# $^{239}_{94}$Pu $_{145}$

## 1 Decay Scheme

Le Pu-239 se désintègre par émission alpha principalement vers le niveaux excités de 51,7 ; 13,0 et 0,07 keV de U-235.
*Pu-239 mainly disintegrates to the 51,7; 13,0 and 0,07 keV excited levels of U-235.*

## 2 Nuclear Data

| | | | | |
|---|---|---|---|---|
| $T_{1/2}(^{239}Pu)$ | : | 24100 | (11) | a |
| $T_{1/2}(^{235}U)$ | : | 704 | (1) | $10^6$ a |
| $Q^{\alpha}(^{239}Pu)$ | : | 5244,51 | (21) | keV |

### 2.1 $\alpha$ Transitions

| | Energy keV | Probability × 100 | F |
|---|---|---|---|
| $\alpha_{0,53}$ | 4128,3 (3) | 0,000000021 (5) | 41 |
| $\alpha_{0,52}$ | 4186,93 (25) | 0,000000093 (9) | 31 |
| $\alpha_{0,51}$ | 4251,8 (3) | 0,00000020 (3) | 53 |
| $\alpha_{0,50}$ | 4257,86 (27) | 0,000000077 (7) | 156 |
| $\alpha_{0,49}$ | 4274,0 (3) | 0,000000041 (4) | 402 |
| $\alpha_{0,48}$ | 4276,06 (21) | 0,000000061 (15) | 281 |
| $\alpha_{0,47}$ | 4352,62 (26) | 0,000000199 (12) | 380 |
| $\alpha_{0,46}$ | 4379,16 (28) | 0,000000098 (13) | 1280 |
| $\alpha_{0,45}$ | 4399,2 (10) | ∼ 0,000000042 | ∼ 4360 |
| $\alpha_{0,44}$ | 4400,65 (21) | 0,000000228 (12) | 825 |
| $\alpha_{0,43}$ | 4423,26 (21) | 0,00000030 (3) | 960 |
| $\alpha_{0,42}$ | 4438,79 (22) | 0,000000084 (14) | 4560 |
| $\alpha_{0,41}$ | 4465,00 (21) | 0,00000101 (11) | 616 |
| $\alpha_{0,40}$ | 4466,92 (28) | 0,000000247 (19) | 2610 |
| $\alpha_{0,39}$ | 4475,0 (4) | 0,0000103 (12) | 73 |
| $\alpha_{0,38}$ | 4475,24 (21) | 0,000027 (3) | 28 |
| $\alpha_{0,37}$ | 4483,47 (22) | 0,000000103 (17) | 8500 |

| | Energy keV | Probability × 100 | F |
|---|---|---|---|
| $\alpha_{0,36}$ | 4494,44 (26) | 0,00000034 (4) | 3140 |
| $\alpha_{0,35}$ | 4524,26 (21) | 0,00000213 (9) | 859 |
| $\alpha_{0,34}$ | 4540,75 (21) | 0,0000114 (3) | 216 |
| $\alpha_{0,33}$ | 4543,49 (21) | 0,00000707 (13) | 366 |
| $\alpha_{0,32}$ | 4573,52 (21) | < 0,000000034 | > 130000 |
| $\alpha_{0,31}$ | 4579,97 (21) | 0,00000631 (11) | 784 |
| $\alpha_{0,30}$ | 4585,46 (21) | 0,0000264 (6) | 207 |
| $\alpha_{0,29}$ | 4606,70 (22) | 0,00000322 (21) | 2460 |
| $\alpha_{0,28}$ | 4611,34 (22) | 0,00000284 (7) | 3025 |
| $\alpha_{0,27}$ | 4636,43 (22) | 0,000012 (4) | 1110 |
| $\alpha_{0,26}$ | 4711,28 (21) | 0,00086 (3) | 55,8 |
| $\alpha_{0,25}$ | 4734,59 (27) | 0,0000033 (7) | 22000 |
| $\alpha_{0,24}$ | 4770,21 (21) | 0,00056 (5) | 230 |
| $\alpha_{0,23}$ | 4798,79 (21) | 0,0000400 (11) | 5200 |
| $\alpha_{0,22}$ | 4817,76 (21) | 0,00570 (5) | 49,6 |
| $\alpha_{0,21}$ | 4829,73 (21) | 0,00075 (11) | 460 |
| $\alpha_{0,20}$ | 4851,29 (21) | 0,00125 (3) | 390 |
| $\alpha_{0,19}$ | 4877,44 (21) | 0,000944 (17) | 788 |
| $\alpha_{0,18}$ | 4887,21 (22) | 0,000017 (4) | 51000 |
| $\alpha_{0,17}$ | 4905,99 (22) | ≈ 0,000022 | ≈ 53000 |
| $\alpha_{0,16}$ | 4911,67 (21) | 0,00354 (7) | 363 |
| $\alpha_{0,15}$ | 4949,84 (21) | 0,0018 (5) | 1300 |
| $\alpha_{0,14}$ | 4953,37 (21) | 0,0007 (3) | 3500 |
| $\alpha_{0,13}$ | 4995,38 (21) | 0,0030 (16) | 1590 |
| $\alpha_{0,12}$ | 5019,09 (21) | 0,0050 (7) | 1380 |
| $\alpha_{0,11}$ | 5047,39 (21) | 0,007 (1) | 1520 |
| $\alpha_{0,10}$ | 5073,12 (21) | 0,0034 (10) | 4600 |
| $\alpha_{0,8}$ | 5094,04 (21) | 0,0182 (27) | 1180 |
| $\alpha_{0,7}$ | 5115,12 (21) | 0,013 (4) | 2270 |
| $\alpha_{0,6}$ | 5141,48 (21) | 0,0375 (12) | 1160 |
| $\alpha_{0,5}$ | 5162,77 (21) | 0,052 (8) | 1150 |
| $\alpha_{0,4}$ | 5192,81 (21) | 11,87 (3) | 7,81 |
| $\alpha_{0,3}$ | 5198,30 (21) | < 0,02 | > 5019 |
| $\alpha_{0,2}$ | 5231,47 (21) | 17,14 (4) | 9,47 |
| $\alpha_{0,1}$ | 5244,43 (14) | 70,79 (10) | 2,762 |
| $\alpha_{0,0}$ | 5244,51 (21) | ∼ 0,03 | ∼ 6500 |

## 2.2 Gamma Transitions and Internal Conversion Coefficients

| | Energy keV | $P_{\gamma+ce}$ × 100 | Multipolarity | $\alpha_K$ | $\alpha_L$ | $\alpha_M$ | $\alpha_T$ |
|---|---|---|---|---|---|---|---|
| $\gamma_{1,0}$(U) | 0,0765 (4) | 100 | E3 | | | | 1 $10^{10}$ |
| $\gamma_{2,1}$(U) | 12,975 (10) | 20,7 (8) | M1+0,19(2)%E2 | | | 451 (13) | 607 (17) |
| $\gamma_{(-1,1)}$(U) | 14,22 (3) | > 0,006 | | | | | |
| $\gamma_{5,4}$(U) | 30,04 (2) | 0,0346 (14) | (M1) | | 118,0 (24) | 28,7 (6) | 157 (3) |
| $\gamma_{4,2}$(U) | 38,661 (2) | 3,56 (21) | M1+22,2(16)%E2 | | 249 (14) | 67 (4) | 339 (19) |
| $\gamma_{(-1,2)}$(U) | 40,41 (5) | > 0,0002 | | | | | |
| $\gamma_{10,7}$(U) | 41,93 (5) | 0,0097 (5) | (M1) | | 44,2 (9) | 10,71 (21) | 58,6 (12) |
| $\gamma_{3,0}$(U) | 46,21 (5) | 0,0389 (21) | M1+1,8(5)%E2 | | 39,4 (19) | 9,8 (5) | 52,6 (27) |
| $\gamma_{11,8}$(U) | 46,68 (3) | 0,0044 (13) | M1+9(5)%E2 | | 63 (17) | 17 (5) | 86 (24) |
| $\gamma_{7,5}$(U) | 47,60 (3) | 0,00259 (11) | (M1) | | 30,4 (6) | 7,37 (15) | 40,4 (8) |
| $\gamma_{4,1}$(U) | 51,624 (1) | 8,38 (18) | E2 | | 226 (5) | 62,6 (13) | 310 (6) |
| $\gamma_{12,10}$(U) | 54,039 (8) | 0,00560 (14) | M1 | | 21,0 (4) | 5,08 (10) | 27,8 (6) |
| $\gamma_{6,3}$(U) | 56,828 (3) | 0,0382 (18) | M1+5,0(8)%E2 | | 24,3 (11) | 6,14 (30) | 32,6 (15) |
| $\gamma_{14,12}$(U) | 65,708 (30) | 0,00095 (29) | M1+4(6)%E2 | | 14 (5) | 3,6 (13) | 19 (6) |
| $\gamma_{9,6}$(U) | 67,674 (12) | 0,00283 (12) | M1+3,6(11)%E2 | | 12,7 (4) | 3,15 (9) | 16,9 (5) |
| $\gamma_{5,2}$(U) | 68,696 (6) | 0,029 (8) | E2 | | 57,3 (11) | 15,9 (3) | 78,6 (16) |
| $\gamma_{8,5}$(U) | 68,73 (2) | 0,0036 (17) | (M1+20%E2) | | 20 | 5,2 | 27 |
| $\gamma_{(-1,3)}$(U) | 74,96 (10) | > 0,00004 | | | | | |
| $\gamma_{7,4}$(U) | 77,592 (14) | 0,0068 (38) | M1(+20(32)%E2) | | 12 (7) | 3,2 (21) | 17 (10) |
| $\gamma_{13,9}$(U) | 78,43 (2) | 0,0026 (15) | M1(+20(32)%E2) | | 12 (7) | 3,1 (20) | 16 (10) |
| $\gamma_{17,13}$(U) | 89,39 (6) | ~0,000015 | [M1] | | 4,82 (10) | 1,167 (23) | 6,40 (13) |
| $\gamma_{10,5}$(U) | 89,64 (3) | 0,00040 (22) | (M1+E2) | | 11 (6) | 2,8 (17) | 14 (8) |
| $\gamma_{12,7}$(U) | 96,14 (3) | 0,00064 (3) | [E2] | | 11,67 (23) | 3,24 (7) | 16,0 (3) |
| $\gamma_{15,11}$(U) | 97,6 (3) | 0,0007 (5) | M1+20(19)%E2 | | 5,2 (14) | 1,3 (4) | 7,0 (19) |
| $\gamma_{8,4}$(U) | 98,78 (2) | 0,0204 (17) | E2 | | 10,28 (21) | 2,85 (6) | 14,1 (3) |
| $\gamma_{6,0}$(U) | 103,06 (3) | 0,00273 (9) | E2 | | 8,44 (17) | 2,34 (5) | 11,58 (23) |
| $\gamma_{11,5}$(U) | 115,38 (5) | 0,00362 (40) | E2 | | 5,0 (1) | 1,39 (3) | 6,87 (14) |
| $\gamma_{7,2}$(U) | 116,26 (2) | 0,0077 (15) | M1+24(36)%E2 | 8,4 (18) | 2,9 (6) | 0,74 (16) | 12,2 (26) |
| $\gamma_{10,4}$(U) | 119,70 (3) | 0,00021 (9) | (M1+E2) | 5 (5) | 3,1 (11) | 0,8 (3) | 9 (4) |
| $\gamma_{14,10}$(U) | 119,76 (2) | 0,000063 (14) | [E2] | 0,200 (4) | 4,22 (8) | 1,169 (23) | 5,99 (12) |
| $\gamma_{12,6}$(U) | 122,35 (12) | 0,00000125 (17) | (E1) | 0,238 (5) | 0,0556 (11) | 0,0135 (3) | 0,312 (6) |
| $\gamma_{37,29}$(U) | 123,228 (5) | 0,000000021 (5) | (M1) | 9,66 (19) | 1,91 (4) | 0,461 (9) | 12,19 (24) |
| $\gamma_{21,14}$(U) | 123,62 (5) | 0,000310 (13) | [M1] | 9,57 (19) | 1,89 (4) | 0,457 (9) | 12,08 (24) |
| $\gamma_{9,3}$(U) | 124,51 (3) | 0,000413 (13) | E2 | 0,214 (4) | 3,53 (7) | 0,978 (20) | 5,06 (10) |
| $\gamma_{10,3}$(U) | 125,21 (10) | 0,0000730 (21) | [E1] | 0,227 (5) | 0,0523 (10) | 0,0128 (3) | 0,296 (6) |
| $\gamma_{7,0}$(U) | 129,296 (1) | 0,00805 (6) | E1 | 0,211 (4) | 0,0482 (10) | 0,01173 (24) | 0,275 (6) |
| $\gamma_{19,12}$(U) | 141,657 (20) | 0,000296 (11) | [M1] | 6,52 (13) | 1,28 (3) | 0,309 (6) | 8,22 (16) |
| $\gamma_{12,5}$(U) | 143,35 (20) | 0,000110 (46) | [M1+E2] | 3,3 (30) | 1,5 (3) | 0,41 (11) | 5,3 (26) |
| $\gamma_{15,8}$(U) | 144,201 (3) | 0,00106 (3) | E2 | 0,225 (5) | 1,82 (4) | 0,502 (10) | 2,72 (5) |
| $\gamma_{13,6}$(U) | 146,094 (6) | 0,000432 (12) | E2 | 0,223 (4) | 1,71 (3) | 0,474 (10) | 2,57 (5) |
| $\gamma_{10,2}$(U) | 158,1 (3) | 0,0000029 (3) | [E2] | 0,211 (4) | 1,200 (24) | 0,333 (7) | 1,86 (4) |
| $\gamma_{18,11}$(U) | 160,19 (5) | 0,0000172 (36) | [E2] | 0,208 (4) | 1,140 (23) | 0,314 (6) | 1,77 (4) |
| $\gamma_{16,10}$(U) | 161,450 (15) | 0,000814 (42) | (M1) | 4,51 (9) | 0,880 (18) | 0,213 (4) | 5,67 (11) |
| $\gamma_{17,9}$(U) | 167,81 (5) | 0,0000074 (20) | [E2] | 0,198 (4) | 0,925 (19) | 0,256 (5) | 1,47 (3) |
| $\gamma_{10,0}$(U) | 171,393 (6) | 0,0001255 (34) | [E1] | 0,1103 (22) | 0,0235 (5) | 0,00570 (11) | 0,141 (3) |
| $\gamma_{42,28}$(U) | 172,560 (8) | ~0,000000017 | M1 | 3,73 (8) | 0,728 (15) | 0,176 (4) | 4,70 (9) |
| $\gamma_{12,4}$(U) | 173,70 (5) | 0,0000071 (18) | [E2] | 0,190 (4) | 0,795 (16) | 0,220 (4) | 1,28 (3) |
| $\gamma_{12,3}$(U) | 179,220 (12) | 0,0000739 (22) | [E1] | 0,0995 (20) | 0,0210 (4) | 0,00509 (10) | 0,127 (3) |
| $\gamma_{(-1,4)}$(U) | 184,55 (5) | 0,000010 (3) | [M1] | 3,08 (6) | 0,601 (12) | 0,146 (3) | 3,87 (8) |
| $\gamma_{14,6}$(U) | 188,23 (10) | 0,0000123 (12) | [E1] | 0,0889 (18) | 0,0186 (4) | 0,00450 (9) | 0,1140 (23) |
| $\gamma_{21,12}$(U) | 189,36 (1) | 0,00027 (11) | [M1+E2] | 1,5 (13) | 0,553 (11) | 0,143 (8) | 2,3 (14) |
| $\gamma_{(-1,5)}$(U) | 193,13 (12) | > 0,000009 | | | | | |
| $\gamma_{19,10}$(U) | 195,679 (8) | 0,000456 (11) | M1 | 2,62 (5) | 0,51 (1) | 0,123 (3) | 3,30 (7) |
| $\gamma_{(-1,6)}$(U) | 196,87 (5) | >0,000004 | | | | | |
| $\gamma_{16,7}$(U) | 203,550 (5) | 0,002224 (49) | M1 | 2,35 (5) | 0,456 (9) | 0,1103 (22) | 2,95 (6) |
| $\gamma_{21,11}$(U) | 218,0 (5) | > 0,000002 | | | | | |
| $\gamma_{12,0}$(U) | 225,42 (4) | 0,0000161 (4) | [E1] | 0,0589 (12) | 0,01190 (24) | 0,00288 (6) | 0,0747 (15) |

| | Energy keV | $P_{\gamma+ce}$ × 100 | Multipolarity | $\alpha_K$ | $\alpha_L$ | $\alpha_M$ | $\alpha_T$ |
|---|---|---|---|---|---|---|---|
| $\gamma_{19,7}$(U) | 237,77 (10) | 0,0000422 (18) | [M1] | 1,52 (3) | 0,295 (6) | 0,0712 (14) | 1,91 (4) |
| $\gamma_{26,14}$(U) | 242,08 (3) | 0,0000209 (14) | [M1] | 1,45 (3) | 0,280 (6) | 0,0678 (14) | 1,82 (4) |
| $\gamma_{21,10}$(U) | 243,38 (3) | 0,000053 (18) | [M1+E2] | 0,8 (6) | 0,23 (4) | 0,059 (7) | 1,1 (7) |
| $\gamma_{14,3}$(U) | 244,92 (5) | 0,0000054 (5) | [E1] | 0,0485 (10) | 0,00973 (19) | 0,00235 (5) | 0,0618 (12) |
| $\gamma_{24,12}$(U) | 248,95 (5) | 0,0000188 (16) | [M1] | 1,34 (3) | 0,259 (5) | 0,0626 (14) | 1,68 (3) |
| $\gamma_{22,10}$(U) | 255,384 (15) | 0,000204 (6) | [M1] | 1,25 (3) | 0,241 (5) | 0,0583 (12) | 1,57 (3) |
| $\gamma_{20,7}$(U) | 263,95 (3) | 0,0000629 (26) | M1 | 1,140 (23) | 0,220 (4) | 0,0532 (11) | 1,43 (3) |
| $\gamma_{30,20}$(U) | 265,7 (3) | 0,0000017 (4) | [E1] | 0,0408 (8) | 0,00802 (16) | 0,00194 (4) | 0,0514 (10) |
| $\gamma_{16,4}$(U) | 281,2 (2) | 0,0000036 (12) | [M1+E2] | 0,5 (4) | 0,14 (4) | 0,036 (8) | 0,7 (5) |
| $\gamma_{19,5}$(U) | 285,3 (2) | 0,0000032 (12) | [M1+E2] | 0,5 (4) | 0,14 (4) | 0,035 (8) | 0,7 (5) |
| $\gamma_{22,7}$(U) | 297,46 (3) | 0,000100 (3) | [M1] | 0,816 (16) | 0,158 (3) | 0,0381 (8) | 1,025 (21) |
| $\gamma_{24,10}$(U) | 302,87 (5) | 0,0000097 (8) | [M1] | 0,777 (16) | 0,150 (3) | 0,0362 (7) | 0,976 (20) |
| $\gamma_{26,12}$(U) | 307,85 (5) | 0,0000101 (8) | [M1] | 0,743 (15) | 0,143 (3) | 0,0346 (7) | 0,933 (19) |
| $\gamma_{21,6}$(U) | 311,78 (4) | 0,0000266 (8) | [E1] | 0,0287 (6) | 0,00552 (11) | 0,00133 (3) | 0,0361 (7) |
| $\gamma_{23,7}$(U) | 316,41 (3) | 0,0000248 (10) | M1 | 0,689 (14) | 0,133 (3) | 0,0321 (6) | 0,865 (17) |
| $\gamma_{16,2}$(U) | 319,68 (10) | 0,0000073 (19) | [M1+E2] | 0,37 (30) | 0,10 (3) | 0,024 (7) | 0,50 (35) |
| $\gamma_{19,3}$(U) | 320,862 (20) | 0,0000558 (12) | [E1] | 0,0269 (5) | 0,00517 (10) | 0,00125 (3) | 0,0337 (7) |
| $\gamma_{24,8}$(U) | 323,84 (3) | 0,0000960 (25) | M1 | 0,646 (13) | 0,1246 (25) | 0,0301 (6) | 0,811 (16) |
| $\gamma_{16,0}$(U) | 332,845 (5) | 0,000503 (8) | E1 | 0,0250 (5) | 0,00476 (10) | 0,001150 (23) | 0,0313 (6) |
| $\gamma_{26,11}$(U) | 336,113 (12) | 0,000192 (5) | M1 | 0,583 (12) | 0,1130 (23) | 0,0272 (5) | 0,733 (15) |
| $\gamma_{20,4}$(U) | 341,506 (10) | 0,0001106 (24) | M1 | 0,559 (11) | 0,1080 (22) | 0,0260 (5) | 0,701 (14) |
| $\gamma_{24,7}$(U) | 345,00 (2) | < 0,000084 | (M1) | 0,543 (11) | 0,1050 (21) | 0,0253 (5) | 0,682 (14) |
| $\gamma_{22,5}$(U) | 345,013 (4) | 0,000922 (15) | M1 | 0,543 (11) | 0,1050 (21) | 0,0253 (5) | 0,682 (14) |
| $\gamma_{(-1,7)}$(U) | 350,8 (3) | > 0,000002 | | | | | |
| $\gamma_{19,2}$(U) | 354,0 (5) | 0,00000085 (33) | [E2] | 0,0549 (11) | 0,0445 (9) | 0,01200 (24) | 0,1150 (23) |
| $\gamma_{26,10}$(U) | 361,89 (5) | 0,0000187 (11) | [M1] | 0,477 (10) | 0,0918 (18) | 0,0222 (4) | 0,598 (12) |
| $\gamma_{19,0}$(U) | 367,073 (25) | 0,0000893 (21) | [E1] | 0,0203 (4) | 0,00382 (8) | 0,000920 (18) | 0,0254 (5) |
| $\gamma_{21,3}$(U) | 368,554 (20) | 0,0000899 (14) | [E1] | 0,0202 (4) | 0,00378 (8) | 0,000910 (18) | 0,0252 (5) |
| $\gamma_{22,4}$(U) | 375,054 (3) | 0,002376 (37) | M1 | 0,432 (9) | 0,0832 (17) | 0,0201 (4) | 0,543 (11) |
| $\gamma_{20,2}$(U) | 380,191 (6) | 0,000460 (7) | M1 | 0,417 (8) | 0,0801 (16) | 0,0193 (4) | 0,523 (10) |
| $\gamma_{26,8}$(U) | 382,75 (5) | 0,000387 (7) | M1 | 0,409 (8) | 0,0787 (16) | 0,0190 (4) | 0,513 (10) |
| $\gamma_{24,5}$(U) | 392,53 (3) | 0,000179 (24) | M1 | 0,382 (8) | 0,0731 (15) | 0,0177 (4) | 0,479 (10) |
| $\gamma_{20,1}$(U) | 393,14 (3) | 0,000619 (25) | M1 | 0,380 (8) | 0,0731 (15) | 0,0176 (4) | 0,477 (10) |
| $\gamma_{23,3}$(U) | 399,53 (6) | 0,00000625 (27) | [E1] | 0,0171 (3) | 0,00317 (6) | 0,000761 (15) | 0,0213 (4) |
| $\gamma_{25,6}$(U) | 406,8 (2) | 0,0000030 (7) | [E1] | 0,0164 (3) | 0,00304 (6) | 0,000731 (15) | 0,0204 (4) |
| $\gamma_{27,11}$(U) | 411,2 (3) | 0,000010 (4) | [M1] | 0,337 (7) | 0,0646 (13) | 0,0156 (3) | 0,422 (8) |
| $\gamma_{42,20}$(U) | 412,49 (6) | ~0,000000018 | [E1] | 0,0160 (3) | 0,00296 (6) | 0,000709 (14) | 0,0199 (4) |
| $\gamma_{22,2}$(U) | 413,713 (5) | 0,00207 (3) | M1 | 0,331 (7) | 0,0636 (13) | 0,0153 (3) | 0,415 (8) |
| $\gamma_{24,4}$(U) | 422,598 (19) | 0,0001669 (30) | M1 | 0,313 (6) | 0,0560 (11) | 0,0145 (3) | 0,392 (8) |
| $\gamma_{22,1}$(U) | 426,68 (3) | 0,0000256 (6) | [E2] | 0,0387 (8) | 0,0230 (5) | 0,00610 (12) | 0,0699 (14) |
| $\gamma_{24,3}$(U) | 428,4 (3) | 0,00000103 (10) | [E1] | 0,0147 (3) | 0,00270 (5) | 0,000653 (13) | 0,0184 (4) |
| $\gamma_{26,6}$(U) | 430,08 (10) | 0,00000437 (19) | [E1] | 0,0147 (3) | 0,00270 (5) | 0,000648 (13) | 0,0183 (4) |
| $\gamma_{23,0}$(U) | 445,72 (3) | 0,00000892 (26) | E1 | 0,0137 (3) | 0,00250 (5) | 0,000560 (11) | 0,0170 (3) |
| $\gamma_{(-1,8)}$(U) | 446,82 (20) | 0,0000009 (1) | | | | | |
| $\gamma_{26,5}$(U) | 451,481 (10) | 0,000223 (25) | M1(+50%E2) | 0,15 (11) | 0,035 (16) | 0,009 (4) | 0,19 (13) |
| $\gamma_{27,8}$(U) | 457,61 (5) | 0,00000199 (4) | [M1] | 0,252 (5) | 0,0483 (10) | 0,01170 (23) | 0,316 (6) |
| $\gamma_{24,2}$(U) | 461,25 (5) | 0,00000242 (5) | [E2] | 0,0334 (7) | 0,0177 (4) | 0,00467 (9) | 0,0575 (12) |
| $\gamma_{25,3}$(U) | 463,9 (3) | 0,000000284 (30) | [E1] | 0,0126 (3) | 0,00230 (5) | 0,000551 (11) | 0,0157 (3) |
| $\gamma_{24,0}$(U) | 473,9 (5) | 0,000000061 (30) | [E1] | 0,01210 (24) | 0,00220 (4) | 0,000526 (11) | 0,0150 (3) |
| $\gamma_{26,4}$(U) | 481,66 (12) | 0,00000485 (11) | [E2] | 0,0309 (6) | 0,0154 (3) | 0,00404 (8) | 0,0517 (10) |
| $\gamma_{26,3}$(U) | 487,06 (10) | 0,000000269 (19) | [E1] | 0,01150 (23) | 0,00208 (4) | 0,000497 (10) | 0,0142 (3) |
| $\gamma_{31,10}$(U) | 493,08 (5) | 0,00000089 (3) | [E1] | 0,01119 (22) | 0,00202 (4) | 0,000484 (10) | 0,0139 (3) |
| $\gamma_{(-1,9)}$(U) | 497,0 (5) | 0,000000044 (25) | | | | | |
| $\gamma_{27,5}$(U) | 526,4 (4) | 0,000000059 (19) | [E2] | 0,0262 (5) | 0,011600 (23) | 0,00303 (6) | 0,0419 (8) |
| $\gamma_{(-1,10)}$(U) | 538,8 (2) | 0,00000031 (2) | | | | | |
| $\gamma_{33,8}$(U) | 550,5 (2) | 0,000000440 (25) | (E1) | 0,00904 (18) | 0,00161 (3) | 0,000385 (8) | 0,01120 (22) |
| $\gamma_{(-1,11)}$(U) | 557,3 (5) | 0,00000004 (2) | | | | | |
| $\gamma_{36,10}$(U) | 579,4 (3) | 0,000000091 (20) | [E2] | 0,0220 (4) | 0,00867 (17) | 0,00224 (4) | 0,0337 (7) |
| $\gamma_{31,5}$(U) | 582,89 (10) | 0,00000624 (26) | [E1] | 0,00811 (16) | 0,00144 (3) | 0,000343 (7) | 0,0100 (2) |

| | Energy keV | $P_{\gamma+ce}$ × 100 | Multipolarity | $\alpha_K$ | $\alpha_L$ | $\alpha_M$ | $\alpha_T$ |
|---|---|---|---|---|---|---|---|
| $\gamma_{29,4}$(U) | 586,3 (3) | 0,000000155 (16) | [E1] | 0,00802 (16) | 0,00142 (3) | 0,000339 (7) | 0,0099 (2) |
| $\gamma_{43,12}$(U) | 596,0 (5) | 0,000000040 (12) | [E2] | 0,0209 (4) | 0,00797 (16) | 0,00206 (4) | 0,0317 (6) |
| $\gamma_{33,6}$(U) | 597,99 (5) | 0,00000179 (6) | [E2] | 0,0208 (4) | 0,00789 (16) | 0,00204 (4) | 0,0314 (6) |
| $\gamma_{36,8}$(U) | 599,6 (2) | 0,000000204 (25) | [E1] | 0,00769 (15) | 0,00136 (3) | 0,000324 (6) | 0,00948 (19) |
| $\gamma_{40,10}$(U) | 606,9 (2) | 0,000000136 (15) | M1(+E2) | 0,09 (3) | 0,019 (4) | 0,0045 (9) | 0,12 (3) |
| $\gamma_{(-1,12)}$(U) | 608,9 (2) | 0,00000012 (2) | | | | | |
| $\gamma_{31,4}$(U) | 612,83 (3) | 0,00000096 (5) | E1 | 0,00738 (15) | 0,00130 (3) | 0,000310 (6) | 0,00910 (18) |
| $\gamma_{35,6}$(U) | 617,1 (1) | 0,00000154 (9) | [M1] | 0,1130 (23) | 0,0215 (4) | 0,00518 (10) | 0,142 (3) |
| $\gamma_{31,3}$(U) | 618,28 (6) | 0,00000212 (8) | (E2) | 0,0196 (4) | 0,00716 (14) | 0,00184 (4) | 0,0292 (6) |
| $\gamma_{33,5}$(U) | 619,21 (6) | 0,00000122 (8) | [E1] | 0,00724 (14) | 0,00127 (3) | 0,000304 (6) | 0,00892 (18) |
| $\gamma_{29,2}$(U) | 624,78 (5) | 0,000000464 (19) | [E1] | 0,00712 (14) | 0,001250 (25) | 0,000299 (6) | 0,00877 (18) |
| $\gamma_{32,3}$(U) | 624,78 (3) | < 0,000000025 | (M1) | 0,1090 (22) | 0,0208 (4) | 0,00501 (10) | 0,137 (3) |
| $\gamma_{28,0}$(U) | 633,15 (6) | 0,00000286 (7) | M1(+E2) | 0,097 (8) | 0,0187 (13) | 0,0045 (3) | 0,122 (11) |
| $\gamma_{29,1}$(U) | 637,73 (5) | 0,00000065 (6) | [E1] | 0,00684 (14) | 0,001200 (24) | 0,000287 (6) | 0,00844 (17) |
| $\gamma_{29,0}$(U) | 637,80 (5) | 0,00000197 (20) | E2 | 0,0185 (4) | 0,00655 (13) | 0,00167 (3) | 0,0273 (5) |
| $\gamma_{38,7}$(U) | 639,99 (10) | 0,00000869 (21) | [E2] | 0,0184 (4) | 0,00648 (13) | 0,00167 (3) | 0,0271 (5) |
| $\gamma_{30,2}$(U) | 645,94 (4) | 0,0000150 (3) | E1 | 0,00669 (13) | 0,001170 (24) | 0,000280 (6) | 0,00824 (16) |
| $\gamma_{33,4}$(U) | 649,32 (6) | 0,00000073 (5) | [E1] | 0,00662 (13) | 0,001160 (23) | 0,000277 (6) | 0,00816 (16) |
| $\gamma_{(-1,13)}$(U) | 650,53 (6) | 0,00000027 (4) | | | | | |
| $\gamma_{34,4}$(U) | 652,05 (2) | 0,00000668 (20) | E1 | 0,00657 (13) | 0,001150 (23) | 0,000274 (5) | 0,00809 (16) |
| $\gamma_{33,3}$(U) | 654,88 (8) | 0,00000233 (5) | (E2) | 0,0177 (4) | 0,00607 (12) | 0,00156 (3) | 0,0258 (5) |
| $\gamma_{30,1}$(U) | 658,86 (6) | 0,00000967 (26) | E1 | 0,00645 (13) | 0,001130 (23) | 0,000269 (5) | 0,00794 (16) |
| $\gamma_{31,0}$(U) | 664,58 (5) | 0,000001712 (41) | E2 | 0,0172 (4) | 0,00583 (12) | 0,00149 (3) | 0,0251 (5) |
| $\gamma_{36,5}$(U) | 668,2 (5) | 0,000000040 (12) | [E1] | 0,00628 (13) | 0,001100 (22) | 0,000262 (5) | 0,00773 (15) |
| $\gamma_{43,8}$(U) | 670,8 (5) | ≤ 0,000000009 (3) | | | | | |
| $\gamma_{32,0}$(U) | 670,99 (4) | ≤ 0,000000009 (3) | [M1+E2] | 0,05 (3) | 0,0033 (17) | 0,0025 (12) | 0,06 (4) |
| $\gamma_{35,3}$(U) | 674,043 (32) | 0,000000556 (22) | | 0,0893 (18) | 0,0169 (3) | 0,00408 (8) | 0,1120 (22) |
| $\gamma_{40,5}$(U) | 674,4 (5) | 0,000000111 (11) | (M1) | 0,0892 (18) | 0,0169 (3) | 0,00408 (8) | 0,1120 (22) |
| $\gamma_{(-1,14)}$(U) | 685,97 (11) | 0,00000127 (6) | E1 | 0,00599 (12) | 0,001040 (21) | 0,000248 (5) | 0,00736 (15) |
| $\gamma_{(-1,15)}$(U) | 688,1 (3) | 0,000000114 (11) | | | | | |
| $\gamma_{34,2}$(U) | 690,81 (8) | 0,00000059 (5) | E1 | 0,00591 (12) | 0,001030 (21) | 0,000245 (5) | 0,00727 (15) |
| $\gamma_{(-1,16)}$(U) | 693,2 (5) | 0,000000033 (13) | | | | | |
| $\gamma_{46,10}$(U) | 693,81 (1) | 0,000000019 (7) | (E2) | 0,0159 (3) | 0,00517 (10) | 0,00132 (3) | 0,0229 (5) |
| $\gamma_{41,5}$(U) | 697,8 (5) | 0,000000076 (15) | | | | | |
| $\gamma_{(-1,17)}$(U) | 699,6 (5) | 0,00000008 (2) | | | | | |
| $\gamma_{33,0}$(U) | 701,1 (2) | 0,000000555 (29) | [M1+E2] | 0,05 (3) | 0,010 (5) | 0,0025 (12) | 0,06 (4) |
| $\gamma_{34,1}$(U) | 703,68 (5) | 0,00000413 (13) | E1 | 0,00571 (12) | 0,000993 (20) | 0,000237 (5) | 0,00702 (14) |
| $\gamma_{(-1,18)}$(U) | 712,96 (5) | 0,000000052 (6) | | | | | |
| $\gamma_{44,7}$(U) | 714,71 (14) | 0,000000081 (8) | E2 | 0,0151 (3) | 0,00477 (10) | 0,001225 (25) | 0,0215 (4) |
| $\gamma_{39,4}$(U) | 718,0 (5) | 0,00000278 (6) | E1 | 0,00551 (11) | 0,000960 (19) | 0,000227 (5) | 0,00677 (14) |
| $\gamma_{35,0}$(U) | 720,3 (5) | 0,000000029 (5) | | | | | |
| $\gamma_{47,10}$(U) | 720,56 (3) | 0,000000020 (2) | | | | | |
| $\gamma_{41,4}$(U) | 727,9 (2) | 0,000000136 (8) | M1 | 0,0728 (15) | 0,0138 (3) | 0,00332 (7) | 0,0911 (18) |
| $\gamma_{46,7}$(U) | 736,5 (5) | 0,000000031 (9) | M1+59(8)%E2 | 0,0374 (7) | 0,00807 (16) | 0,00198 (4) | 0,0481 (10) |
| $\gamma_{(-1,19)}$(U) | 742,7 (5) | 0,000000038 (11) | | | | | |
| $\gamma_{37,2}$(U) | 747,4 (5) | 0,000000082 (16) | E1 | 0,00512 (10) | 0,000880 (18) | 0,000211 (4) | 0,00629 (13) |
| $\gamma_{38,2}$(U) | 756,23 (6) | 0,0000029 (5) | [M1+E2] | 0,04 (3) | 0,008 (4) | 0,002 (1) | 0,05 (3) |
| $\gamma_{39,2}$(U) | 756,4 (4) | 0,00000069 (19) | [E1] | 0,00501 (10) | 0,000865 (17) | 0,000206 (4) | 0,00615 (12) |
| $\gamma_{47,7}$(U) | 762,6 (2) | ~0,00000001 | | | | | |
| $\gamma_{45,5}$(U) | 763,60 (15) | > 0,000000042 | E0(+M1) | | | | >0,9 |
| $\gamma_{41,2}$(U) | 766,47 (3) | 0,00000065 (11) | E0+M1 | | | | 4,0 (4) |
| $\gamma_{51,12}$(U) | 767,29 (4) | 0,00000014 (3) | | | | | |
| $\gamma_{38,1}$(U) | 769,15 (8) | 0,0000153 (32) | M1+E0 | | | | 2,0 (2) |
| $\gamma_{39,1}$(U) | 769,4 (5) | 0,0000068 (12) | E1 | 0,00486 (10) | 0,000837 (17) | 0,000199 (4) | 0,00596 (12) |
| $\gamma_{43,4}$(U) | 769,54 (4) | 0,00000008 (2) | E0 | | | | |
| $\gamma_{(-1,20)}$(U) | 777,1 (3) | 0,000000028 (7) | | | | | |
| $\gamma_{41,1}$(U) | 779,43 (3) | 0,000000147 (10) | M1 | 0,0607 (12) | 0,01148 (23) | 0,00276 (6) | 0,0759 (15) |
| $\gamma_{(-1,21)}$(U) | 786,9 (2) | 0,000000089 (9) | E2 | 0,0128 (3) | 0,00370 (7) | 0,000930 (19) | 0,0177 (4) |
| $\gamma_{(-1,22)}$(U) | 788,5 (3) | 0,000000035 (7) | | | | | |

| | Energy keV | $P_{\gamma+ce}$ × 100 | Multipolarity | $\alpha_K$ | $\alpha_L$ | $\alpha_M$ | $\alpha_T$ |
|---|---|---|---|---|---|---|---|
| $\gamma_{42,2}$(U) | 792,68 (6) | 0,000000020 (4) | (E1) | 0,00461 (9) | 0,000790 (16) | 0,000188 (4) | 0,00565 (11) |
| $\gamma_{(-1,23)}$(U) | 796,9 (3) | 0,000000015 (3) | | | | | |
| $\gamma_{(-1,24)}$(U) | 803,2 (2) | 0,000000064 (5) | | | | | |
| $\gamma_{42,1}$(U) | 805,65 (6) | 0,000000029 (4) | E2 | 0,01220 (24) | 0,00348 (7) | 0,000880 (18) | 0,0169 (3) |
| $\gamma_{43,2}$(U) | 808,21 (4) | 0,000000130 (6) | M1 | 0,0552 (11) | 0,01040 (21) | 0,00251 (5) | 0,0690 (14) |
| $\gamma_{46,4}$(U) | 813,7 (2) | 0,000000048 (5) | M1 | 0,0542 (11) | 0,01020 (21) | 0,00246 (5) | 0,0677 (14) |
| $\gamma_{50,9}$(U) | 816,0 (2) | 0,000000026 (4) | [M1+E2] | 0,033 (21) | 0,007 (3) | 0,0016 (8) | 0,042 (25) |
| $\gamma_{43,0}$(U) | 821,25 (4) | 0,000000050 (11) | E1+M2 | | | | |
| $\gamma_{51,10}$(U) | 821,3 (2) | ~0,000000006 | | | | | |
| $\gamma_{(-1,25)}$(U) | 826,8 (3) | 0,000000018 (6) | | | | | |
| $\gamma_{(-1,26)}$(U) | 828,9 (2) | 0,00000014 (1) | | | | | |
| $\gamma_{52,12}$(U) | 832,2 (2) | 0,000000030 (4) | | | | | |
| $\gamma_{(-1,27)}$(U) | 837,3 (2) | 0,000000020 (4) | | | | | |
| $\gamma_{47,4}$(U) | 840,4 (2) | 0,000000056 (6) | M1(+E0) | | | | 0,14 (2) |
| $\gamma_{44,1}$(U) | 843,78 (1) | 0,000000147 (9) | M1(+E0) | | | | 0,09 (1) |
| $\gamma_{47,2}$(U) | 879,2 (3) | 0,000000037 (4) | [M1+E2] | 0,027 (17) | 0,006 (3) | 0,0014 (7) | 0,035 (20) |
| $\gamma_{47,1}$(U) | 891,0 (3) | 0,000000076 (8) | [E2] | 0,0102 (2) | 0,00270 (5) | 0,000677 (14) | 0,0139 (3) |
| $\gamma_{(-1,28)}$(U) | 895,4 (3) | 0,000000008 (3) | | | | | |
| $\gamma_{(-1,29)}$(U) | 898,1 (3) | 0,000000018 (4) | | | | | |
| $\gamma_{(-1,30)}$(U) | 905,5 (3) | 0,000000008 (3) | | | | | |
| $\gamma_{(-1,31)}$(U) | 911,7 (3) | 0,000000014 (3) | | | | | |
| $\gamma_{49,4}$(U) | 918,7 (3) | 0,000000009 (3) | | | | | |
| $\gamma_{(-1,32)}$(U) | 931,9 (3) | 0,000000013 (4) | | | | | |
| $\gamma_{50,3}$(U) | 940,3 (3) | 0,000000051 (5) | [E2] | 0,00932 (19) | 0,00237 (5) | 0,000591 (12) | 0,01250 (25) |
| $\gamma_{48,2}$(U) | 955,41 (2) | 0,000000032 (3) | M1+27(13)%E2 | 0,029 (3) | 0,0055 (6) | 0,00133 (13) | 0,036 (4) |
| $\gamma_{49,2}$(U) | 957,6 (3) | 0,000000032 (3) | | | | | |
| $\gamma_{48,1}$(U) | 968,37 (2) | 0,000000029 (5) | M1+27(20)%E2 | 0,0028 (15) | 0,0053 (29) | 0,0013 (7) | 0,035 (19) |
| $\gamma_{51,2}$(U) | 979,7 (3) | 0,000000029 (5) | [M1+E2] | 0,021 (12) | 0,0042 (20) | 0,0010 (5) | 0,026 (15) |
| $\gamma_{(-1,33)}$(U) | 982,7 (3) | 0,000000011 (3) | | | | | |
| $\gamma_{53,7}$(U) | 986,90 (4) | 0,000000021 (5) | E1 | 0,00313 (6) | 0,000529 (11) | 0,0001260 (25) | 0,00383 (8) |
| $\gamma_{51,1}$(U) | 992,64 (3) | 0,000000027 (4) | | | | | |
| $\gamma_{52,4}$(U) | 1005,7 (3) | 0,000000018 (3) | | | | | |
| $\gamma_{(-1,34)}$(U) | 1009,4 (3) | 0,000000014 (3) | | | | | |
| $\gamma_{52,0}$(U) | 1057,3 (2) | 0,000000045 (7) | | | | | |

# 3 Atomic Data

## 3.1 U

$\omega_K$ : 0,970 (4)
$\bar{\omega}_L$ : 0,500 (19)
$n_{KL}$ : 0,794 (5)

### 3.1.1 Auger Electrons

| | Energy keV | Relative probability |
|---|---|---|
| Auger K | | |
| KLL | 71,78 – 80,95 | 100 |
| KLX | 88,15 – 98,34 | 59,6 |
| KXY | 104,42 – 115,40 | 8,88 |
| Auger L | 5,9 – 21,6 | |

# 4 α Emissions

| | Energy keV | Probability × 100 |
|---|---|---|
| $\alpha_{0,53}$ | 4059,1 (3) | 0,000000021 (5) |
| $\alpha_{0,52}$ | 4116,78 (25) | 0,000000093 (9) |
| $\alpha_{0,51}$ | 4180,6 (3) | 0,00000020 (3) |
| $\alpha_{0,50}$ | 4186,53 (27) | 0,000000077 (7) |
| $\alpha_{0,49}$ | 4202,4 (3) | 0,000000041 (4) |
| $\alpha_{0,48}$ | 4204,42 (21) | 0,000000061 (15) |
| $\alpha_{0,47}$ | 4279,70 (26) | 0,000000199 (12) |
| $\alpha_{0,46}$ | 4305,79 (28) | 0,000000098 (13) |
| $\alpha_{0,45}$ | 4325,5 (10) | ∼ 0,000000042 |
| $\alpha_{0,44}$ | 4326,92 (21) | 0,000000228 (12) |
| $\alpha_{0,43}$ | 4349,15 (21) | 0,00000030 (3) |
| $\alpha_{0,42}$ | 4364,42 (22) | 0,000000084 (14) |
| $\alpha_{0,41}$ | 4390,20 (21) | 0,00000101 (11) |
| $\alpha_{0,40}$ | 4392,08 (28) | 0,000000247 (19) |
| $\alpha_{0,39}$ | 4400,0 (4) | 0,0000103 (12) |
| $\alpha_{0,38}$ | 4400,26 (21) | 0,000027 (3) |
| $\alpha_{0,37}$ | 4408,36 (22) | 0,000000103 (17) |
| $\alpha_{0,36}$ | 4419,14 (26) | 0,00000034 (4) |
| $\alpha_{0,35}$ | 4448,46 (21) | 0,00000213 (9) |
| $\alpha_{0,34}$ | 4464,68 (21) | 0,0000114 (3) |
| $\alpha_{0,33}$ | 4467,37 (21) | 0,00000707 (13) |
| $\alpha_{0,32}$ | 4496,90 (21) | < 0,000000034 |
| $\alpha_{0,31}$ | 4503,24 (21) | 0,00000631 (11) |
| $\alpha_{0,30}$ | 4508,72 (21) | 0,0000264 (6) |
| $\alpha_{0,29}$ | 4529,52 (22) | 0,00000322 (21) |
| $\alpha_{0,28}$ | 4534,08 (22) | 0,00000284 (7) |
| $\alpha_{0,27}$ | 4558,75 (22) | 0,000012 (4) |
| $\alpha_{0,26}$ | 4632,35 (21) | 0,00086 (3) |
| $\alpha_{0,25}$ | 4655,27 (27) | 0,0000033 (7) |
| $\alpha_{0,24}$ | 4690,29 (21) | 0,00056 (5) |
| $\alpha_{0,23}$ | 4718,39 (21) | 0,0000400 (11) |
| $\alpha_{0,22}$ | 4737,05 (21) | 0,00570 (5) |
| $\alpha_{0,21}$ | 4748,81 (21) | 0,00075 (11) |
| $\alpha_{0,20}$ | 4770,01 (21) | 0,00125 (3) |
| $\alpha_{0,19}$ | 4795,73 (21) | 0,000944 (17) |
| $\alpha_{0,18}$ | 4805,33 (22) | 0,000017 (4) |
| $\alpha_{0,17}$ | 4823,80 (22) | ≈ 0,000022 |
| $\alpha_{0,16}$ | 4829,38 (21) | 0,00354 (7) |
| $\alpha_{0,15}$ | 4866,91 (21) | 0,0018 (5) |
| $\alpha_{0,14}$ | 4870,38 (21) | 0,0007 (3) |
| $\alpha_{0,13}$ | 4911,69 (21) | 0,0030 (16) |
| $\alpha_{0,12}$ | 4935,00 (21) | 0,0050 (7) |
| $\alpha_{0,11}$ | 4962,83 (21) | 0,007 (1) |
| $\alpha_{0,10}$ | 4988,13 (21) | 0,0034 (10) |
| $\alpha_{0,8}$ | 5008,70 (21) | 0,0182 (27) |

| | Energy keV | Probability × 100 |
|---|---|---|
| $\alpha_{0,7}$ | 5029,51 (21) | 0,013 (4) |
| $\alpha_{0,6}$ | 5055,34 (21) | 0,0375 (12) |
| $\alpha_{0,5}$ | 5076,28 (21) | 0,052 (8) |
| $\alpha_{0,4}$ | 5105,81 (21) | 11,87 (3) |
| $\alpha_{0,3}$ | 5111,21 (21) | < 0,02 |
| $\alpha_{0,2}$ | 5143,82 (21) | 17,14 (4) |
| $\alpha_{0,1}$ | 5156,59 (14) | 70,79 (10) |
| $\alpha_{0,0}$ | 5156,65 (21) | ~ 0,03 |

## 5 Electron Emissions

| | | Energy keV | Electrons per 100 disint. |
|---|---|---|---|
| $e_{AL}$ | (U) | 5,9 - 21,6 | 4,66 (19) |
| $e_{AK}$ | (U) | | 0,00045 (6) |
| | KLL | 71,78 - 80,95 | } |
| | KLX | 88,15 - 98,34 | } |
| | KXY | 104,42 - 115,40 | } |
| $ec_{7,2\ K}$ | (U) | 0,66 (2) | 0,0049 (11) |
| $ec_{10,4\ K}$ | (U) | 4,10 (3) | 0,00011 (11) |
| $ec_{2,1\ M}$ | (U) | 7,427 - 9,425 | 15,4 (6) |
| $ec_{21,14\ K}$ | (U) | 8,02 (5) | 0,000227 (10) |
| $ec_{5,4\ L}$ | (U) | 8,28 - 12,87 | 0,0259 (11) |
| $ec_{7,0\ K}$ | (U) | 13,694 (1) | 0,00133 (3) |
| $ec_{4,2\ L}$ | (U) | 16,903 - 21,493 | 2,61 (16) |
| $ec_{10,7\ L}$ | (U) | 20,17 - 24,76 | 0,0072 (4) |
| $ec_{3,0\ L}$ | (U) | 24,45 - 29,04 | 0,0286 (16) |
| $ec_{5,4\ M}$ | (U) | 24,49 - 26,49 | 0,0063 (3) |
| $ec_{11,8\ L}$ | (U) | 24,92 - 29,51 | 0,0032 (9) |
| $ec_{7,5\ L}$ | (U) | 25,84 - 30,43 | 0,00190 (9) |
| $ec_{19,12\ K}$ | (U) | 26,055 (20) | 0,000209 (8) |
| $ec_{4,1\ L}$ | (U) | 29,866 - 34,456 | 6,09 (15) |
| $ec_{12,10\ L}$ | (U) | 32,281 - 36,871 | 0,00408 (10) |
| $ec_{4,2\ M}$ | (U) | 33,113 - 35,111 | 0,70 (4) |
| $ec_{6,3\ L}$ | (U) | 35,07 - 39,66 | 0,0276 (13) |
| $ec_{10,7\ M}$ | (U) | 36,38 - 38,38 | 0,00175 (9) |
| $ec_{3,0\ M}$ | (U) | 40,66 - 42,66 | 0,0071 (4) |
| $ec_{11,8\ M}$ | (U) | 41,13 - 43,13 | 0,00085 (25) |
| $ec_{7,5\ M}$ | (U) | 42,05 - 44,05 | 0,00046 (2) |
| $ec_{14,12\ L}$ | (U) | 43,95 - 48,54 | 0,00066 (24) |

| | | Energy keV | Electrons per 100 disint. |
|---|---|---|---|
| $ec_{16,10\ K}$ | (U) | 45,848 (15) | 0,00055 (3) |
| $ec_{9,6\ L}$ | (U) | 45,916 - 50,506 | 0,00201 (9) |
| $ec_{4,1\ M}$ | (U) | 46,076 - 48,074 | 1,68 (4) |
| $ec_{5,2\ L}$ | (U) | 46,938 - 51,528 | 0,021 (6) |
| $ec_{8,5\ L}$ | (U) | 46,97 - 51,56 | 0,0026 (12) |
| $ec_{12,10\ M}$ | (U) | 48,491 - 50,489 | 0,000987 (24) |
| $ec_{6,3\ M}$ | (U) | 51,280 - 53,278 | 0,0070 (4) |
| $ec_{7,4\ L}$ | (U) | 55,834 - 60,424 | 0,005 (3) |
| $ec_{13,9\ L}$ | (U) | 56,664 - 61,254 | 0,0018 (11) |
| $ec_{14,12\ M}$ | (U) | 60,160 - 62,158 | 0,00017 (6) |
| $ec_{9,6\ M}$ | (U) | 62,126 - 64,124 | 0,000498 (21) |
| $ec_{5,2\ M}$ | (U) | 63,148 - 65,146 | 0,0057 (16) |
| $ec_{8,5\ M}$ | (U) | 63,18 - 65,18 | 0,0007 (3) |
| $ec_{10,5\ L}$ | (U) | 67,88 - 72,47 | 0,00030 (16) |
| $ec_{7,4\ M}$ | (U) | 72,050 - 74,048 | 0,0012 (8) |
| $ec_{13,9\ M}$ | (U) | 72,868 - 74,866 | 0,0005 (3) |
| $ec_{12,7\ L}$ | (U) | 74,38 - 78,97 | 0,00044 (2) |
| $ec_{15,11\ L}$ | (U) | 75,8 - 80,4 | 0,0005 (3) |
| $ec_{8,4\ L}$ | (U) | 77,02 - 81,61 | 0,0139 (12) |
| $ec_{6,0\ L}$ | (U) | 81,30 - 85,89 | 0,00183 (6) |
| $ec_{16,7\ K}$ | (U) | 87,948 (5) | 0,00133 (3) |
| $ec_{12,7\ M}$ | (U) | 90,59 - 92,59 | 0,000123 (7) |
| $ec_{15,11\ M}$ | (U) | 92,1 - 94,1 | 0,00012 (8) |
| $ec_{8,4\ M}$ | (U) | 93,23 - 95,23 | 0,0039 (3) |
| $ec_{11,5\ L}$ | (U) | 93,62 - 98,21 | 0,0023 (3) |
| $ec_{7,2\ L}$ | (U) | 94,50 - 99,09 | 0,0017 (4) |
| $ec_{6,0\ M}$ | (U) | 97,51 - 99,51 | 0,000508 (18) |
| $ec_{7,0\ L}$ | (U) | 107,538 - 112,128 | 0,000304 (7) |
| $ec_{11,5\ M}$ | (U) | 109,83 - 111,83 | 0,00064 (7) |
| $ec_{7,2\ M}$ | (U) | 110,71 - 112,71 | 0,00043 (9) |
| $ec_{15,8\ L}$ | (U) | 122,443 - 127,033 | 0,000519 (16) |
| $ec_{15,8\ M}$ | (U) | 138,653 - 140,651 | 0,000143 (5) |
| $ec_{16,10\ L}$ | (U) | 139,692 - 144,282 | 0,000107 (6) |
| $ec_{16,7\ L}$ | (U) | 181,79 - 186,38 | 0,000257 (7) |

# 6 Photon Emissions

## 6.1 X-Ray Emissions

| | | Energy keV | | Photons per 100 disint. | |
|---|---|---|---|---|---|
| XL | (U) | 11,619 — 20,714 | | 4,66 (5) | |
| $XK\alpha_2$ | (U) | 94,666 | | 0,00418 (4) | } $K\alpha$ |
| $XK\alpha_1$ | (U) | 98,44 | | 0,00661 (9) | } |
| $XK\beta_3$ | (U) | 110,421 | } | | |
| $XK\beta_1$ | (U) | 111,298 | } | 0,00239 (3) | $K'\beta_1$ |
| $XK\beta_5''$ | (U) | 111,964 | } | | |
| $XK\beta_2$ | (U) | 114,407 | } | | |
| $XK\beta_4$ | (U) | 115,012 | } | 0,00131 (6) | $K'\beta_2$ |
| $XKO_{2,3}$ | (U) | 115,377 | } | | |
| $XK_{O,P}$ | (U) | 115,42 | | 0,01447 (14) | |

## 6.2 Gamma Emissions

| | Energy keV | Photons per 100 disint. |
|---|---|---|
| $\gamma_{1,0}$(U) | 0,0765 (4) | ~0,00000001 |
| $\gamma_{2,1}$(U) | 12,975 (10) | 0,0341 (9) |
| $\gamma_{(-1,1)}$(U) | 14,22 (3) | 0,0055 (4) |
| $\gamma_{5,4}$(U) | 30,04 (2) | 0,000219 (8) |
| $\gamma_{4,2}$(U) | 38,661 (2) | 0,01047 (21) |
| $\gamma_{(-1,2)}$(U) | 40,41 (5) | 0,000163 (16) |
| $\gamma_{10,7}$(U) | 41,93 (5) | 0,000163 (8) |
| $\gamma_{3,0}$(U) | 46,21 (5) | 0,000726 (13) |
| $\gamma_{11,8}$(U) | 46,68 (3) | 0,000050 (6) |
| $\gamma_{7,5}$(U) | 47,60 (3) | 0,0000625 (25) |
| $\gamma_{4,1}$(U) | 51,624 (1) | 0,02694 (26) |
| $\gamma_{12,10}$(U) | 54,039 (8) | 0,0001943 (28) |
| $\gamma_{6,3}$(U) | 56,828 (3) | 0,001136 (15) |
| $\gamma_{14,12}$(U) | 65,708 (30) | 0,0000473 (25) |
| $\gamma_{9,6}$(U) | 67,674 (12) | 0,000158 (5) |
| $\gamma_{5,2}$(U) | 68,696 (6) | 0,00036 (10) |
| $\gamma_{8,5}$(U) | 68,73 (2) | 0,00013 (6) |
| $\gamma_{(-1,3)}$(U) | 74,96 (10) | 0,000038 (6) |
| $\gamma_{7,4}$(U) | 77,592 (14) | 0,000380 (6) |
| $\gamma_{13,9}$(U) | 78,43 (2) | 0,0001533 (28) |
| $\gamma_{17,13}$(U) | 89,39 (6) | ~0,000002 |
| $\gamma_{10,5}$(U) | 89,64 (3) | 0,000027 (2) |
| $\gamma_{12,7}$(U) | 96,14 (3) | 0,0000379 (19) |
| $\gamma_{15,11}$(U) | 97,6 (3) | 0,00009 (6) |

| | Energy keV | Photons per 100 disint. |
|---|---|---|
| $\gamma_{8,4}$(U) | 98,78 (2) | 0,00135 (11) |
| $\gamma_{6,0}$(U) | 103,06 (3) | 0,000217 (6) |
| $\gamma_{11,5}$(U) | 115,38 (5) | 0,00046 (5) |
| $\gamma_{7,2}$(U) | 116,26 (2) | 0,000581 (19) |
| $\gamma_{10,4}$(U) | 119,70 (3) | 0,000021 (3) |
| $\gamma_{14,10}$(U) | 119,76 (2) | 0,000009 (2) |
| $\gamma_{12,6}$(U) | 122,35 (12) | 0,00000095 (13) |
| $\gamma_{37,29}$(U) | 123,228 (5) | 0,0000000016 (4) |
| $\gamma_{21,14}$(U) | 123,62 (5) | 0,0000237 (9) |
| $\gamma_{9,3}$(U) | 124,51 (3) | 0,0000681 (19) |
| $\gamma_{10,3}$(U) | 125,21 (10) | 0,0000563 (16) |
| $\gamma_{7,0}$(U) | 129,296 (1) | 0,00631 (4) |
| $\gamma_{19,12}$(U) | 141,657 (20) | 0,0000321 (10) |
| $\gamma_{12,5}$(U) | 143,35 (20) | 0,0000174 (8) |
| $\gamma_{15,8}$(U) | 144,201 (3) | 0,000285 (7) |
| $\gamma_{13,6}$(U) | 146,094 (6) | 0,000121 (3) |
| $\gamma_{10,2}$(U) | 158,1 (3) | 0,00000101 (10) |
| $\gamma_{18,11}$(U) | 160,19 (5) | 0,0000062 (13) |
| $\gamma_{16,10}$(U) | 161,450 (15) | 0,000122 (6) |
| $\gamma_{17,9}$(U) | 167,81 (5) | 0,0000030 (8) |
| $\gamma_{10,0}$(U) | 171,393 (6) | 0,000110 (3) |
| $\gamma_{42,28}$(U) | 172,560 (8) | 0,000000003 |
| $\gamma_{12,4}$(U) | 173,70 (5) | 0,0000031 (8) |
| $\gamma_{12,3}$(U) | 179,220 (12) | 0,0000656 (19) |
| $\gamma_{(-1,4)}$(U) | 184,55 (5) | 0,0000021 (6) |
| $\gamma_{14,6}$(U) | 188,23 (10) | 0,0000110 (11) |
| $\gamma_{21,12}$(U) | 189,36 (1) | 0,0000820 (14) |
| $\gamma_{(-1,5)}$(U) | 193,13 (12) | 0,0000090 (9) |
| $\gamma_{19,10}$(U) | 195,679 (8) | 0,000106 (2) |
| $\gamma_{(-1,6)}$(U) | 196,87 (5) | 0,0000037 (4) |
| $\gamma_{16,7}$(U) | 203,550 (5) | 0,000563 (9) |
| $\gamma_{21,11}$(U) | 218,0 (5) | 0,0000012 (10) |
| $\gamma_{12,0}$(U) | 225,42 (4) | 0,0000150 (4) |
| $\gamma_{19,7}$(U) | 237,77 (10) | 0,0000145 (6) |
| $\gamma_{26,14}$(U) | 242,08 (3) | 0,0000074 (5) |
| $\gamma_{21,10}$(U) | 243,38 (3) | 0,0000254 (7) |
| $\gamma_{14,3}$(U) | 244,92 (5) | 0,0000051 (5) |
| $\gamma_{24,12}$(U) | 248,95 (5) | 0,0000070 (6) |
| $\gamma_{22,10}$(U) | 255,384 (15) | 0,0000795 (20) |
| $\gamma_{20,7}$(U) | 263,95 (3) | 0,0000259 (10) |
| $\gamma_{30,20}$(U) | 265,7 (3) | 0,0000016 (4) |
| $\gamma_{16,4}$(U) | 281,2 (2) | 0,0000021 (3) |
| $\gamma_{19,5}$(U) | 285,3 (2) | 0,0000019 (4) |
| $\gamma_{22,7}$(U) | 297,46 (3) | 0,0000492 (13) |
| $\gamma_{24,10}$(U) | 302,87 (5) | 0,0000049 (4) |
| $\gamma_{26,12}$(U) | 307,85 (5) | 0,0000052 (4) |
| $\gamma_{21,6}$(U) | 311,78 (4) | 0,0000257 (8) |

| | Energy keV | Photons per 100 disint. |
|---|---|---|
| $\gamma_{23,7}$(U) | 316,41 (3) | 0,0000133 (5) |
| $\gamma_{16,2}$(U) | 319,68 (10) | 0,0000049 (5) |
| $\gamma_{19,3}$(U) | 320,862 (20) | 0,0000540 (12) |
| $\gamma_{24,8}$(U) | 323,84 (3) | 0,0000530 (13) |
| $\gamma_{16,0}$(U) | 332,845 (5) | 0,000488 (8) |
| $\gamma_{26,11}$(U) | 336,113 (12) | 0,0001111 (26) |
| $\gamma_{20,4}$(U) | 341,506 (10) | 0,0000650 (13) |
| $\gamma_{24,7}$(U) | 345,00 (2) | $<$ 0,00005 |
| $\gamma_{22,5}$(U) | 345,013 (4) | 0,000548 (8) |
| $\gamma_{(-1,7)}$(U) | 350,8 (3) | 0,0000018 (4) |
| $\gamma_{19,2}$(U) | 354,0 (5) | 0,00000076 (30) |
| $\gamma_{26,10}$(U) | 361,89 (5) | 0,0000117 (7) |
| $\gamma_{19,0}$(U) | 367,073 (25) | 0,0000871 (20) |
| $\gamma_{21,3}$(U) | 368,554 (20) | 0,0000877 (14) |
| $\gamma_{22,4}$(U) | 375,054 (3) | 0,001540 (21) |
| $\gamma_{20,2}$(U) | 380,191 (6) | 0,000302 (4) |
| $\gamma_{26,8}$(U) | 382,75 (5) | 0,000256 (4) |
| $\gamma_{24,5}$(U) | 392,53 (3) | 0,000121 (16) |
| $\gamma_{20,1}$(U) | 393,14 (3) | 0,000419 (17) |
| $\gamma_{23,3}$(U) | 399,53 (6) | 0,00000612 (26) |
| $\gamma_{25,6}$(U) | 406,8 (2) | 0,0000029 (7) |
| $\gamma_{27,11}$(U) | 411,2 (3) | 0,0000069 (30) |
| $\gamma_{42,20}$(U) | 412,49 (6) | ~0,000000018 |
| $\gamma_{22,2}$(U) | 413,713 (5) | 0,001464 (21) |
| $\gamma_{24,4}$(U) | 422,598 (19) | 0,0001199 (20) |
| $\gamma_{22,1}$(U) | 426,68 (3) | 0,0000239 (6) |
| $\gamma_{24,3}$(U) | 428,4 (3) | 0,00000101 (10) |
| $\gamma_{26,6}$(U) | 430,08 (10) | 0,00000429 (19) |
| $\gamma_{23,0}$(U) | 445,72 (3) | 0,00000877 (26) |
| $\gamma_{(-1,8)}$(U) | 446,82 (20) | 0,00000085 (13) |
| $\gamma_{26,5}$(U) | 451,481 (10) | 0,000187 (3) |
| $\gamma_{27,8}$(U) | 457,61 (5) | 0,00000151 (3) |
| $\gamma_{24,2}$(U) | 461,25 (5) | 0,00000229 (5) |
| $\gamma_{25,3}$(U) | 463,9 (3) | 0,00000028 (3) |
| $\gamma_{24,0}$(U) | 473,9 (5) | 0,00000006 (3) |
| $\gamma_{26,4}$(U) | 481,66 (12) | 0,00000461 (10) |
| $\gamma_{26,3}$(U) | 487,06 (10) | 0,000000265 (19) |
| $\gamma_{31,10}$(U) | 493,08 (5) | 0,00000088 (3) |
| $\gamma_{(-1,9)}$(U) | 497,0 (5) | 0,000000044 (25) |
| $\gamma_{27,5}$(U) | 526,4 (4) | 0,000000057 (19) |
| $\gamma_{(-1,10)}$(U) | 538,8 (2) | 0,000000309 (19) |
| $\gamma_{33,8}$(U) | 550,5 (2) | 0,000000435 (25) |
| $\gamma_{(-1,11)}$(U) | 557,3 (5) | 0,000000038 (19) |
| $\gamma_{36,10}$(U) | 579,4 (3) | 0,000000088 (19) |
| $\gamma_{31,5}$(U) | 582,89 (10) | 0,000000618 (26) |
| $\gamma_{29,4}$(U) | 586,3 (3) | 0,000000153 (16) |
| $\gamma_{43,12}$(U) | 596,0 (5) | 0,000000039 (12) |

| | Energy keV | Photons per 100 disint. |
|---|---|---|
| $\gamma_{33,6}$(U) | 597,99 (5) | 0,00000174 (6) |
| $\gamma_{36,8}$(U) | 599,6 (2) | 0,000000202 (25) |
| $\gamma_{40,10}$(U) | 606,9 (2) | 0,000000121 (13) |
| $\gamma_{(-1,12)}$(U) | 608,9 (2) | 0,000000117 (12) |
| $\gamma_{31,4}$(U) | 612,83 (3) | 0,00000095 (5) |
| $\gamma_{35,6}$(U) | 617,1 (1) | 0,00000135 (8) |
| $\gamma_{31,3}$(U) | 618,28 (6) | 0,00000206 (8) |
| $\gamma_{33,5}$(U) | 619,21 (6) | 0,00000121 (8) |
| $\gamma_{32,3}$(U) | 624,78 (3) | < 0,000000022 |
| $\gamma_{29,2}$(U) | 624,78 (5) | 0,000000460 (19) |
| $\gamma_{28,0}$(U) | 633,15 (6) | 0,00000255 (6) |
| $\gamma_{29,1}$(U) | 637,73 (5) | 0,00000064 (6) |
| $\gamma_{29,0}$(U) | 637,80 (5) | 0,00000192 (19) |
| $\gamma_{38,7}$(U) | 639,99 (10) | 0,00000846 (20) |
| $\gamma_{30,2}$(U) | 645,94 (4) | 0,0000149 (3) |
| $\gamma_{33,4}$(U) | 649,32 (6) | 0,00000072 (5) |
| $\gamma_{(-1,13)}$(U) | 650,53 (6) | 0,00000027 (4) |
| $\gamma_{34,4}$(U) | 652,05 (2) | 0,00000663 (20) |
| $\gamma_{33,3}$(U) | 654,88 (8) | 0,00000227 (5) |
| $\gamma_{30,1}$(U) | 658,86 (6) | 0,00000959 (26) |
| $\gamma_{31,0}$(U) | 664,58 (5) | 0,00000167 (4) |
| $\gamma_{36,5}$(U) | 668,2 (5) | 0,000000040 (12) |
| $\gamma_{43,8}$(U) | 670,8 (5) | < 0,000000009 (3) |
| $\gamma_{32,0}$(U) | 670,99 (4) | < 0,000000009 (3) |
| $\gamma_{35,3}$(U) | 674,05 (3) | 0,00000050 (2) |
| $\gamma_{40,5}$(U) | 674,4 (5) | 0,00000010 (1) |
| $\gamma_{(-1,14)}$(U) | 685,97 (11) | 0,00000126 (6) |
| $\gamma_{(-1,15)}$(U) | 688,1 (3) | 0,000000112 (11) |
| $\gamma_{34,2}$(U) | 690,81 (8) | 0,00000059 (5) |
| $\gamma_{(-1,16)}$(U) | 693,2 (5) | 0,000000032 (13) |
| $\gamma_{46,10}$(U) | 693,81 (1) | 0,000000019 (7) |
| $\gamma_{41,5}$(U) | 697,8 (5) | 0,000000074 (15) |
| $\gamma_{(-1,17)}$(U) | 699,6 (5) | 0,000000080 (16) |
| $\gamma_{33,0}$(U) | 701,1 (2) | 0,000000524 (19) |
| $\gamma_{34,1}$(U) | 703,68 (5) | 0,00000410 (13) |
| $\gamma_{(-1,18)}$(U) | 712,96 (5) | 0,000000052 (6) |
| $\gamma_{44,7}$(U) | 714,71 (14) | 0,000000079 (8) |
| $\gamma_{39,4}$(U) | 718,0 (5) | 0,00000276 (6) |
| $\gamma_{35,0}$(U) | 720,3 (5) | 0,000000029 (5) |
| $\gamma_{47,10}$(U) | 720,55 (3) | 0,000000020 (2) |
| $\gamma_{41,4}$(U) | 727,9 (2) | 0,000000125 (7) |
| $\gamma_{46,7}$(U) | 736,5 (5) | 0,000000030 (9) |
| $\gamma_{(-1,19)}$(U) | 742,7 (5) | 0,000000038 (11) |
| $\gamma_{37,2}$(U) | 747,4 (5) | 0,000000081 (16) |
| $\gamma_{38,2}$(U) | 756,23 (6) | 0,0000028 (5) |
| $\gamma_{39,2}$(U) | 756,4 (4) | 0,00000069 (19) |
| $\gamma_{47,7}$(U) | 762,6 (2) | ~0,00000001 |

| | Energy keV | Photons per 100 disint. |
|---|---|---|
| $\gamma_{45,5}$(U) | 763,60 (15) | ~0,000000022 |
| $\gamma_{41,2}$(U) | 766,47 (3) | 0,00000013 (2) |
| $\gamma_{51,12}$(U) | 767,29 (4) | 0,00000014 (3) |
| $\gamma_{38,1}$(U) | 769,15 (8) | 0,0000051 (10) |
| $\gamma_{39,1}$(U) | 769,4 (5) | 0,0000068 (12) |
| $\gamma_{(-1,20)}$(U) | 777,1 (3) | 0,000000028 (7) |
| $\gamma_{41,1}$(U) | 779,43 (3) | 0,000000137 (9) |
| $\gamma_{(-1,21)}$(U) | 786,9 (2) | 0,000000087 (9) |
| $\gamma_{(-1,22)}$(U) | 788,5 (3) | 0,000000035 (7) |
| $\gamma_{42,2}$(U) | 792,68 (6) | 0,000000020 (4) |
| $\gamma_{(-1,23)}$(U) | 796,9 (3) | 0,000000015 (3) |
| $\gamma_{(-1,24)}$(U) | 803,2 (2) | 0,000000064 (5) |
| $\gamma_{42,1}$(U) | 805,65 (6) | 0,000000028 (4) |
| $\gamma_{43,2}$(U) | 808,21 (4) | 0,000000122 (6) |
| $\gamma_{46,4}$(U) | 813,7 (2) | 0,000000045 (5) |
| $\gamma_{50,9}$(U) | 816,0 (2) | 0,000000025 (4) |
| $\gamma_{43,0}$(U) | 821,25 (4) | 0,000000050 (11) |
| $\gamma_{51,10}$(U) | 821,3 (2) | ~0,000000006 |
| $\gamma_{(-1,25)}$(U) | 826,8 (3) | 0,000000018 (6) |
| $\gamma_{(-1,26)}$(U) | 828,9 (2) | 0,000000134 (8) |
| $\gamma_{52,12}$(U) | 832,2 (2) | 0,000000030 (4) |
| $\gamma_{(-1,27)}$(U) | 837,3 (2) | 0,000000020 (4) |
| $\gamma_{47,4}$(U) | 840,4 (2) | 0,000000049 (5) |
| $\gamma_{44,1}$(U) | 843,78 (1) | 0,000000135 (8) |
| $\gamma_{47,2}$(U) | 879,2 (3) | 0,000000036 (4) |
| $\gamma_{47,1}$(U) | 891,0 (3) | 0,000000075 (8) |
| $\gamma_{(-1,28)}$(U) | 895,4 (3) | 0,0000000076 (25) |
| $\gamma_{(-1,29)}$(U) | 898,1 (3) | 0,000000018 (4) |
| $\gamma_{(-1,30)}$(U) | 905,5 (3) | 0,0000000076 (25) |
| $\gamma_{(-1,31)}$(U) | 911,7 (3) | 0,000000014 (3) |
| $\gamma_{49,4}$(U) | 918,7 (3) | 0,0000000088 (30) |
| $\gamma_{(-1,32)}$(U) | 931,9 (3) | 0,000000013 (4) |
| $\gamma_{50,3}$(U) | 940,3 (3) | 0,000000050 (5) |
| $\gamma_{48,2}$(U) | 955,41 (2) | 0,000000031 (3) |
| $\gamma_{49,2}$(U) | 957,6 (3) | 0,000000032 (3) |
| $\gamma_{48,1}$(U) | 968,37 (2) | ~0,000000028 |
| $\gamma_{51,2}$(U) | 979,7 (3) | 0,000000028 (5) |
| $\gamma_{(-1,33)}$(U) | 982,7 (3) | 0,0000000107 (25) |
| $\gamma_{53,7}$(U) | 986,90 (4) | 0,000000021 (5) |
| $\gamma_{51,1}$(U) | 992,64 (3) | 0,000000027 (4) |
| $\gamma_{52,4}$(U) | 1005,7 (3) | 0,0000000177 (25) |
| $\gamma_{(-1,34)}$(U) | 1009,4 (3) | 0,0000000139 (25) |
| $\gamma_{52,0}$(U) | 1057,3 (2) | 0,000000045 (7) |

## 7 Main Production Modes

U – 238(n,$\gamma$)U – 239

$\left\{ \begin{array}{l} \text{U} - 239(\beta^-)\text{Np} - 239 \\ \text{Possible impurities : } \text{T}_{1/2} : \text{ 23,5 min} \end{array} \right.$

$\left\{ \begin{array}{l} \text{Np} - 239(\beta^-)\text{Pu} - 239 \quad \sigma : 2,7\ (1)\ \text{barns} \\ \text{Possible impurities : } \text{T}_{1/2} : \text{ 2,35 d; Pu} - 240,\ \text{Pu} - 241,\ \text{Am} - 241 \end{array} \right.$

U – 238(d,p)U – 239

## 8 References


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(alpha-transition energies and probabilities)
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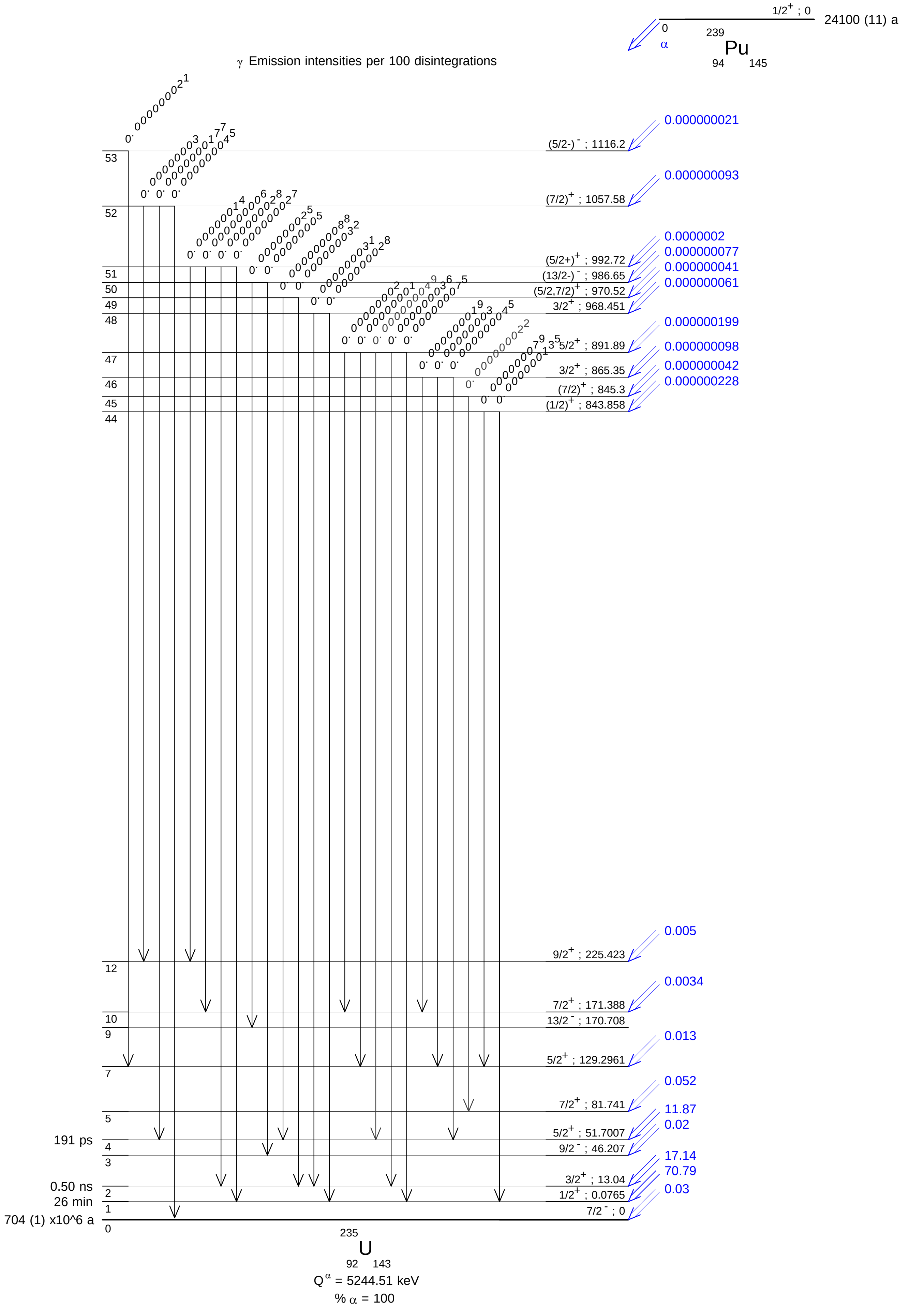
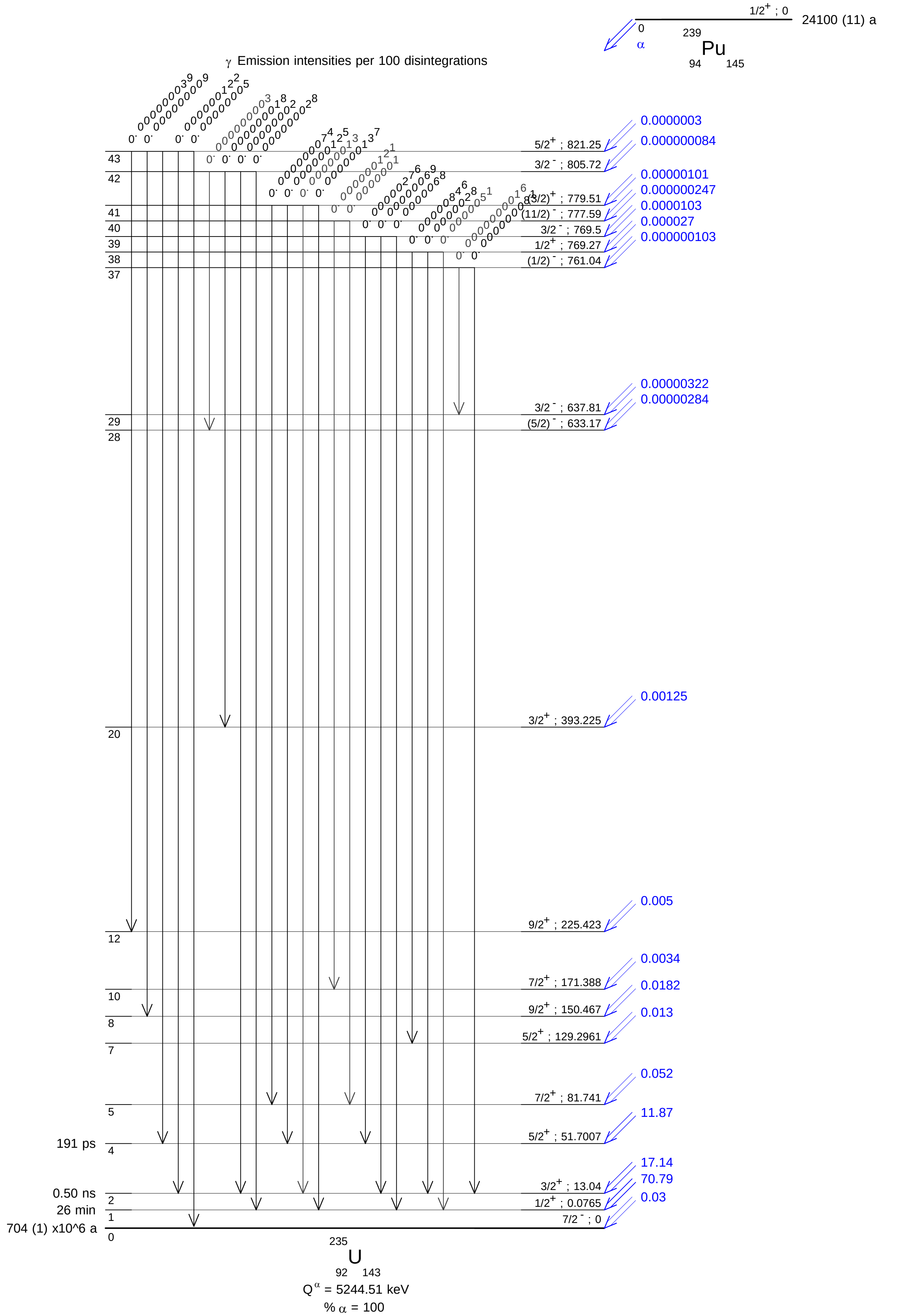

1/2+ ; 0
24100 (11) a
α
239 Pu 94 145
γ Emission intensities per 100 disintegrations
(5/2-)- ; 1116.2
0.000000021
(7/2)+ ; 1057.58
0.000000093
(5/2+)+ ; 992.72
0.0000002
(13/2-)- ; 986.65
0.000000077
(5/2,7/2)+ ; 970.52
0.000000041
3/2+ ; 968.451
0.000000061
5/2+ ; 891.89
0.000000199
3/2+ ; 865.35
0.000000098
(7/2)+ ; 845.3
0.000000042
(1/2)+ ; 843.858
0.000000228
9/2+ ; 225.423
0.005
7/2+ ; 171.388
0.0034
13/2- ; 170.708
5/2+ ; 129.2961
0.013
7/2+ ; 81.741
0.052
5/2+ ; 51.7007
11.87
9/2- ; 46.207
0.02
3/2+ ; 13.04
17.14
1/2+ ; 0.0765
70.79
7/2- ; 0
0.03
191 ps
0.50 ns
26 min
704 (1) x10^6 a
235 U 92 143
Qα = 5244.51 keV
% α = 100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24100 (11) a
0
α
239 Pu 94 145
γ Emission intensities per 100 disintegrations
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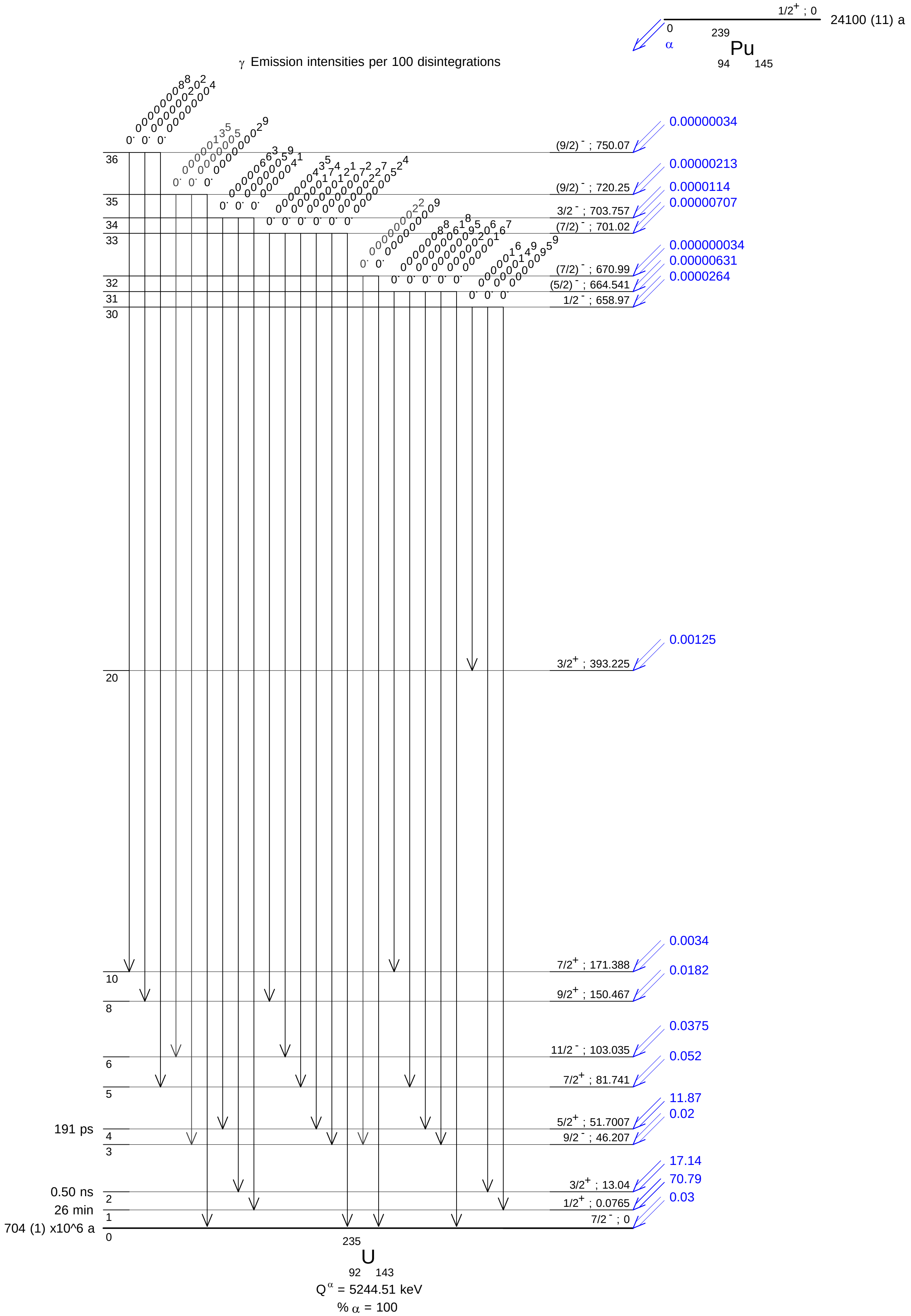
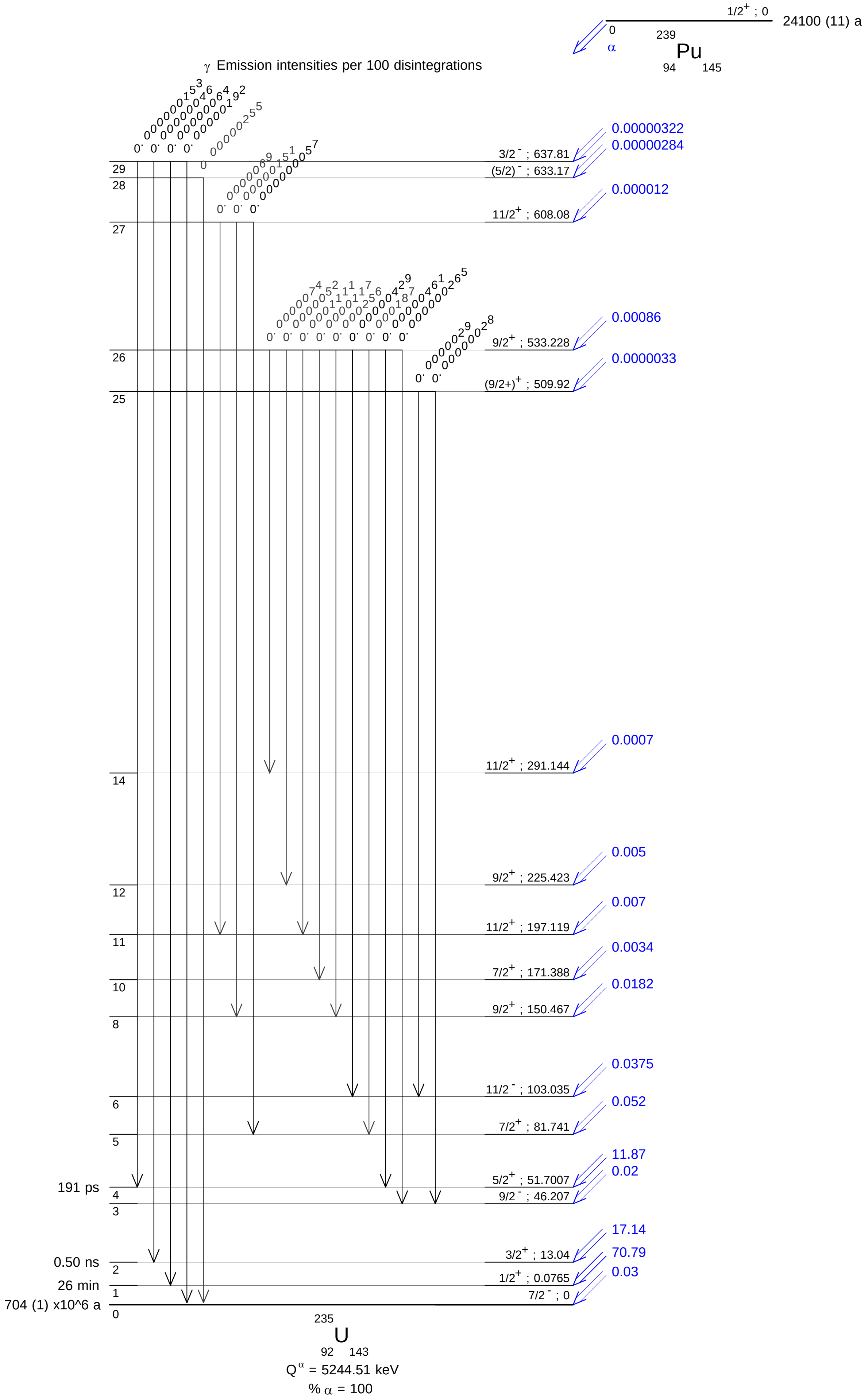
0.0000003
3/2 - ; 805.72
0.000000084
(3/2)+ ; 779.51
0.00000101
(11/2) - ; 777.59
0.000000247
3/2 - ; 769.5
0.0000103
1/2+ ; 769.27
0.000027
(1/2) - ; 761.04
0.000000103
3/2 - ; 637.81
0.00000322
(5/2) - ; 633.17
0.00000284
3/2+ ; 393.225
0.00125
9/2+ ; 225.423
0.005
7/2+ ; 171.388
0.0034
9/2+ ; 150.467
0.0182
5/2+ ; 129.2961
0.013
7/2+ ; 81.741
0.052
5/2+ ; 51.7007
11.87
3/2+ ; 13.04
17.14
1/2+ ; 0.0765
70.79
7/2 - ; 0
0.03
43
42
41
40
39
38
37
29
28
20
12
10
8
7
5
191 ps
4
0.50 ns
2
26 min
1
704 (1) x10^6 a
0
235 U 92 143
Qα = 5244.51 keV
% α = 100


1/2+ ; 0
24100 (11) a
0
α
239
Pu
94 145
γ Emission intensities per 100 disintegrations
(9/2) - ; 750.07
0.00000034
(9/2) - ; 720.25
0.00000213
3/2 - ; 703.757
0.0000114
(7/2) - ; 701.02
0.00000707
(7/2) - ; 670.99
0.000000034
(5/2) - ; 664.541
0.00000631
1/2 - ; 658.97
0.0000264
3/2+ ; 393.225
0.00125
7/2+ ; 171.388
0.0034
9/2+ ; 150.467
0.0182
11/2 - ; 103.035
0.0375
7/2+ ; 81.741
0.052
5/2+ ; 51.7007
11.87
9/2 - ; 46.207
0.02
3/2+ ; 13.04
17.14
1/2+ ; 0.0765
70.79
7/2 - ; 0
0.03
36
35
34
33
32
31
30
20
10
8
6
5
191 ps
4
3
0.50 ns
2
26 min
1
704 (1) x10^6 a
0
235
U
92 143
Q α = 5244.51 keV
% α = 100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24100 (11) a
0
α
239
Pu
94 145
γ Emission intensities per 100 disintegrations
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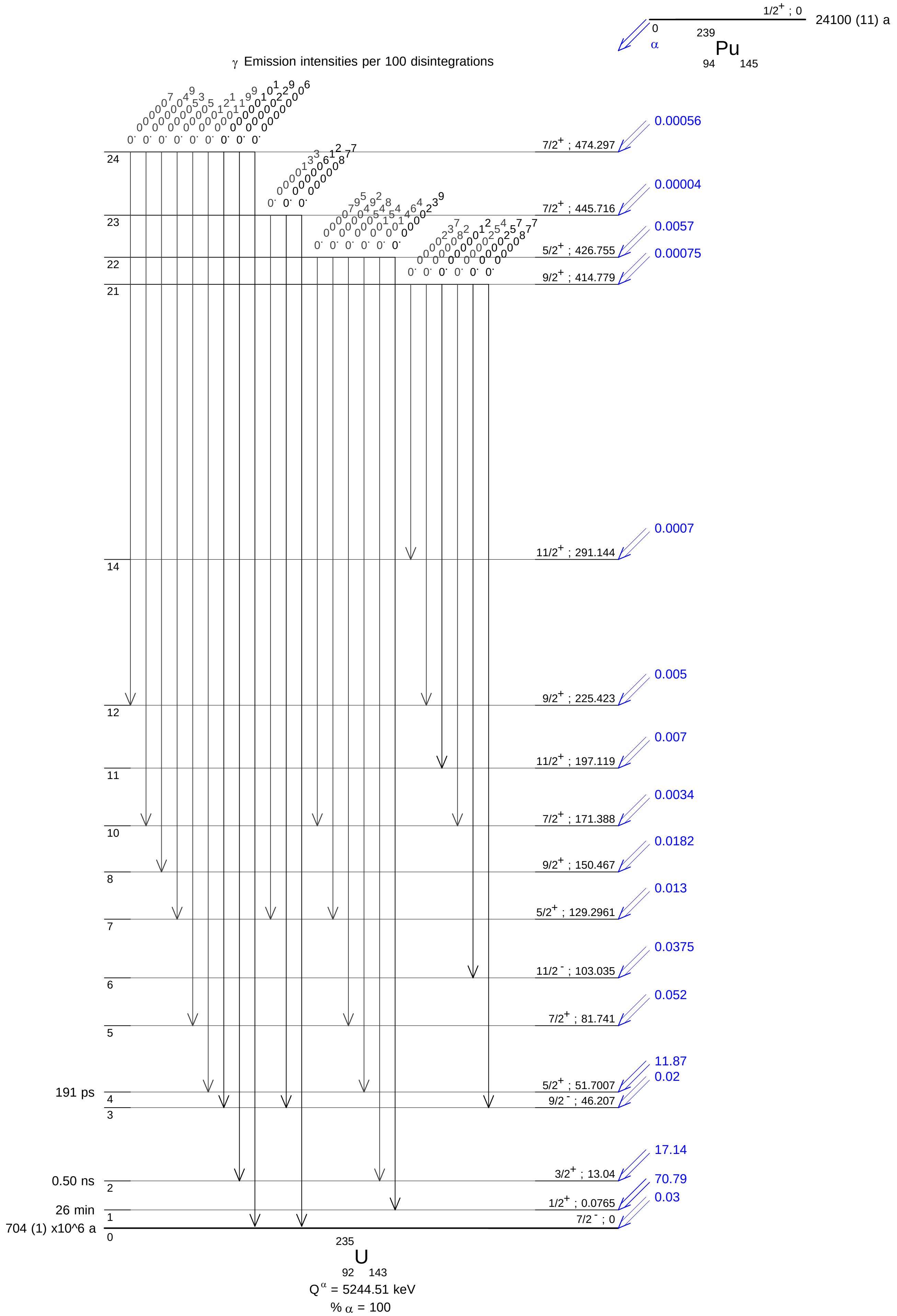
(5/2)- ; 633.17
0.00000284
11/2+ ; 608.08
0.000012
9/2+ ; 533.228
0.00086
(9/2+)+ ; 509.92
0.0000033
11/2+ ; 291.144
0.0007
9/2+ ; 225.423
0.005
11/2+ ; 197.119
0.007
7/2+ ; 171.388
0.0034
9/2+ ; 150.467
0.0182
11/2- ; 103.035
0.0375
7/2+ ; 81.741
0.052
191 ps
5/2+ ; 51.7007
11.87
9/2- ; 46.207
0.02
0.50 ns
3/2+ ; 13.04
17.14
26 min
1/2+ ; 0.0765
70.79
704 (1) x10^6 a
7/2- ; 0
0.03
235
U
92 143
Qα = 5244.51 keV
% α = 100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24100 (11) a
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α
239 Pu 94 145
γ Emission intensities per 100 disintegrations
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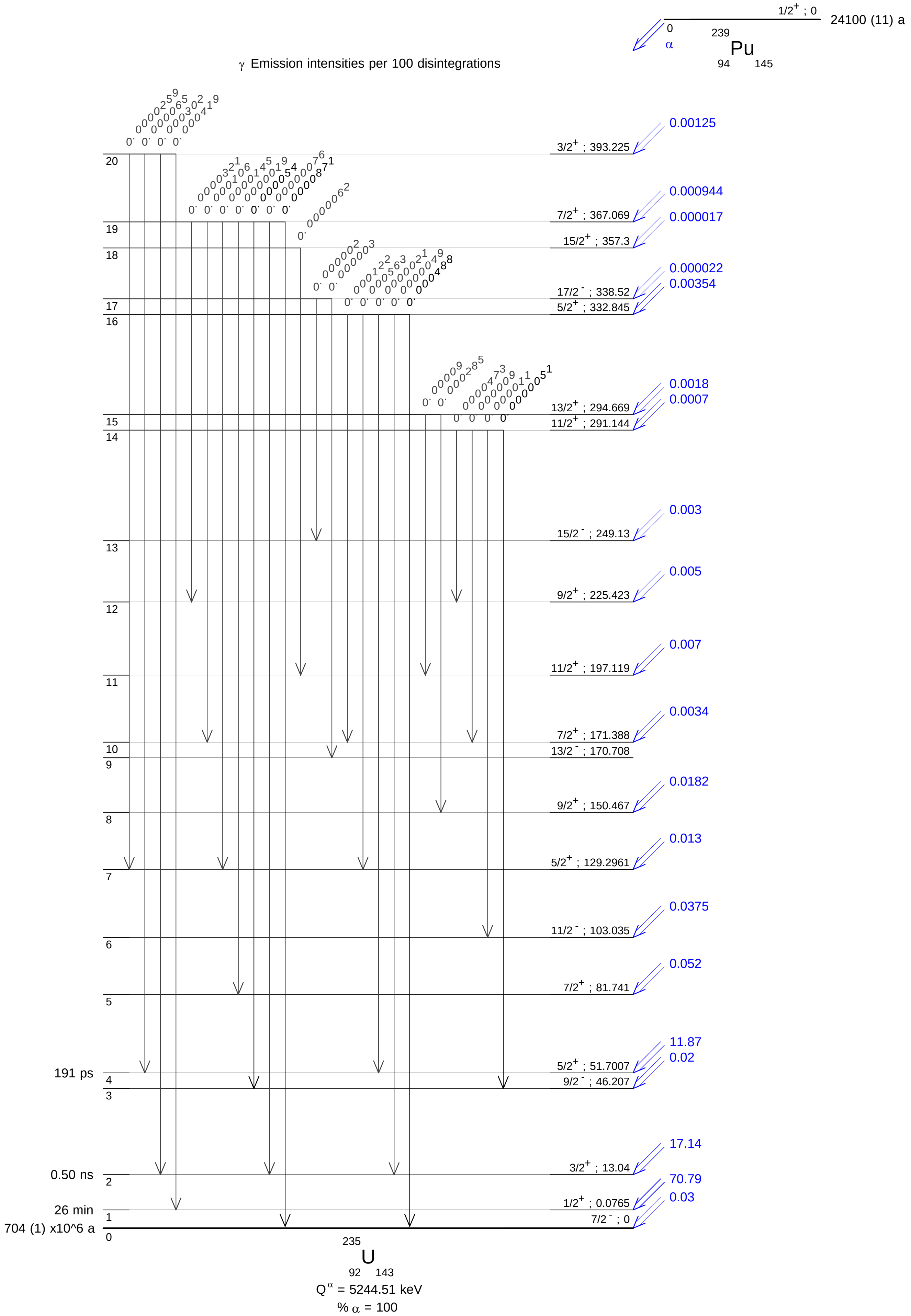
7/2+ ; 445.716
0.00004
5/2+ ; 426.755
0.0057
9/2+ ; 414.779
0.00075
11/2+ ; 291.144
0.0007
9/2+ ; 225.423
0.005
11/2+ ; 197.119
0.007
7/2+ ; 171.388
0.0034
9/2+ ; 150.467
0.0182
5/2+ ; 129.2961
0.013
11/2- ; 103.035
0.0375
7/2+ ; 81.741
0.052
5/2+ ; 51.7007
11.87
9/2- ; 46.207
0.02
3/2+ ; 13.04
17.14
1/2+ ; 0.0765
70.79
7/2- ; 0
0.03
191 ps
0.50 ns
26 min
704 (1) x10^6 a
24
23
22
21
14
12
11
10
8
7
6
5
4
3
2
1
0
235 U 92 143
Qα = 5244.51 keV
% α = 100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24100 (11) a
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α
239
Pu
94 145
γ Emission intensities per 100 disintegrations
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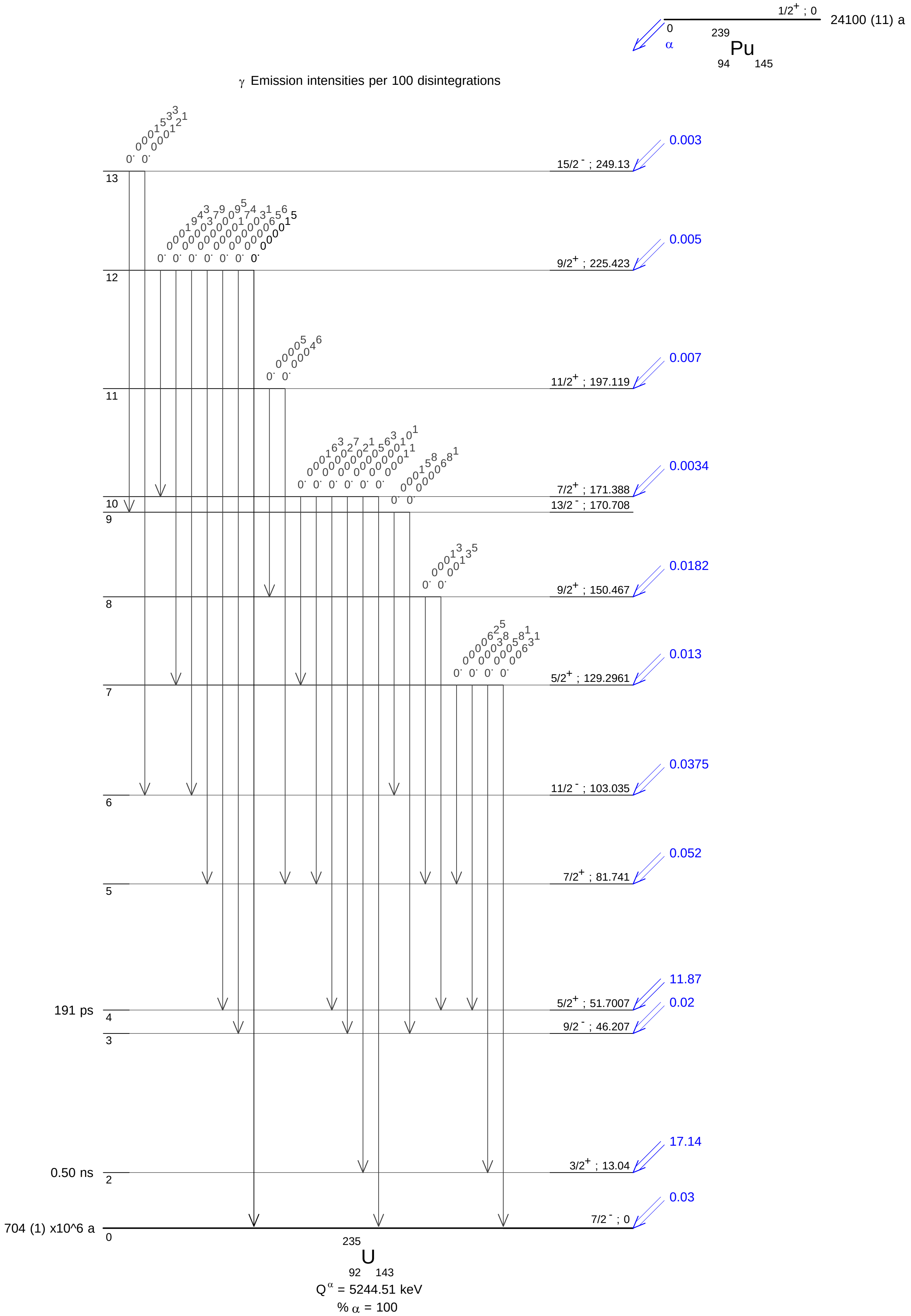
0.00125
7/2+ ; 367.069
0.000944
15/2+ ; 357.3
0.000017
17/2 - ; 338.52
0.000022
5/2+ ; 332.845
0.00354
13/2+ ; 294.669
0.0018
11/2+ ; 291.144
0.0007
15/2 - ; 249.13
0.003
9/2+ ; 225.423
0.005
11/2+ ; 197.119
0.007
7/2+ ; 171.388
0.0034
13/2 - ; 170.708
9/2+ ; 150.467
0.0182
5/2+ ; 129.2961
0.013
11/2 - ; 103.035
0.0375
7/2+ ; 81.741
0.052
5/2+ ; 51.7007
11.87
9/2 - ; 46.207
0.02
191 ps
3/2+ ; 13.04
17.14
0.50 ns
1/2+ ; 0.0765
70.79
26 min
7/2 - ; 0
0.03
704 (1) x10^6 a
235
U
92 143
Qα = 5244.51 keV
% α = 100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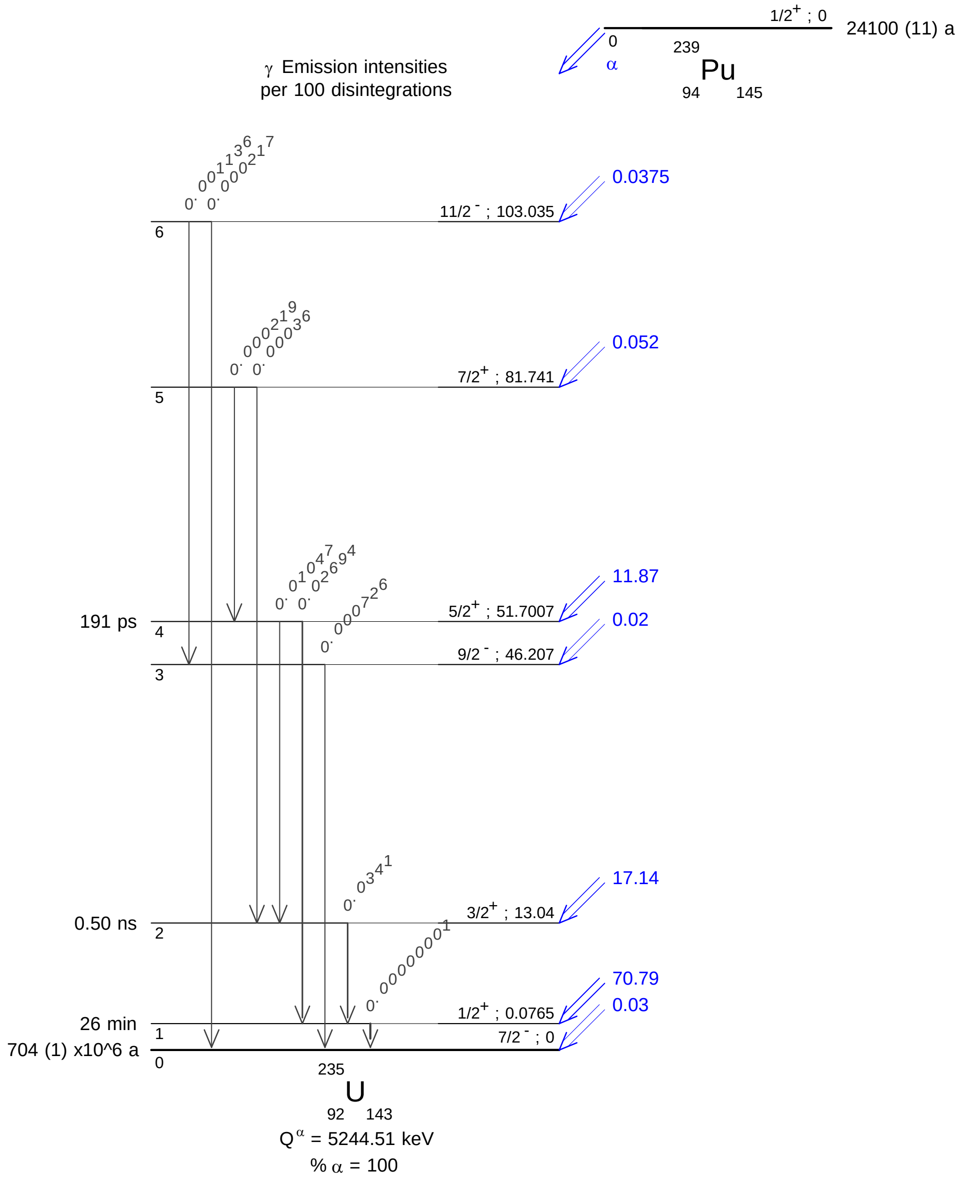
24100 (11) a
0
α
239
Pu
94 145
γ Emission intensities per 100 disintegrations
15/2 - ; 249.13
0.003
9/2+ ; 225.423
0.005
11/2+ ; 197.119
0.007
7/2+ ; 171.388
0.0034
13/2 - ; 170.708
9/2+ ; 150.467
0.0182
5/2+ ; 129.2961
0.013
11/2 - ; 103.035
0.0375
7/2+ ; 81.741
0.052
5/2+ ; 51.7007
11.87
9/2 - ; 46.207
0.02
3/2+ ; 13.04
17.14
7/2 - ; 0
0.03
191 ps
0.50 ns
704 (1) x10^6 a
235
U
92 143
Qα = 5244.51 keV
% α = 100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24100 (11) a
0
α
239
Pu
94
145
γ Emission intensities
per 100 disintegrations
11/2 - ; 103.035
0.0375
6
7/2+ ; 81.741
0.052
5
191 ps
4
5/2+ ; 51.7007
11.87
3
9/2 - ; 46.207
0.02
0.50 ns
2
3/2+ ; 13.04
17.14
26 min
1
1/2+ ; 0.0765
70.79
704 (1) x10^6 a
0
7/2 - ; 0
0.03
235
U
92
143
Q α = 5244.51 keV
% α = 100