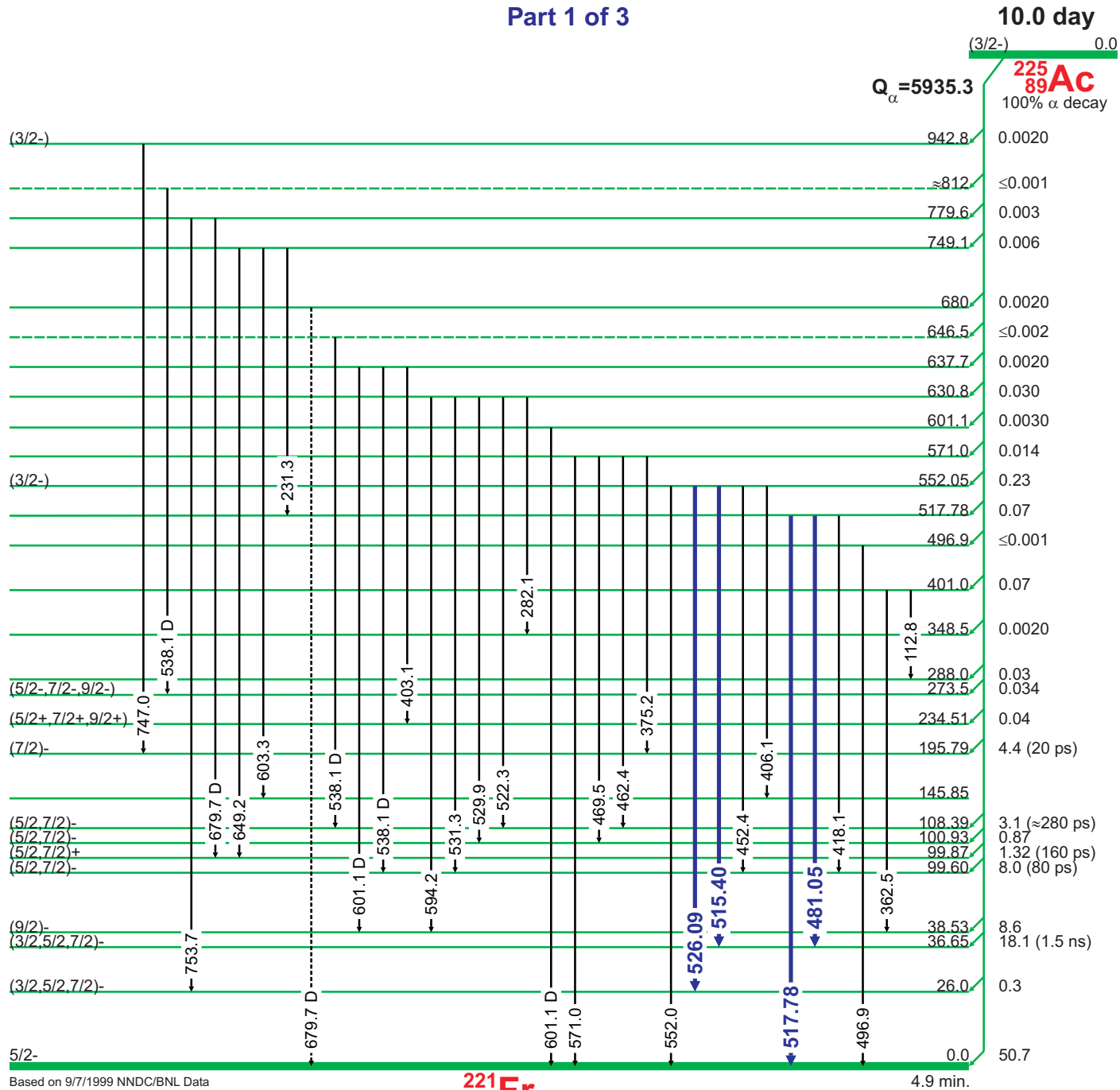
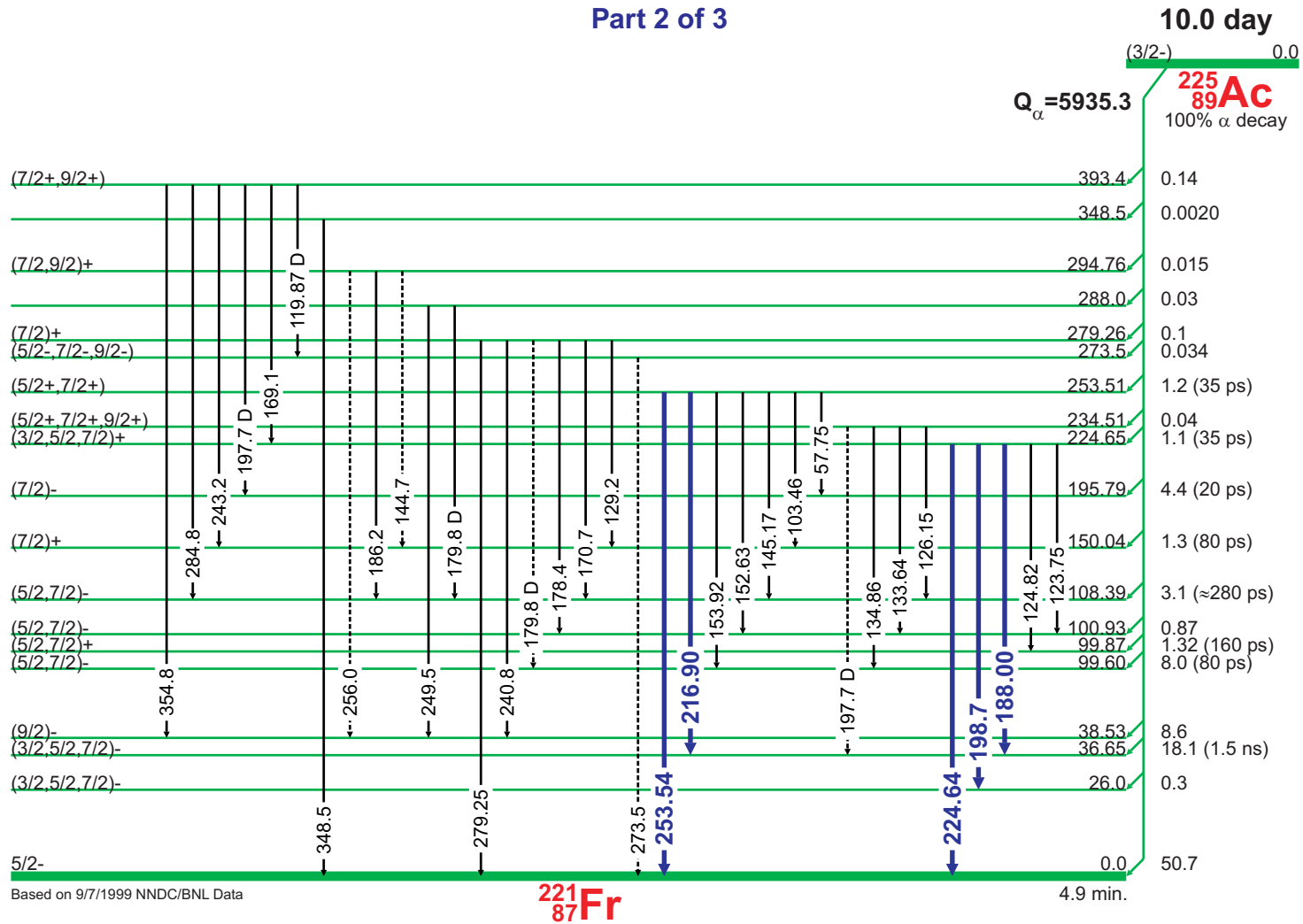


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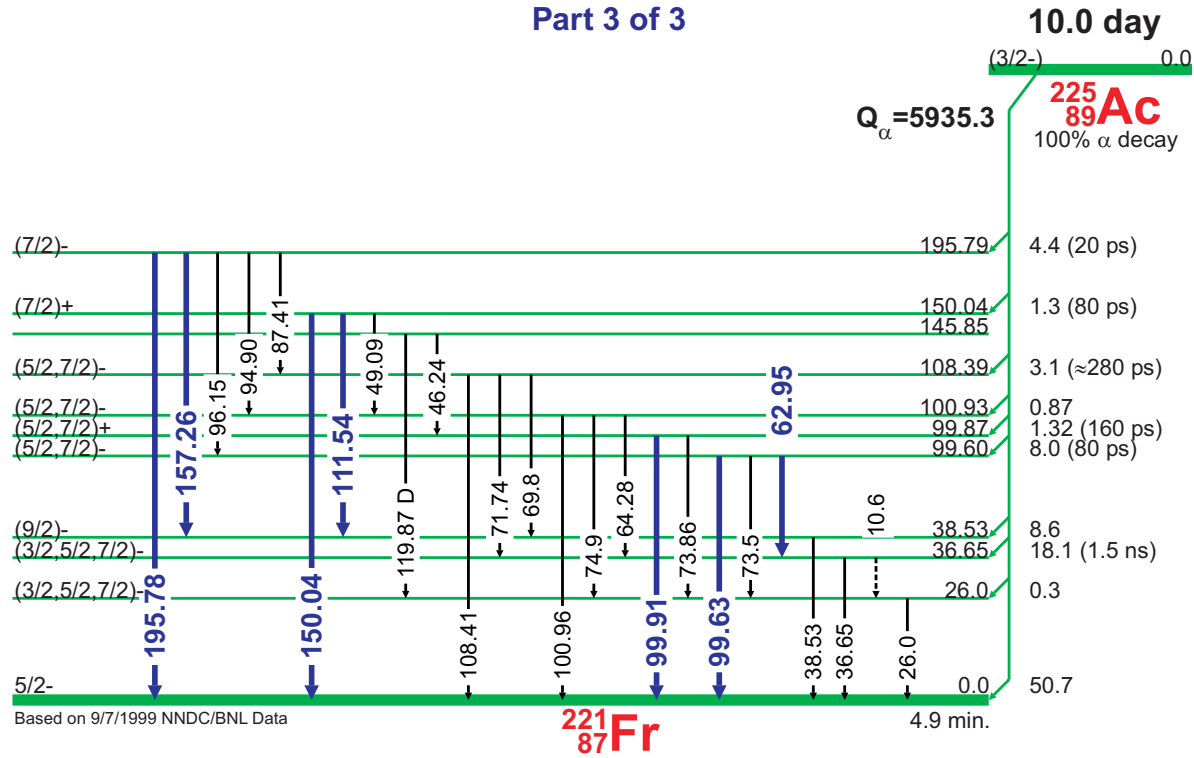
²²⁵Ac (10.0 day) Decay Scheme

Part 2 of 3



²²⁵Ac (10.0 day) Decay Scheme

Part 3 of 3



GAMMA-RAY ENERGIES AND INTENSITIES (page 1 of 2)

Nuclide: **²²⁵Ac**E_γ, σE_γ, I_γ, σI_γ, Levels- from ENSDF Database as of September 7, 1999

Half Life: 10.0(1) day

E _γ (keV)	σ E _γ	① I _γ	② σ I _γ	Level	
10.6				36.65	α
26.0	0.1	0.001 6	0.000 2	26.0	α
36.65	0.03	0.017	0.002	36.65	α
38.53	0.03	0.013	0.001	38.53	α
46.24	0.05	0.004	0.002	145.85	α
49.09	0.05	0.008	0.002	150.04	α
57.75	0.05	0.004	0.002	253.51	α
62.95	0.03	0.45	0.02	99.6	α
64.28	0.05	0.033	0.003	100.93	α
69.8	0.2	0.005	0.002	108.39	α
71.74	0.03	0.014	0.001	108.39	α
73.5	0.1	0.010	0.002	99.6	α
73.86	0.02	0.315	0.014	99.87	α
74.9	0.2	0.017	0.002	100.93	α
82.6		0.16	0.04		α
87.41	0.03	0.254	0.012	195.79	α
94.90	0.05	0.095	0.009	195.79	α
96.15	0.05	0.031	0.003	195.79	α
99.63	0.05	0.62	0.03	99.6	α
99.91	0.05	1.01	0.05	99.87	α
100.96	0.05	0.070	0.011	100.93	α
103.46	0.10	0.004	0.002	253.51	α
108.41	0.03	0.25	0.01	108.39	α
111.54	0.03	0.317	0.014	150.04	α
112.8	0.2	0.002	0.001	401	α
119.87	0.05	0.055	0.009	145.85	α
119.87	0.05	0.020	0.004	393.4	α
123.75	0.05	0.072	0.007	224.65	α
124.82	0.05	0.026	0.002	224.65	α
126.15	0.10	0.008	0.002	234.51	α
129.2	0.2	0.003	0.001	279.26	α
133.64	0.05	0.014	0.002	234.51	α
134.86	0.05	0.031	0.003	234.51	α
138.2		0.02	0.01		α
144.7	0.2	0.000 5	≈	294.76	α

E _γ (keV)	σ E _γ	① I _γ	② σ I _γ	Level	
145.17	0.05	0.146	0.007	253.51	α
150.04	0.02	0.80	0.03	150.04	α
152.63	0.05	0.017	0.002	253.51	α
153.92	0.05	0.187	0.009	253.51	α
157.26	0.02	0.36	0.02	195.79	α
169.1	0.2	0.019	0.002	393.4	α
170.7	0.2	0.008	0.003	279.26	α
178.4	0.1	0.014	0.001	279.26	α
179.8	0.2	0.008	0.002	288.0	α
179.8	0.2			279.26	α
186.2	0.1	0.020	0.004	294.76	α
188.00	0.05	0.540	0.027	224.65	α
195.78	0.05	0.16	0.01	195.79	α
197.7	0.1	0.060	0.005	393.4	α
197.7				234.51	α
198.7	0.1	0.024	0.005	224.65	α
216.90	0.05	0.32	0.07	253.51	α
224.64	0.05	0.096	0.009	224.65	α
231.3	0.2	0.002	0.001	749.1	α
240.8	0.1	0.008	0.002	279.26	α
243.2	0.1	0.001 3	0.000 5	393.4	α
249.5	0.2	0.012	0.005	288	α
253.54	0.05	0.123	0.005	253.51	α
256.0	0.2	0.000 3	0.000 1	294.76	α
273.5	0.3			273.5	α
279.25	0.10	0.019	0.002	279.26	α
282.1	0.2	0.004	0.002	630.8	α
284.8	0.1	0.004	0.002	393.4	α
348.5	0.1	0.003	0.001	348.5	α
354.8	0.2	0.001 6	0.000 4	393.4	α
362.5	0.1	0.007	0.002	401	α
375.2	0.1	0.003	0.001	571.0	α
403.1	0.1	0.001 4	0.000 4	637.7	α
406.1	0.1	0.008	0.002	552.05	α
418.1	0.1	0.005	0.001	517.78	α

① These I_γ are per 100 Decays of ²²⁵Ac.

② Normalization factor is 1.090, and its uncertainty is taken to be 0.0.



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GAMMA-RAY ENERGIES AND INTENSITIES (page 2 of 2)

Nuclide: **²²⁵Ac**E_γ, σE_γ, I_γ, σI_γ, Levels- from ENSDF Database as of September 7, 1999

Half Life: 10.0(1) day

E _γ (keV)	σ E _γ	^① I _γ	^② σ I _γ	Level	
452.4	0.1	0.118	0.010	552.05	α
458.8	0.2	0.005	0.002		α
462.4	0.4	0.001 7	0.000 9	571.0	α
469.5	0.3	0.004	0.001	571.0	α
481.05	0.05	0.033	0.003	517.78	α
496.9	0.3	0.0016	0.0008	496.9	α
515.40	0.05	0.020	0.002	552.05	α
517.78	0.05	0.014	0.002	517.78	α
522.3	0.1	0.001 6	0.000 4	630.8	α
526.09	0.05	0.032	0.003	552.05	α
529.9	0.1	0.007	0.003	630.8	α
531.3	0.1	0.004	0.001	630.8	α
538.1		0.001	≤	812	α
538.1	0.1	0.001	≈	637.7	α

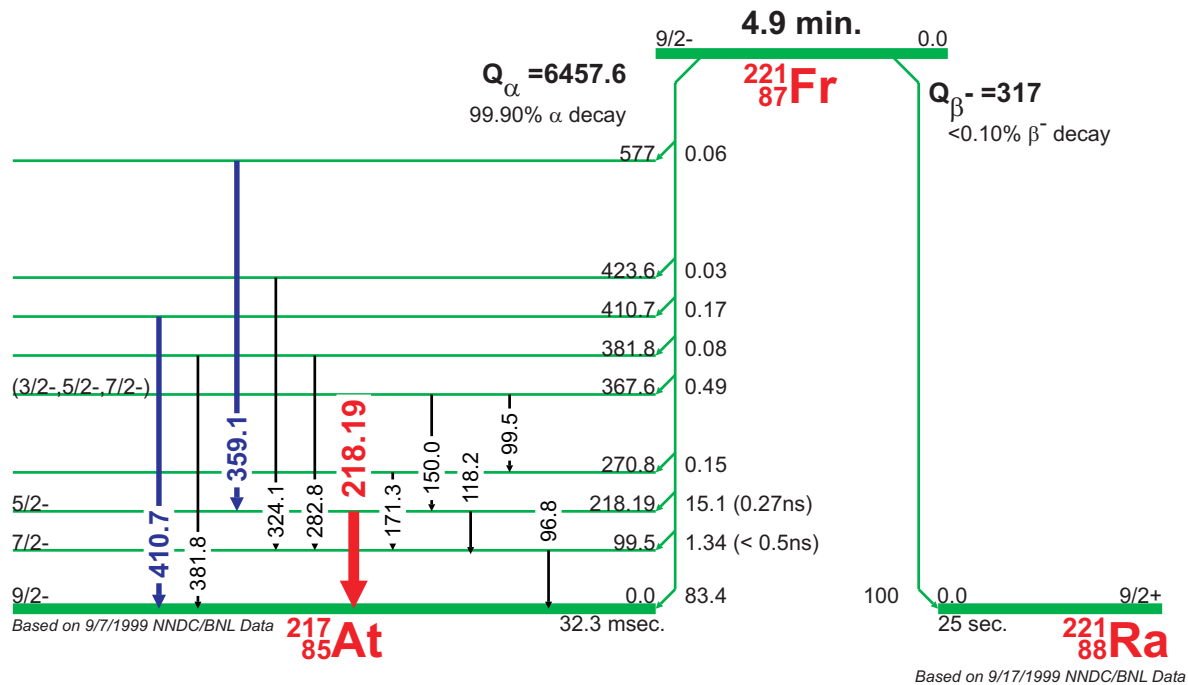
E _γ (keV)	σ E _γ	^① I _γ	^② σ I _γ	Level	
538.1	0.1	0.002	≤	646.5	α
552.0	0.1	0.004	0.001	552.05	α
571.0	0.1	0.004	0.001	571.0	α
594.2	0.1	0.001 7	0.000 9	630.8	α
601.1	0.1	0.003 1	0.000 9	601.1	α
601.1	0.1	0.000 7	≈	637.7	α
603.3	0.1	0.002	0.001	749.1	α
649.2	0.1	0.001 4	0.000 4	749.1	α
679.7	0.1	0.000 9	0.000 2	779.6	α
679.7				680	α
747.0	0.1	0.001 3	0.000 4	942.8	α
753.7	0.3	0.000 9	0.000 2	779.6	α
758.7	0.1	0.005	0.001		α

① These I_γ are per 100 Decays of ²²⁵Ac.

② Normalization factor is 1.090, and its uncertainty is taken to be 0.0.



²²¹Fr (4.9 min.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ²²¹Fr

Half Life: 4.9(2) min.

E_{γ} (keV)	σE_{γ}	I_{γ} ①	σI_{γ} ②	Level	
96.8				367.6	α
99.5	0.2	0.11	0.04	99.5	α
118.2	0.2	0.04	0.02	218.19	α
150.0	0.2	0.07	0.03	367.6	α
171.3		0.07	0.03	270.8	α
218.19	0.05	11.6	0.4	218.19	α
282.8		0.01	≈	381.8	α
324.1		0.02	0.01	423.6	α
359.1		0.04	0.02	577	α
381.8		0.04	0.02	381.8	α
410.7	0.2	0.14	0.04	410.7	α

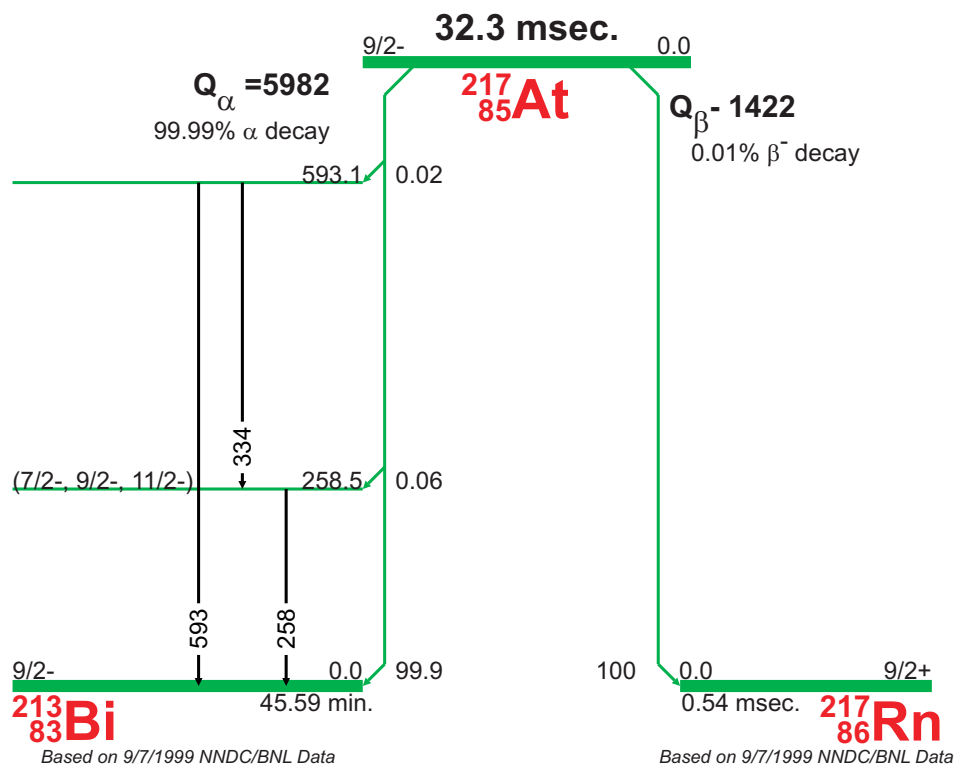
E_{γ} , σE_{γ} , I_{γ} , σI_{γ} Levels from ENSDF Database as of September 7, 1999

① These I_{γ} are per 100 Decays of ²²¹Fr.

② For total uncertainty add 1.4% systematic component in quadrature, based on the normalization factor 0.926(13).



^{217}At (32.3 msec.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{217}At Half Life: 32.3(4) msec.

E_{γ} (keV)	σE_{γ}	I_{γ}	σI_{γ}	Level	
140					α
166					α
218					α
258.5	0.2	0.056	0.005	258.5	α
334				593.1	α
375					α
455					α
593.1	0.2	0.0120	0.0006	593.1	α

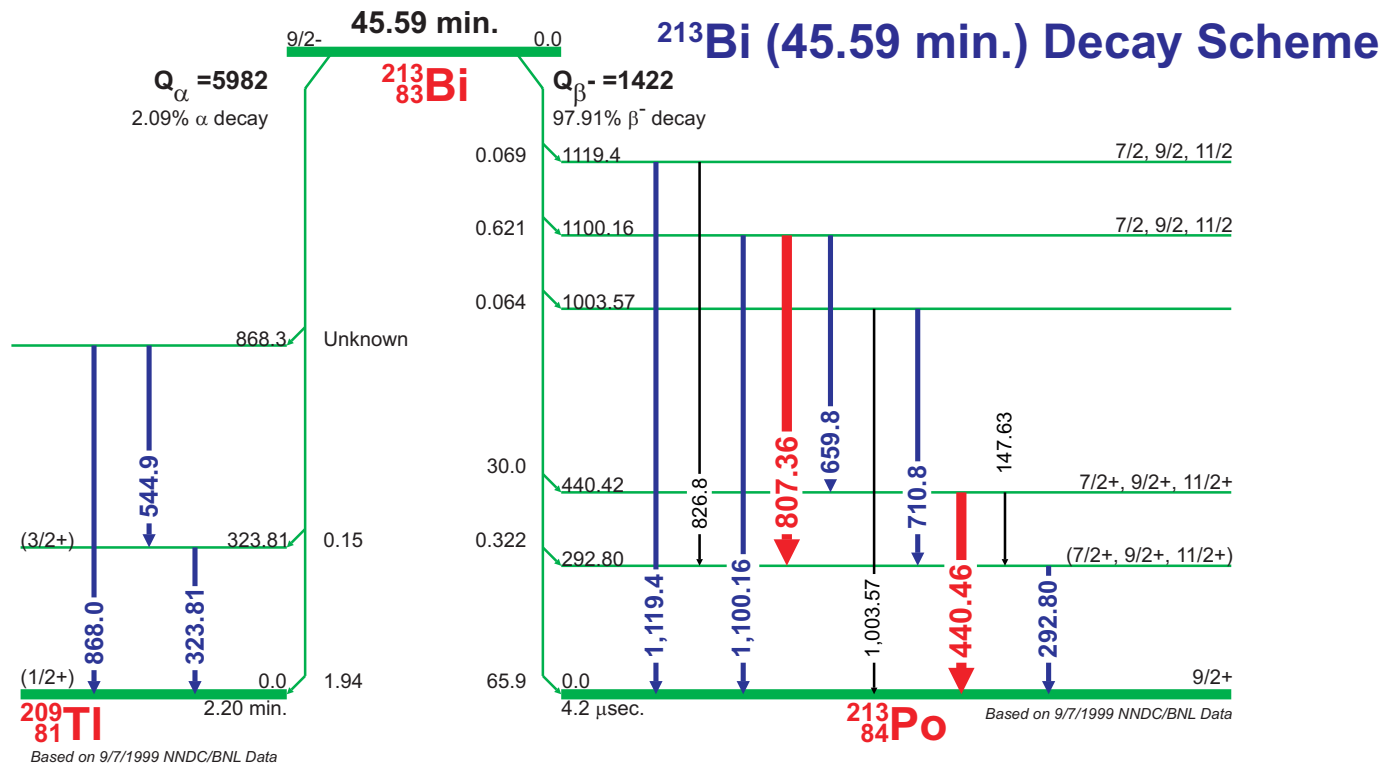
E_{γ} , σE_{γ} , I_{γ} , σI_{γ} , Levels from ENSDF Database as of September 7, 1999

① These I_{γ} are per 100 Decays of ^{217}At .

For ^{221}Fr parent, multiply these values by 0.9990

② For total uncertainty add 2.54% systematic component in quadrature, based on the normalization factor 0.236(6)





GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: **^{213}Bi** Half Life: 45.59(6) min.

E_{γ} (keV)	σE_{γ}	I_{γ}	σI_{γ}	Level	
323.81	0.05	0.165		323.81	α
544.9	0.3	0.017	0.002	868.3	α
868.0	0.2	0.013	0.001	868.3	α

E_{γ} , σE_{γ} , I_{γ} , σI_{γ} Levels from ENSDF Database as of September 7, 1999

- ① These I_{γ} are per 100 Decays of ^{213}Bi .
For ^{217}At parent, multiply these values by 0.9999
- ② For total uncertainty add 1.4% systematic component in quadrature, based on the normalization factor 0.0209(3)

GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: **^{213}Bi** Half Life: 32.3(4) msec.

E_{γ} (keV)	σE_{γ}	I_{γ}	σI_{γ}	Level	
147.63	0.08	0.011	0.002	440.46	β^-
292.80	0.01	0.429	0.007	292.80	β^-
440.46	0.01	26.1	0.3	440.46	β^-
659.8	0.1	0.039	0.004	1,100.16	β^-
710.8	0.1	0.011	0.002	1,003.57	β^-
807.36	0.01	0.292	0.012	1,100.16	β^-
826.8	0.2	0.007 1	0.000 8	1,119.4	β^-
1,003.57	0.03	0.053	0.006	1,003.57	β^-
1,100.16	0.02	0.29	0.02	1,100.16	β^-
1,119.4	0.1	0.062	0.007	1,119.4	β^-

E_{γ} , σE_{γ} , I_{γ} , σI_{γ} Levels from ENSDF Database as of September 7, 1999

- ① These I_{γ} are per 100 Decays of ^{213}Bi .
For ^{217}At parent, multiply these values by 0.9999
- ② For total uncertainty add 0.03% systematic component in quadrature, based on the normalization factor 1.0000(3)

