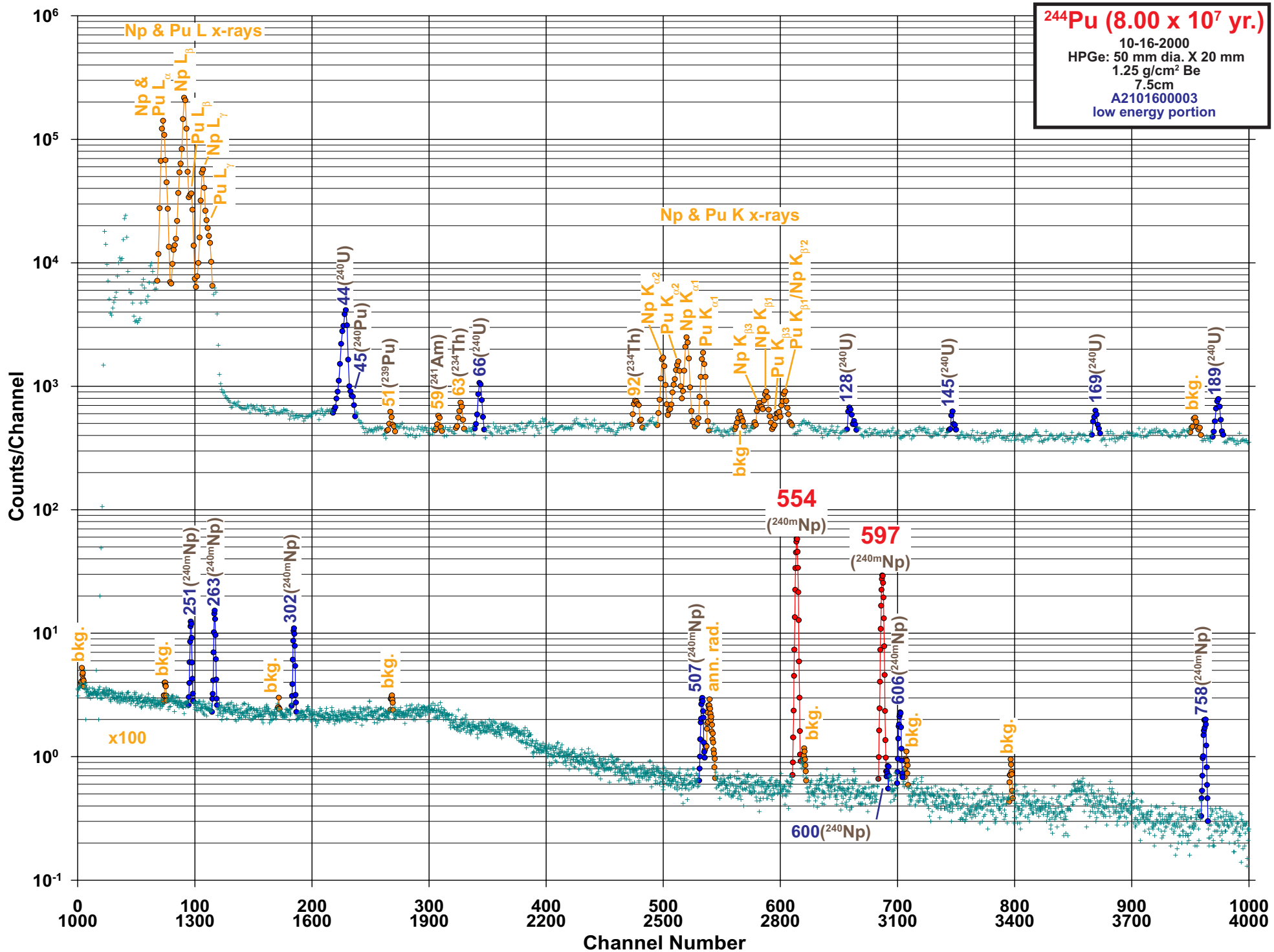
244Pu (8.00 x 10^7 yr.)
10-16-2000
HPGe: 50 mm dia. X 20 mm
1.25 g/cm² Be
7.5cm
A2101600003
low energy portion
Np & Pu L x-rays
Np & Pu K x-rays
554 (240mNp)
597 (240mNp)
600(240Np)
x100
bkg.
Counts/Channel
Channel Number
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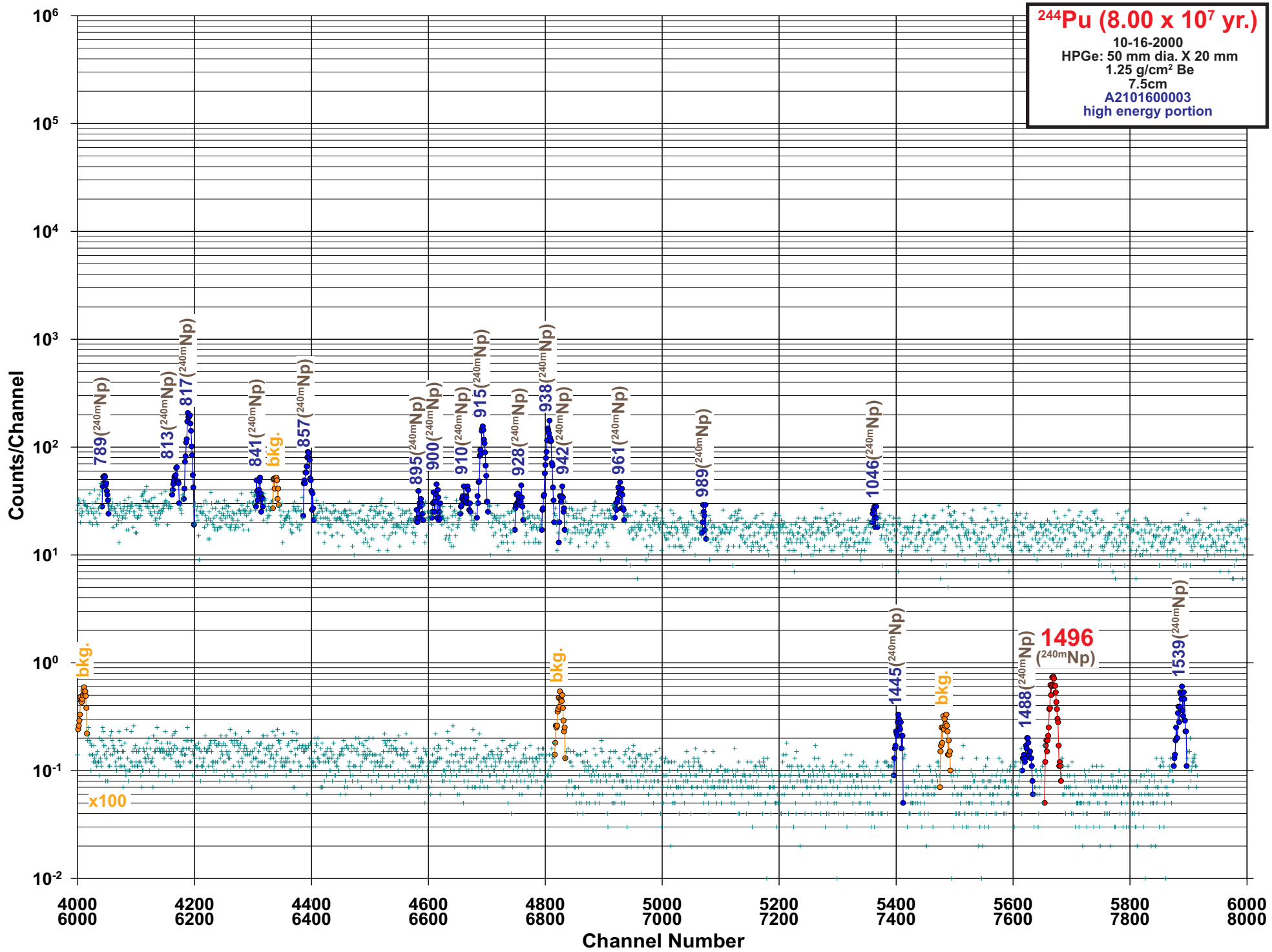

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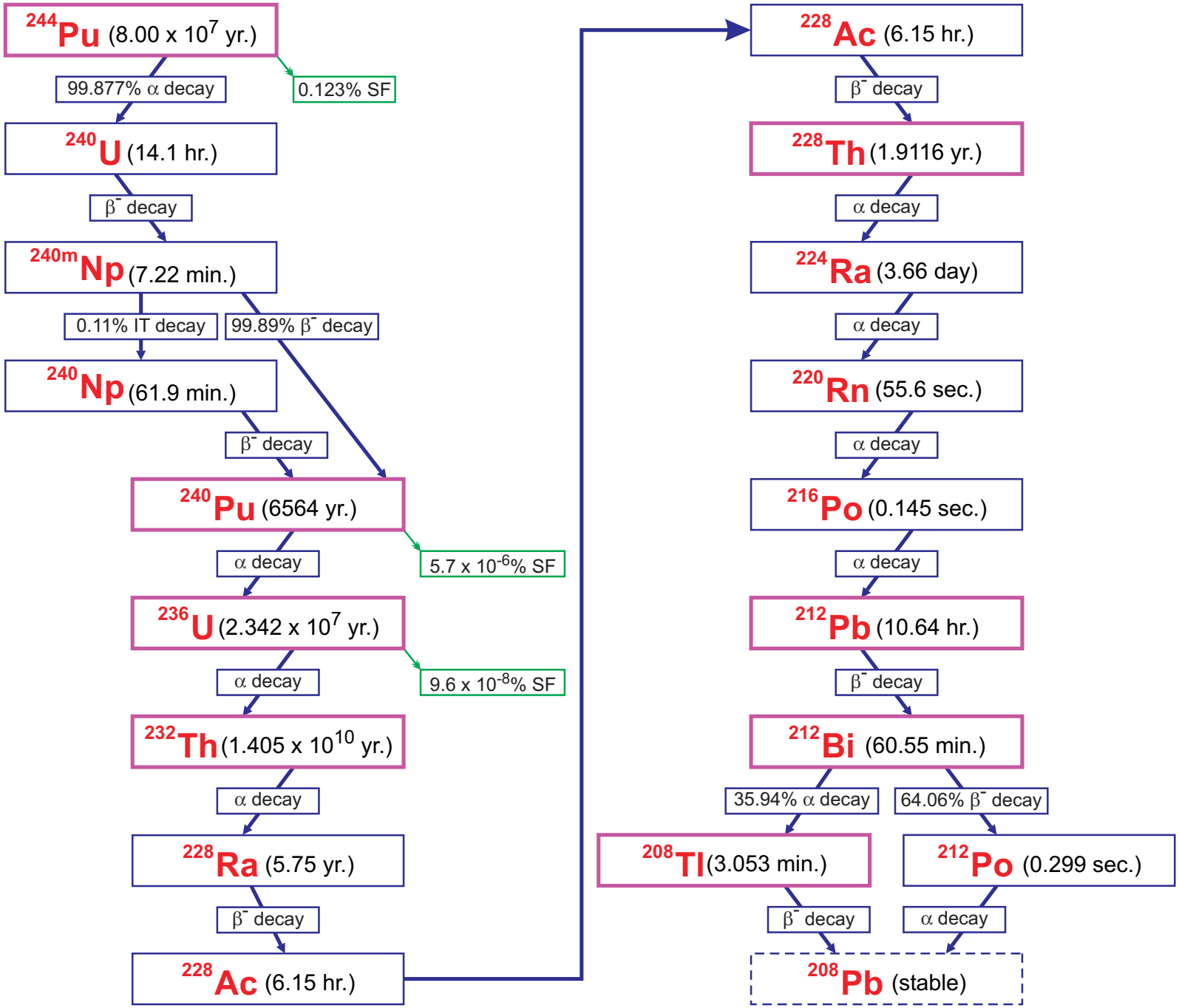
Simplified Decay Chain



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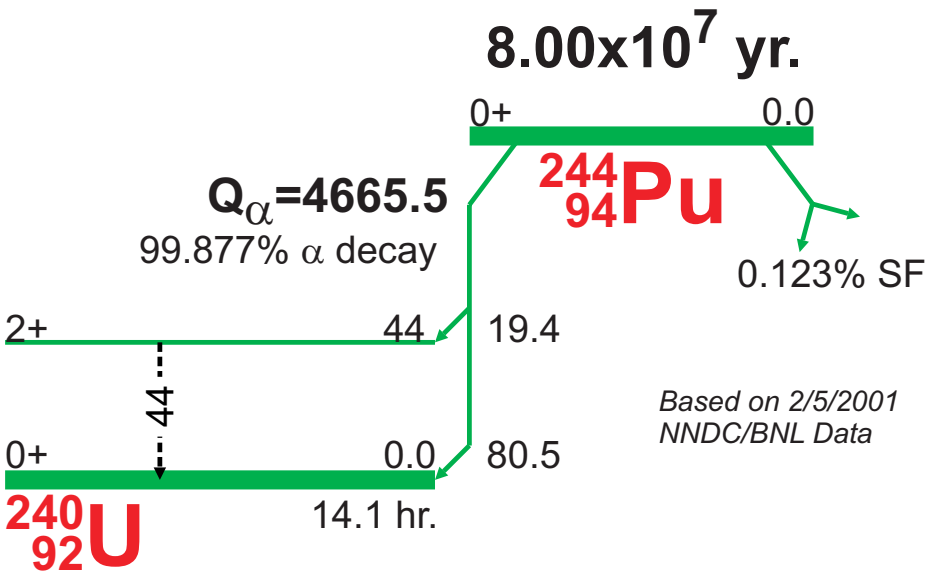
^{244}Pu (8.08 x 10^7 yr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{244}Pu — Half Life: 8.00x10^7(9) yr.

E_γ (keV)	σ E_γ	① I_γ	② σI_γ	Level	
44	2	0.022 7	calculated	44	α

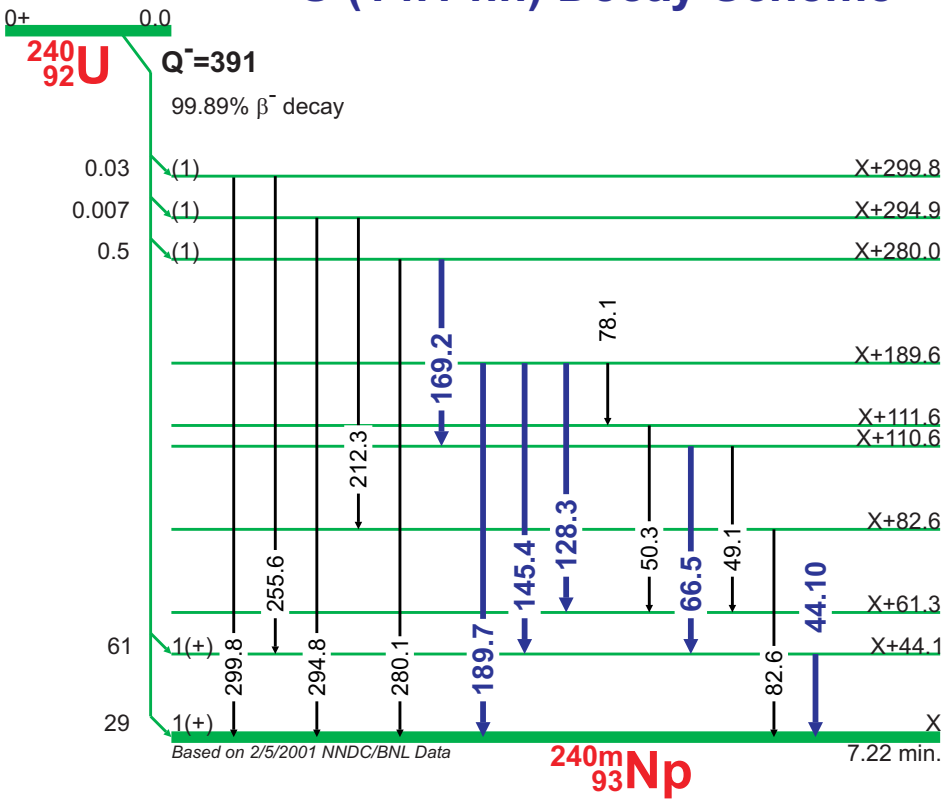
E_γ, σE_γ, I_γ, σI_γ, Levels from ENSDF Database as of February 5, 2001

① These $I\gamma$ are per 100 Decays of ^{244}Pu.

② For total uncertainty add 0.004% systematic component in quadrature, based on the normalization factor 0.99879(4).

14.1 hr.

^{240}U (14.1 hr.) Decay Scheme



GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{240}U Half Life: 14.1(1) hr.

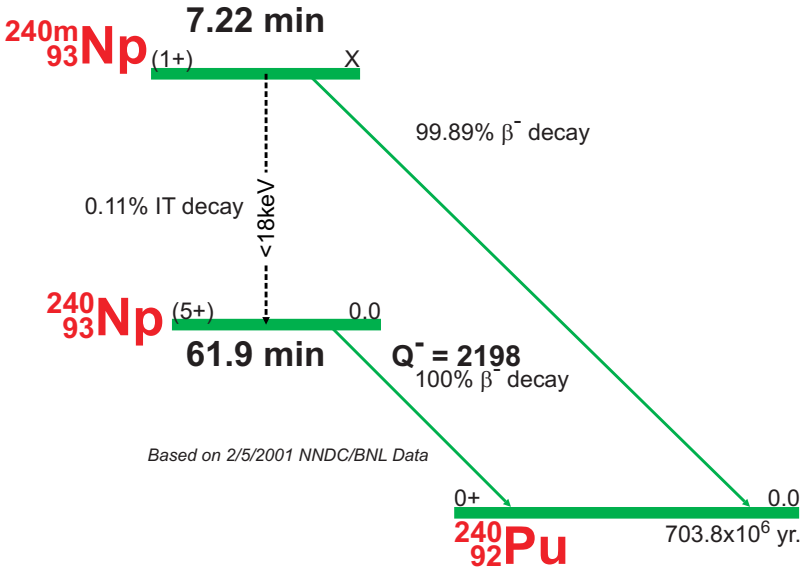
E_γ (keV)	σ E_γ	① I_γ	② σI_γ	Level	
44.10	0.07	1.05	0.05	X+44.1	β–
49.1	0.2	0.007	0.002	X+110.6	β–
50.3	0.2	0.005	0.001	X+111.6	β–
66.5	0.1	0.154	0.015	X+110.6	β–
78.1	0.2	0.004	0.001	X+189.6	β–
82.6	0.1	0.014	0.001	X+82.6	β–
128.3	0.1	0.087	0.002	X+189.6	β–
145.4	0.1	0.081	0.002	X+189.6	β–
169.2	0.1	0.115	0.008	X+280.0	β–
189.7	0.1	0.24	0.01	X+189.6	β–
212.3	0.5	0.0015	0.0003	X+294.9	β–
255.6	0.2	0.0040	0.0003	X+299.8	β–
280.1	0.1	0.016	0.001	X+280.0	β–
294.8	0.3	0.0019	0.0004	X+294.9	β–
299.8	0.2	0.013	0.001	X+299.8	β–

E_γ, σE_γ, I_γ, σI_γ, Levels from ENSDF Database as of February 5, 2001

① These Iγ are per 100 Decays of ^{240}U.
For ^{244}Pu parent, multiply these values by 0.99877

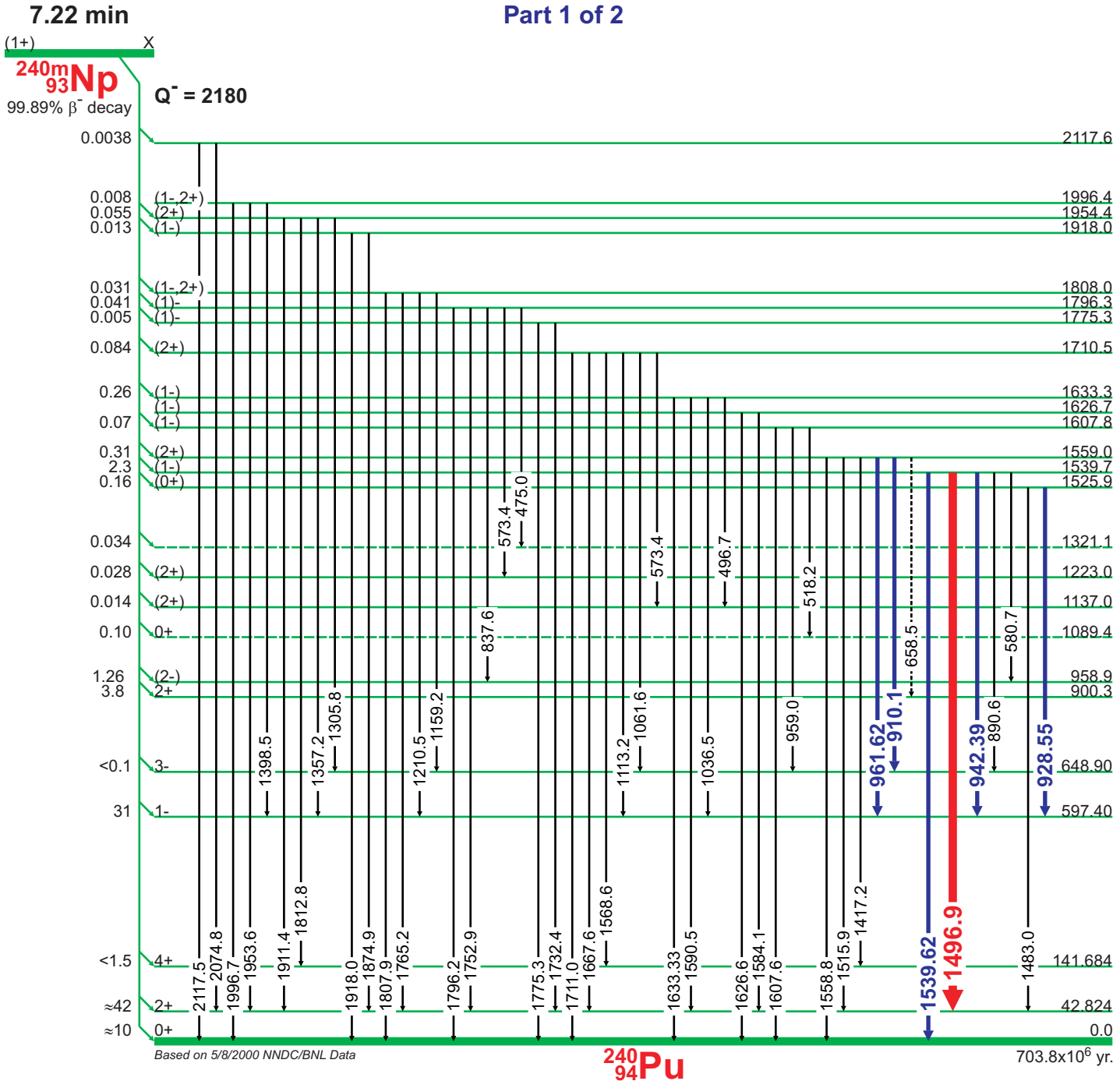
② Normalization factor is 1.0, and its uncertainty is taken to be 0.0.

^{240}Np IT Decay Scheme



^{240m}Np (7.22 min.) Decay Scheme

Part 1 of 2



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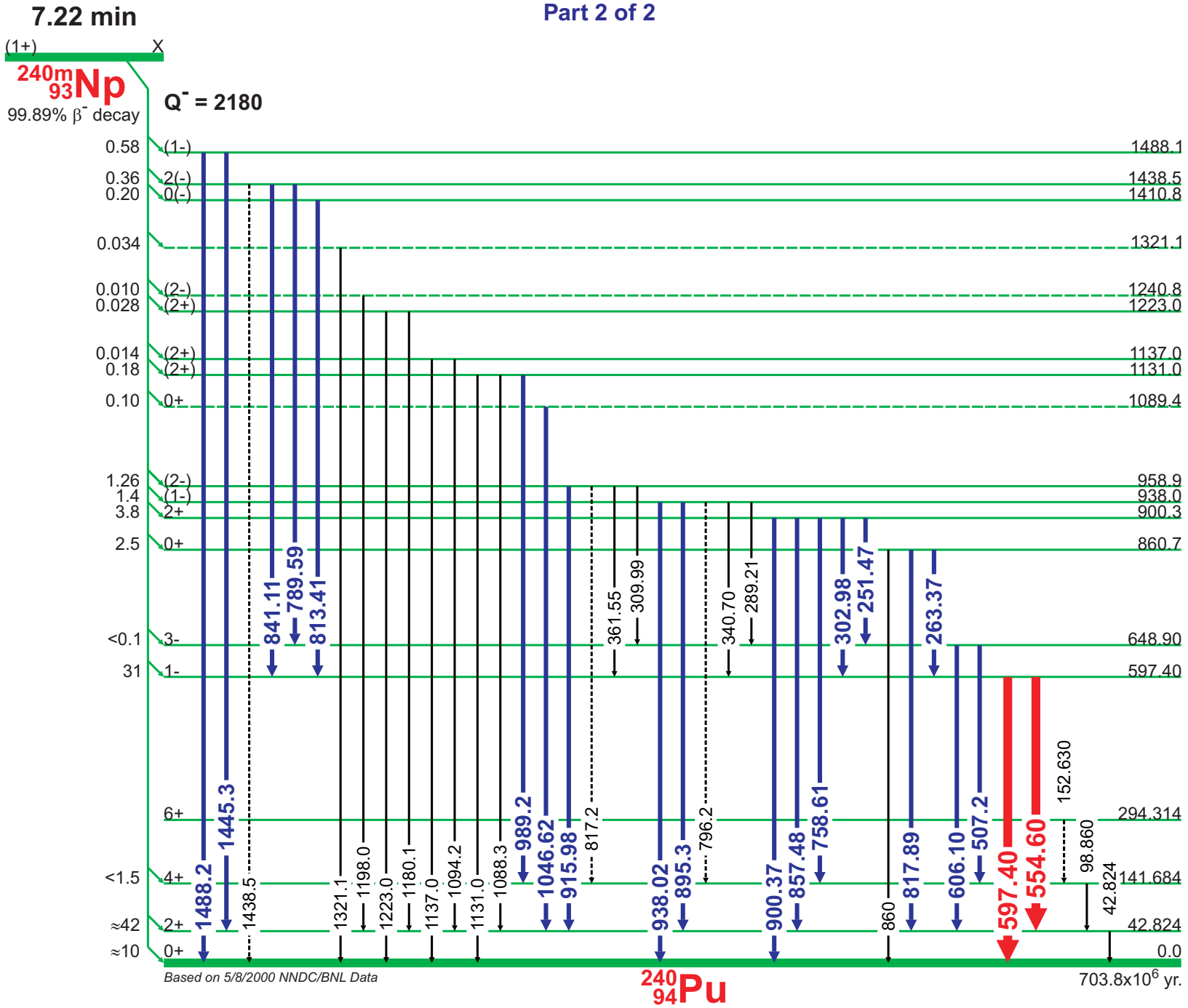
^{240m}Np (7.22 min.) Decay Scheme

Part 2 of 2



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GAMMA-RAY ENERGIES AND INTENSITIES Page 1 of 2

Nuclide: ^{240m}Np — E_γ, σE_γ, I_γ, σI_γ, Levels- from ENSDF Database as of August 30, 1999 — Half Life: 7.22(2) min.

E_γ (keV)	σE_γ	① I_γ	② σI_γ	Level	
42.824	0.008	0.074	0.016	42.824	β–
98.860	0.020	0.17	0.03	141.684	β–
152.630		0.02	<	294.314	β–
251.47	0.07	0.86	0.03	900.3	β–
263.37	0.07	1.14	0.02	860.7	β–
289.21	0.10	0.017	0.004	938.0	β–
302.98	0.07	1.00	0.04	900.3	β–
309.99	0.09	0.044	0.004	958.9	β–
340.70	0.01	0.060	0.006	938.0	β–
361.55	0.10	0.036	0.006	958.9	β–
475.0	0.3	0.011	0.003	1,796.3	β–
496.7	0.3	0.010	0.002	1,633.3	β–
507.2	0.1	0.70	0.09	648.90	β–
518.2	0.3	0.006	0.002	1,607.8	β–
554.60	**0.07**	**20.9**	**0.5**	**597.40**	**β–**
573.4	0.2	0.008	0.002	1,710.5	β–
573.4	0.2	0.008	0.002	1,796.3	β–
580.7	0.2	0.007	0.002	1,539.7	β–
597.40	**0.07**	**11.7**	**0.3**	**597.40**	**β–**
606.10	0.07	0.67	0.07	648.90	β–
658.5		0.018	<	1,559.0	β–
758.61	0.08	1.18	0.03	900.3	β–
789.59	0.10	0.18	0.03	1,438.5	β–
796.2		0.001	<	938.0	β–
813.41	0.10	0.18	0.03	1,410.8	β–
817.2		0.1	<	958.9	β–
817.89	0.10	1.28	0.03	860.7	β–
837.6	0.2	0.008	0.003	1,796.3	β–
841.11	0.10	0.150	0.017	1,438.5	β–
857.48	0.10	0.49	0.02	900.3	β–
860		0.005	<	860.7	β–
867.2	0.2	0.009	0.002		β–
890.6	0.2	0.017	0.002	1,539.7	β–
895.3	0.1	0.061	0.010	938.0	β–
900.37	0.10	0.16	0.02	900.3	β–
910.1	0.1	0.14	0.02	1,559.0	β–
915.98	0.09	1.02	0.03	958.9	β–
928.55	0.10	0.15	0.02	1,525.9	β–
938.02	0.10	1.21	0.05	938.0	β–
942.39	0.10	0.096	0.009	1,539.7	β–
959.0	0.2	0.007 3	0.002 0	1,607.8	β–
961.62	0.10	0.130	0.007	1,559.0	β–
985.7	0.5	0.015	0.003		β–
989.2	0.1	0.081	0.005	1,131.0	β–
1,028.3	0.5	0.007	0.001		β–
1,036.5	0.3	0.003	0.002	1,633.3	β–
1,046.62	0.10	0.097	0.018	1089.4?	β–
1,061.6	0.2	0.029	0.007	1,710.5	β–
1,072.2	0.1	0.017	0.003		β–
1,088.3	0.2	0.032	0.003	1,131.0	β–
1,094.2	0.2	0.020	0.003	1,137.0	β–
1,113.2	0.2	0.018	0.003	1,710.5	β–
1,131.0	0.2	0.062	0.005	1,131.0	β–
1,137.0	0.4	0.014	0.002	1,137.0	β–
1,159.2	0.2	0.006	0.002	1,808.0	β–
1,167.4	0.2	0.007	0.002		β–
1,180.1	0.2	0.020	0.005	1,223.0	β–
1,182.1	0.5	0.007	0.002		β–
1,198.0	0.3	0.009	0.002	1240.8?	β–
1,210.5	0.5	0.015	0.004	1,808.0	β–
1,223.0	0.2	0.018	0.003	1,223.0	β–
1,305.8	0.2	0.023	0.006	1,954.4	β–
1,321.1	0.1	0.034	0.003	1321.1?	β–
1,328.9	0.2	0.009	0.002		β–
1,340.0	1.0	0.006	0.002		β–
1,357.2	0.2	0.013	0.003	1,954.4	β–
1,398.5	0.5	0.005	0.002	1,996.4	β–
1,417.2	0.1	0.023	0.005	1,559.0	β–
1,428.3	0.1	0.028	0.004		β–
1,438.5		0.001	<	1,438.5	β–

① These Iγ are per 100 Decays of ^{240m}Np. For ^{244}Pu parent, multiply these values by 0.99877

② For total uncertainty add systematic component of 0.03% in quadrature, based on the normalization factor 0.9989(3).

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GAMMA-RAY ENERGIES AND INTENSITIES Page 2 of 2

Nuclide: ^{240m}Np — E_γ, σE_γ, I_γ, σI_γ, Levels- from ENSDF Database as of August 30, 1999 — Half Life: 7.22(2) min.

E_γ (keV)	σE_γ	① I_γ	② σI_γ	Level	
1,445.3	0.1	0.38	0.01	1,488.1	β–
1,455.1	0.5	0.004	0.001		β–
1,483.0	0.1	0.027	0.004	1,525.9	β–
1,488.2	0.1	0.20	0.01	1,488.1	β–
1,496.9	**0.1**	**1.33**	**0.03**	**1,539.7**	**β–**
1,515.9	0.1	0.015	0.005	1,559.0	β–
1,539.62	0.09	0.84	0.02	1,539.7	β–
1,558.8	0.1	0.006	0.002	1,559.0	β–
1,568.6	0.2	0.006	0.001	1,710.5	β–
1,584.1	0.2	0.017	0.002	1,626.7	β–
1,590.5	0.1	0.097	0.004	1,633.3	β–
1,604.8	0.3	0.037	0.005		β–
1,607.6	0.2	0.055	0.005	1,607.8	β–
1,626.6	0.2	0.005	0.001	1,626.7	β–
1,633.33	0.10	0.154	0.005	1,633.3	β–
1,667.6	0.1	0.019	0.003	1,710.5	β–
1,711.0	1.0	0.002	0.001	1,710.5	β–
1,732.4	0.2	0.002	0.001	1,775.3	β–
1,737.2	0.3	0.004	0.001		β–
1,752.9	0.2	0.005 4	0.001 2	1,796.3	β–
1,765.2	0.2	0.007 0	0.001 1	1,808.0	β–
1,775.3	0.2	0.003	0.001	1,775.3	β–
1,796.2	0.3	0.003	0.001	1,796.3	β–
1,807.9	0.4	0.002	0.001	1,808.0	β–
1,812.8	0.1	0.005	0.002	1,954.4	β–
1,844.5	0.5	0.002	0.001		β–
1,861.1	0.3	0.004	0.001		β–
1,874.9	0.3	0.012	0.001	1,918.0	β–
1,911.4	0.3	0.014	0.001	1,954.4	β–
1,918.0	1.0	0.000 8	0.000 4	1,918.0	β–
1,953.6	0.2	0.002 3	0.000 5	1,996.4	β–
1,978.0	1.0	0.000 4	0.000 2		β–
1,996.7	0.4	0.001 0	0.000 4	1,996.4	β–
2,041.7	0.2	0.006	0.001		β–
2,074.8	0.2	0.003 1	0.000 5	2,117.6	β–
2,086.7	0.2	0.000 8	0.000 4		β–
2,117.5	1.0	0.000 7	0.000 4	2,117.6	β–

① These Iγ are per 100 Decays of ^{240m}Np. For ^{244}Pu parent, multiply these values by 0.99877

② For total uncertainty add systematic component of 0.03% in quadrature, based on the normalization factor 0.9989(3).

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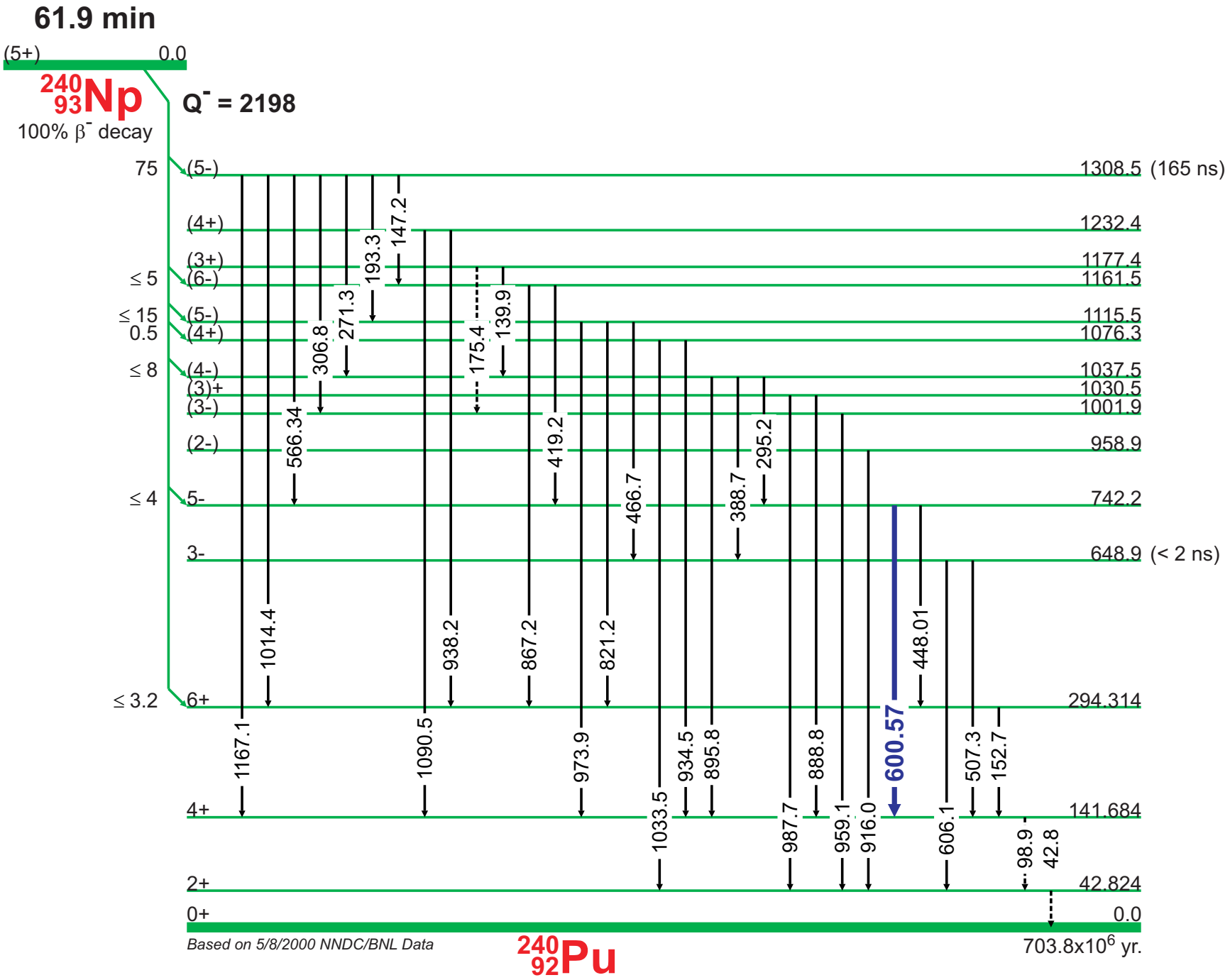
^{240}Np (61.9 min.) Decay Scheme



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GAMMA-RAY ENERGIES AND INTENSITIES

Nuclide: ^{240}Np

E_γ, σE_γ, I_γ, σI_γ, Levels- from ENSDF Database as of August 30, 1999

Half Life: 61.9(2) min.

E_γ (keV)	σE_γ	① I_γ	② σI_γ	Level	
42.8		0.11	0.04	42.824	β–
98.9		4.81	0.20	141.684	β–
139.9	0.1	0.24	0.05	1,177.4	β–
147.2	0.1	1.18	0.13	1,308.5	β–
152.7	0.1	6.7	0.4	294.314	β–
175.4	0.1	4.7	0.3	1,177.4	β–
193.3	0.1	5.6	0.3	1,308.5	β–
222.5	0.3	0.37	0.05		β–
239.3	0.1	0.41	0.06		β–
271.3	0.1	5.7	0.3	1,308.5	β–
295.2	0.1	0.44	0.06	1,037.5	β–
306.8	0.1	0.39	0.05	1,308.5	β–
388.7	0.1	0.89	0.06	1,037.5	β–
419.2	0.1	0.79	0.06	1,161.5	β–
448.01	0.06	12.3	0.6	742.2	β–
466.7	0.1	1.07	0.06	1,115.5	β–
507.3	0.2	1.67	0.08	648.9	β–
566.34	0.06	25.3	1.3	1,308.5	β–
583.9	0.1	0.37	0.07		β–
600.57	0.06	18.4	0.9	742.2	β–
606.1	0.1	1.62	0.08	648.9	β–
633.5	0.2	0.20	0.04		β–
821.2	0.1	1.06	0.08	1,115.5	β–
867.2	0.1	8.1	0.5	1,161.5	β–
888.8	0.1	2.3	0.1	1,030.5	β–
895.8	0.1	13.6	0.6	1,037.5	β–
916.0	0.1	1.22	0.10	958.9	β–
934.5	0.1	0.33	0.04	1,076.3	β–
938.2	0.1	0.17	0.03	1,232.4	β–
959.1	0.1	1.69	0.12	1,001.9	β–
973.9	0.1	23.8	1.2	1,115.5	β–
987.7	0.1	6.7	0.4	1,030.5	β–
1,014.4	0.1	0.21	0.06	1,308.5	β–
1,033.5	0.2	0.14	0.04	1,076.3	β–
1,090.5	0.2	0.07	0.03	1,232.4	β–
1,167.1	0.1	4.5	0.3	1,308.5	β–

① These I_γ are per 100 Decays of ^{240}Np.
For 100 Decays of the ^{244}Pu, ^{240}U, & ^{240m}Np parents, multiply these values by 0.0011

② For total uncertainty add 2.7% systematic component in quadrature, based on the normalization factor 0.918(25)