235	U	
92		143

1 Decay Scheme

U-235 disintegrates by alpha emission to levels in Th-231. The spontaneous fission branching ratio is 7,0 (2) E-9 %.
L'uranium 235 se désintègre par émission alpha vers des niveaux du thorium 231. Le pourcentage de fission spontanée est de 7,0 (2) E-9 %.

2 Nuclear Data

$T_{1/2}(^{235}\text{U})$	:	704	(1)	10^6 a
$T_{1/2}(^{231}\text{Th})$	:	25,52	(1)	h
$Q^{\alpha}(^{235}\text{U})$	:	4678,3	(7)	keV

2.1 α Transitions

	Energy keV	Probability × 100	F
$\alpha_{0,22}$	4045 (5)	≈ 0,0011	79
$\alpha_{0,21}$	4082,7 (8)	0,0396 (10)	4,86
$\alpha_{0,20}$	4148,1 (7)	0,016 (12)	46
$\alpha_{0,19}$	4224 (5)	0,294 (13)	11,6
$\alpha_{0,18}$	4287,7 (19)	5,95 (12)	2
$\alpha_{0,17}$	4292,6 (7)	0,01732 (12)	714
$\alpha_{0,16}$	4300,8 (7)	0,122 (6)	119
$\alpha_{0,15}$	4322 (5)	0,069 (10)	343
$\alpha_{0,14}$	4340 (5)	0,22 (3)	150
$\alpha_{0,13}$	4353,4 (7)	0,0329 (5)	1185
$\alpha_{0,12}$	4361,1 (7)	0,065 (13)	690
$\alpha_{0,11}$	4376,6 (7)	0,00959 (13)	6260
$\alpha_{0,10}$	4397 (4)	3,33 (6)	28,1
$\alpha_{0,9}$	4402,8 (7)	0,405 (13)	241
$\alpha_{0,8}$	4437,4 (7)	0,206 (21)	890
$\alpha_{0,7}$	4441,7 (20)	18,80 (13)	10,47

	Energy keV	Probability × 100	F
$\alpha_{0,6}$	4457,0 (7)	0,106 (16)	2460
$\alpha_{0,5}$	4474,0 (13)	57,19 (20)	6,08
$\alpha_{0,4}$	4491,3 (5)	3,01 (16)	164
$\alpha_{0,3}$	4514,7 (40)	0,236 (25)	3170
$\alpha_{0,2}$	4580,4 (7)	1,28 (5)	1856
$\alpha_{0,1}$	4635,0 (4)	3,79 (6)	1586
$\alpha_{0,0}$	4676,0 (13)	4,74 (6)	2571

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{5,4}$(Th)	19,56 (5)	60 (1)	[M1,E2]		6000 (90)	3000 (45)	10000 (150)
$\gamma_{7,5}$(Th)	31,61 (5)	11,4 (40)	M1+E2		491	131,7	667
$\gamma_{10,7}$(Th)	41,4 (3)	1,5 (6)	[M1]		37,7 (10)	9,08 (24)	49,9 (13)
$\gamma_{1,0}$(Th)	42,01 (6)	24,7 (43)	M1+E2		325 (22)	88 (6)	440 (30)
$\gamma_{7,4}$(Th)	51,21 (4)	9,4 (19)	[E2]		201 (3)	54,9 (8)	274 (4)
$\gamma_{9,6}$(Th)	54,1 (1)	0,24	[E2]		154 (3)	42,1 (7)	210 (4)
$\gamma_{2,1}$(Th)	54,25 (5)	2,1	[M1+E2]		52,7 (20)	14,0 (6)	71 (3)
$\gamma_{19,18}$(Th)	64,45 (5)	0,26	[M1]		10,28 (15)	2,47 (4)	13,6 (2)
$\gamma_{10,5}$(Th)	72,7 (2)	1,86	M1+E2		11,4 (19)	2,9 (6)	15 (3)
$\gamma_{7,3}$(Th)	74,94 (3)	0,064 (8)	[E1]		0,190 (3)	0,0464 (7)	0,252 (4)
$\gamma_{12,6}$(Th)	95,7						
$\gamma_{2,0}$(Th)	96,13 (2)	1,33 (16)	[E2]		9,93 (14)	2,73 (4)	13,58 (19)
$\gamma_{14,7}$(Th)	97 (4)	0,22 (7)	[E2]		9,5 (21)	2,6 (6)	13 (3)
$\gamma_{5,2}$(Th)	109,19 (7)	1,81 (14)	[E1]		0,0704 (10)	0,01708 (24)	0,0932 (14)
$\gamma_{10,3}$(Th)	115,48 (6)	0,040 (13)	[E1]	0,267 (4)	0,0609 (9)	0,01475 (21)	0,348 (5)
$\gamma_{3,1}$(Th)	120,35 (5)	0,31	[M1]	8,73 (13)	1,678 (24)	0,404 (6)	10,95 (16)
$\gamma_{16,8}$(Th)	136,62 (5)	0,103	[M1]	6,11 (9)	1,168 (17)	0,281 (4)	7,66 (11)
$\gamma_{7,2}$(Th)	140,77 (2)	0,244 (12)	[E1]	0,1696 (24)	0,0364 (5)	0,00879 (13)	0,218 (3)
$\gamma_{20,18}$(Th)	142,40 (5)	0,018	[E2]	0,253 (4)	1,627 (23)	0,446 (7)	2,48 (4)
$\gamma_{4,1}$(Th)	143,768 (3)	13,20 (8)	E1	0,1615 (23)	0,0344 (5)	0,00833 (12)	0,207 (3)
$\gamma_{18,8}$(Th)	147						
$\gamma_{18,7}$(Th)	150,936 (15)	0,61 (20)	[M1]	4,60 (7)	0,877 (13)	0,211 (3)	5,76 (8)
$\gamma_{5,1}$(Th)	163,358 (3)	5,855 (36)	(E1)	0,1197 (17)	0,0248 (4)	0,00599 (9)	0,1526 (22)
$\gamma_{16,5}$(Th)	173 (1)	0,007 (6)	[E1]	0,1047 (21)	0,0215 (5)	0,00518 (11)	0,133 (3)
$\gamma_{10,2}$(Th)	181,87						
$\gamma_{18,5}$(Th)	182,63 (5)	1,70 (22)	[M1]	2,69 (4)	0,510 (8)	0,1226 (18)	3,36 (5)
$\gamma_{4,0}$(Th)	185,722 (4)	63,41 (35)	E1	0,0887 (13)	0,0179 (3)	0,00433 (6)	0,1124 (16)
$\gamma_{7,1}$(Th)	194,947 (8)	0,693 (11)	[E1]	0,0792 (11)	0,01589 (23)	0,00383 (6)	0,1002 (14)
$\gamma_{8,1}$(Th)	198,902 (15)	0,131 (7)	M1	2,11 (3)	0,401 (6)	0,0963 (14)	2,64 (4)
$\gamma_{18,4}$(Th)	202,12 (1)	3,81 (8)	[M1]	2,02 (3)	0,383 (6)	0,0920 (13)	2,53 (4)
$\gamma_{5,0}$(Th)	205,316 (4)	5,465 (33)	(E1)	0,0703 (10)	0,01397 (20)	0,00336 (5)	0,0887 (13)
$\gamma_{19,7}$(Th)	215,28 (4)	0,090 (9)	[M1]	1,693 (24)	0,321 (5)	0,0770 (11)	2,12 (3)
$\gamma_{6,0}$(Th)	221,386 (14)	0,349 (15)	M1	1,566 (22)	0,296 (5)	0,0712 (10)	1,96 (3)
$\gamma_{13,2}$(Th)	228,76 (5)	0,021	M1	1,429 (20)	0,270 (4)	0,0649 (9)	1,79 (3)
$\gamma_{9,1}$(Th)	233,504 (20)	0,102 (11)	M1	1,350 (19)	0,255 (4)	0,0613 (9)	1,687 (24)
$\gamma_{8,0}$(Th)	240,88 (4)	0,181 (19)	M1(+E2)	1,14 (21)	0,228 (13)	0,0553 (21)	1,45 (22)
$\gamma_{19,5}$(Th)	246,865 (20)	0,134 (7)	[M1]	1,157 (17)	0,218 (3)	0,0525 (8)	1,445 (21)
$\gamma_{15,2}$(Th)	255,395 (20)	0,017	M1	1,052 (15)	0,199 (3)	0,0477 (7)	1,315 (19)
$\gamma_{19,4}$(Th)	266,47 (4)	0,0097 (7)	[E2]	0,0921 (13)	0,1121 (16)	0,0303 (5)	0,245 (4)
$\gamma_{12,1}$(Th)	275,35 (15)	0,094 (11)	M1+E2	0,65 (5)	0,144 (5)	0,0355 (10)	0,84 (6)
$\gamma_{9,0}$(Th)	275,49 (6)	0,065	M1(+E2)	0,81 (11)	0,157 (9)	0,0379 (18)	1,02 (12)

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{16,2}$(Th)	281,42 (5)	0,013	M1	0,804 (12)	0,1515 (22)	0,0364 (5)	1,005 (14)
$\gamma_{13,1}$(Th)	282,94 (5)	0,013	[M1]	0,792 (12)	0,1493 (21)	0,0359 (5)	0,990 (14)
$\gamma_{17,2}$(Th)	289,56 (4)	0,0142	[M1]	0,743 (11)	0,140 (2)	0,0336 (5)	0,929 (13)
$\gamma_{19,3}$(Th)	291,2						
$\gamma_{18,2}$(Th)	291,71 (3)	0,042 (6)	[E1]	0,0317 (5)	0,00598 (9)	0,001433 (20)	0,0396 (6)
$\gamma_{11,0}$(Th)	301,7 (1)	0,01	M1	0,664 (10)	0,1249 (18)	0,0300 (5)	0,829 (12)
$\gamma_{15,1}$(Th)	310,69 (6)	0,011	(E2)	0,068 (1)	0,0616 (9)	0,01650 (24)	0,1517 (22)
$\gamma_{12,0}$(Th)	317,15 (8)	0,0019	M1	0,579 (9)	0,1088 (16)	0,0261 (4)	0,723 (11)
$\gamma_{17,1}$(Th)	343,6 (2)	0,0032					
$\gamma_{18,1}$(Th)	345,93 (3)	0,041 (6)	[E1]	0,0219 (3)	0,00403 (6)	0,000964 (14)	0,0272 (4)
$\gamma_{15,0}$(Th)	350 (5)	0,009	M1	0,442 (19)	0,083 (4)	0,0199 (9)	0,552 (24)
$\gamma_{19,2}$(Th)	356,05 (5)	0,0054	[E1]	0,0206 (3)	0,00377 (6)	0,000903 (13)	0,0255 (4)
$\gamma_{18,0}$(Th)	387,84 (3)	0,041 (6)	[E1]	0,01717 (24)	0,00312 (5)	0,000745 (11)	0,0213 (3)
$\gamma_{21,5}$(Th)	390,27 (20)	0,040 (1)					
$\gamma_{19,1}$(Th)	410,29 (4)	0,0033	[E1]	0,01527 (22)	0,00275 (4)	0,000657 (10)	0,0189 (3)
$\gamma_{22,4}$(Th)	448,40 (6)	0,0011					

3 Atomic Data

3.1 Th

ω_K	:	0,969	(4)
$\bar{\omega}_L$	:	0,476	(18)
n_{KL}	:	0,797	(5)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	89,954		61,82
	$K\alpha_1$	93,351		100
	$K\beta_3$	104,819	}	
	$K\beta_1$	105,604	}	
	$K\beta_5''$	106,239	}	35,58
	$K\beta_2$	108,509	}	
	$K\beta_4$	108,955	}	11,99
	$KO_{2,3}$	109,442	}	
X_L				
	$L\ell$	11,1177		
	$L\alpha$	12,8085 – 12,967		
	$L\eta$	14,509		
	$L\beta$	14,972 – 17,1383		
	$L\gamma$	18,3633 – 19,5043		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	68,406 – 76,745	100
KLX	83,857 – 93,345	58,8
KXY	99,29 – 109,64	8,64
Auger L	5,8 – 20,3	

4 α Emissions

	Energy keV	Probability × 100
$\alpha_{0,22}$	3976 (5)	≈ 0,0011
$\alpha_{0,21}$	4013,2 (8)	0,0396 (10)
$\alpha_{0,20}$	4077,5 (7)	0,016 (12)
$\alpha_{0,19}$	4152 (5)	0,294 (13)
$\alpha_{0,18}$	4214,7 (19)	5,95 (12)
$\alpha_{0,17}$	4219,5 (7)	0,01732 (12)
$\alpha_{0,16}$	4227,6 (7)	0,122 (6)
$\alpha_{0,15}$	4248 (5)	0,069 (10)
$\alpha_{0,14}$	4266 (5)	0,22 (3)
$\alpha_{0,13}$	4279,3 (7)	0,0329 (5)
$\alpha_{0,12}$	4286,9 (7)	0,065 (13)
$\alpha_{0,11}$	4302,1 (7)	0,00959 (13)
$\alpha_{0,10}$	4322 (4)	3,33 (6)
$\alpha_{0,9}$	4327,9 (7)	0,405 (13)
$\alpha_{0,8}$	4361,9 (7)	0,206 (21)
$\alpha_{0,7}$	4366,1 (20)	18,80 (13)
$\alpha_{0,6}$	4381,1 (7)	0,106 (16)
$\alpha_{0,5}$	4397,8 (13)	57,19 (20)
$\alpha_{0,4}$	4414,9 (5)	3,01 (16)
$\alpha_{0,3}$	4437,9 (40)	0,236 (25)
$\alpha_{0,2}$	4502,4 (7)	1,28 (5)
$\alpha_{0,1}$	4556,0 (4)	3,79 (6)
$\alpha_{0,0}$	4596,4 (13)	4,74 (6)

5 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Th)	5,8 - 20,3	24 (3)
e_{AK}	(Th)		0,381 (9)
	KLL	68,406 - 76,745	}
	KLX	83,857 - 93,345	}
	KXY	99,29 - 109,64	}
$ec_{7,5\ L}$	(Th)	11,117 - 15,300	8,3 (29)
$ec_{10,7\ L}$	(Th)	20,6 - 24,8	1,09 (42)
$ec_{1,0\ L}$	(Th)	21,484 - 25,700	18,2 (32)
$ec_{7,5\ M}$	(Th)	26,407 - 28,257	2,2 (8)
$ec_{7,5\ N}$	(Th)	30,260 - 31,254	0,60 (23)
$ec_{7,4\ L}$	(Th)	30,709 - 34,900	6,8 (14)
$ec_{9,6\ L}$	(Th)	33,602 - 37,800	0,1771 (34)
$ec_{10,7\ M}$	(Th)	35,9 - 37,8	0,26 (10)
$ec_{1,0\ M}$	(Th)	36,774 - 38,624	4,9 (9)
$ec_{10,7\ N}$	(Th)	39,8 - 40,8	0,070 (27)
$ec_{1,0\ N}$	(Th)	40,630 - 41,621	1,32 (23)
$ec_{19,18\ L}$	(Th)	43,87 - 48,00	0,1850 (27)
$ec_{7,4\ M}$	(Th)	45,999 - 47,849	1,87 (39)
$ec_{9,6\ M}$	(Th)	48,892 - 50,742	0,0484 (8)
$ec_{7,4\ N}$	(Th)	49,850 - 50,846	0,5 (1)
$ec_{9,6\ N}$	(Th)	52,740 - 53,739	0,01296 (22)
$ec_{19,18\ M}$	(Th)	59,16 - 61,01	0,0445 (7)
$ec_{19,18\ N}$	(Th)	63,01 - 64,01	0,01188 (18)
$ec_{2,0\ L}$	(Th)	75,66 - 79,80	0,90 (11)
$ec_{4,0\ T}$	(Th)	76,070 - 185,635	6,41 (10)
$ec_{4,0\ K}$	(Th)	76,072 (4)	5,06 (8)
$ec_{2,0\ M}$	(Th)	90,95 - 92,80	0,248 (30)
$ec_{2,0\ N}$	(Th)	94,8 - 95,8	0,067 (8)
$ec_{4,0\ L}$	(Th)	165,25 - 169,40	1,020 (18)
$ec_{4,0\ M}$	(Th)	180,54 - 182,39	0,2468 (37)
$ec_{4,0\ N}$	(Th)	184,390 - 185,387	0,0651 (10)

6 Photon Emissions

6.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Th)	11,1177 — 19,5043		22 (3)	
$XK\alpha_2$	(Th)	89,954		3,56 (9)	} $K\alpha$
$XK\alpha_1$	(Th)	93,351		5,76 (14)	}
$XK\beta_3$	(Th)	104,819	}		
$XK\beta_1$	(Th)	105,604	}	2,06 (5)	$K'\beta_1$
$XK\beta_5''$	(Th)	106,239	}		
$XK\beta_2$	(Th)	108,509	}		
$XK\beta_4$	(Th)	108,955	}	0,685 (18)	$K'\beta_2$
$XKO_{2,3}$	(Th)	109,442	}		

6.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{7,5}$(Th)	31,60 (5)	0,017 (6)
$\gamma_{10,7}$(Th)	41,4 (3)	0,029 (11)
$\gamma_{1,0}$(Th)	42,01 (6)	0,056 (9)
$\gamma_{7,4}$(Th)	51,21 (4)	0,034 (7)
$\gamma_{9,6}$(Th)	54,1 (1)	0,00115
$\gamma_{2,1}$(Th)	54,25 (5)	0,0285
$\gamma_{19,18}$(Th)	64,45 (5)	0,018
$\gamma_{10,5}$(Th)	72,7 (2)	0,116
$\gamma_{7,3}$(Th)	74,94 (3)	0,051 (6)
$\gamma_{2,0}$(Th)	96,09 (2)	0,091 (11)
$\gamma_{14,7}$(Th)	97 (4)	0,016 (4)
$\gamma_{5,2}$(Th)	109,19 (7)	1,66 (13)
$\gamma_{10,3}$(Th)	115,45 (5)	0,03 (1)
$\gamma_{3,1}$(Th)	120,35 (5)	0,026
$\gamma_{16,8}$(Th)	136,55 (5)	0,012
$\gamma_{7,2}$(Th)	140,76 (2)	0,20 (1)
$\gamma_{20,18}$(Th)	142,40 (5)	0,0051
$\gamma_{4,1}$(Th)	143,767 (3)	10,94 (6)
$\gamma_{18,7}$(Th)	150,936 (15)	0,09 (3)
$\gamma_{5,1}$(Th)	163,356 (3)	5,08 (3)
$\gamma_{16,5}$(Th)	173 (1)	0,006 (5)
$\gamma_{18,5}$(Th)	182,62 (5)	0,39 (5)
$\gamma_{4,0}$(Th)	185,720 (4)	57,0 (3)
$\gamma_{7,1}$(Th)	194,940 (6)	0,63 (1)

	Energy keV	Photons per 100 disint.
$\gamma_{8,1}$(Th)	198,894 (14)	0,036 (2)
$\gamma_{18,4}$(Th)	202,12 (1)	1,08 (2)
$\gamma_{5,0}$(Th)	205,316 (4)	5,02 (3)
$\gamma_{19,7}$(Th)	215,28 (4)	0,029 (3)
$\gamma_{6,0}$(Th)	221,386 (14)	0,118 (5)
$\gamma_{13,2}$(Th)	228,76 (5)	0,0074
$\gamma_{9,1}$(Th)	233,50 (2)	0,038 (4)
$\gamma_{8,0}$(Th)	240,88 (4)	0,074 (4)
$\gamma_{19,5}$(Th)	246,83 (2)	0,055 (3)
$\gamma_{15,2}$(Th)	255,365 (10)	0,0074
$\gamma_{19,4}$(Th)	266,47 (4)	0,0078 (6)
$\gamma_{12,1}$(Th)	275,35 (15)	0,051 (6)
$\gamma_{9,0}$(Th)	275,49 (6)	0,032
$\gamma_{16,2}$(Th)	281,42 (5)	0,0063
$\gamma_{13,1}$(Th)	282,94 (5)	0,0063
$\gamma_{17,2}$(Th)	289,56 (4)	0,0074
$\gamma_{18,2}$(Th)	291,65 (3)	0,040 (6)
$\gamma_{11,0}$(Th)	301,7 (1)	0,0053
$\gamma_{15,1}$(Th)	310,69 (6)	0,0094
$\gamma_{12,0}$(Th)	317,10 (8)	0,0011
$\gamma_{17,1}$(Th)	343,5 (2)	0,0032
$\gamma_{18,1}$(Th)	345,92 (3)	0,040 (6)
$\gamma_{15,0}$(Th)	350 (5)	0,006
$\gamma_{19,2}$(Th)	356,03 (5)	0,0053
$\gamma_{18,0}$(Th)	387,84 (3)	0,040 (6)
$\gamma_{21,5}$(Th)	390,27 (20)	0,040 (1)
$\gamma_{19,1}$(Th)	410,29 (4)	0,0032
$\gamma_{22,4}$(Th)	448,40 (6)	0,0011

7 Main Production Modes

Natural source

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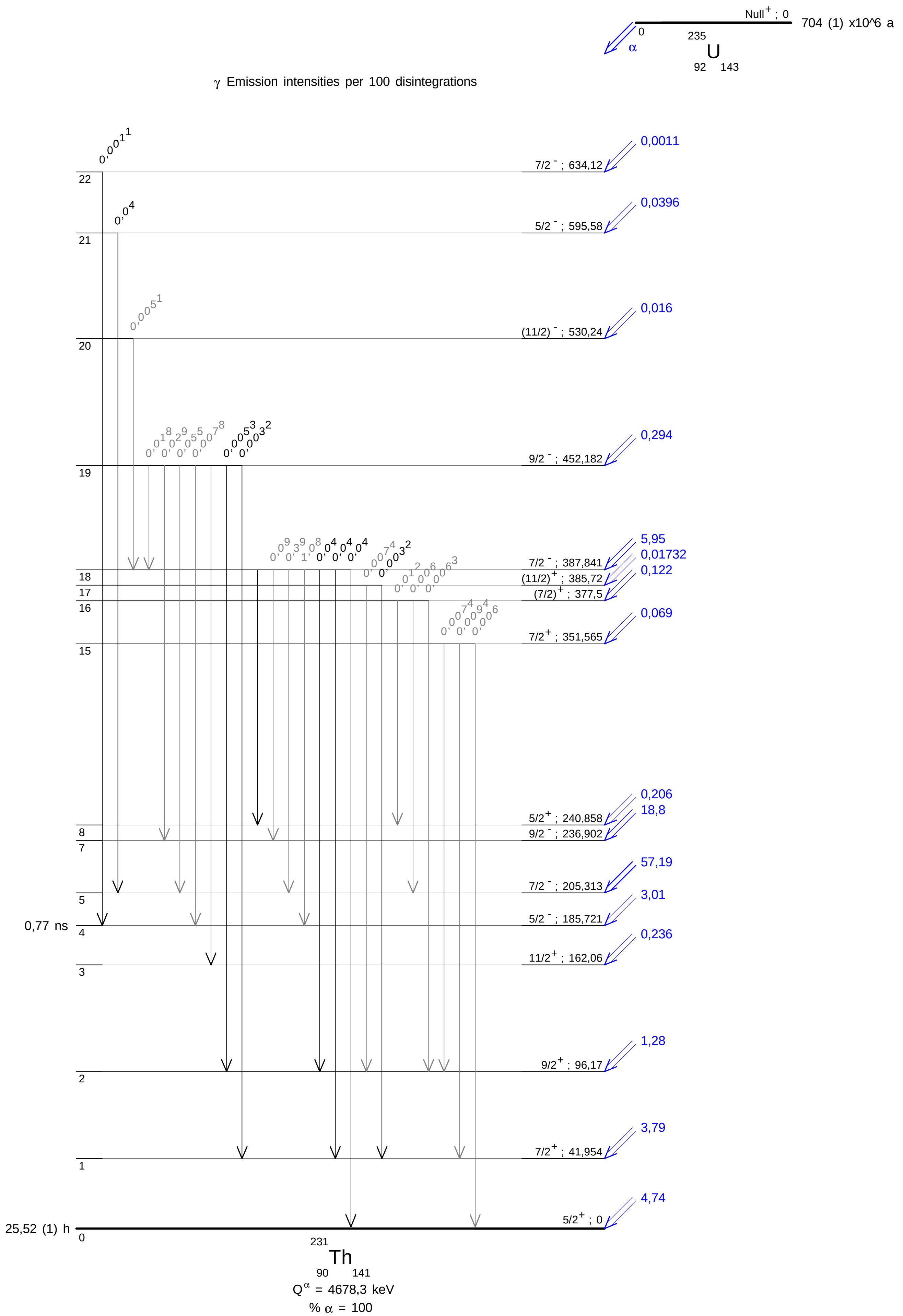
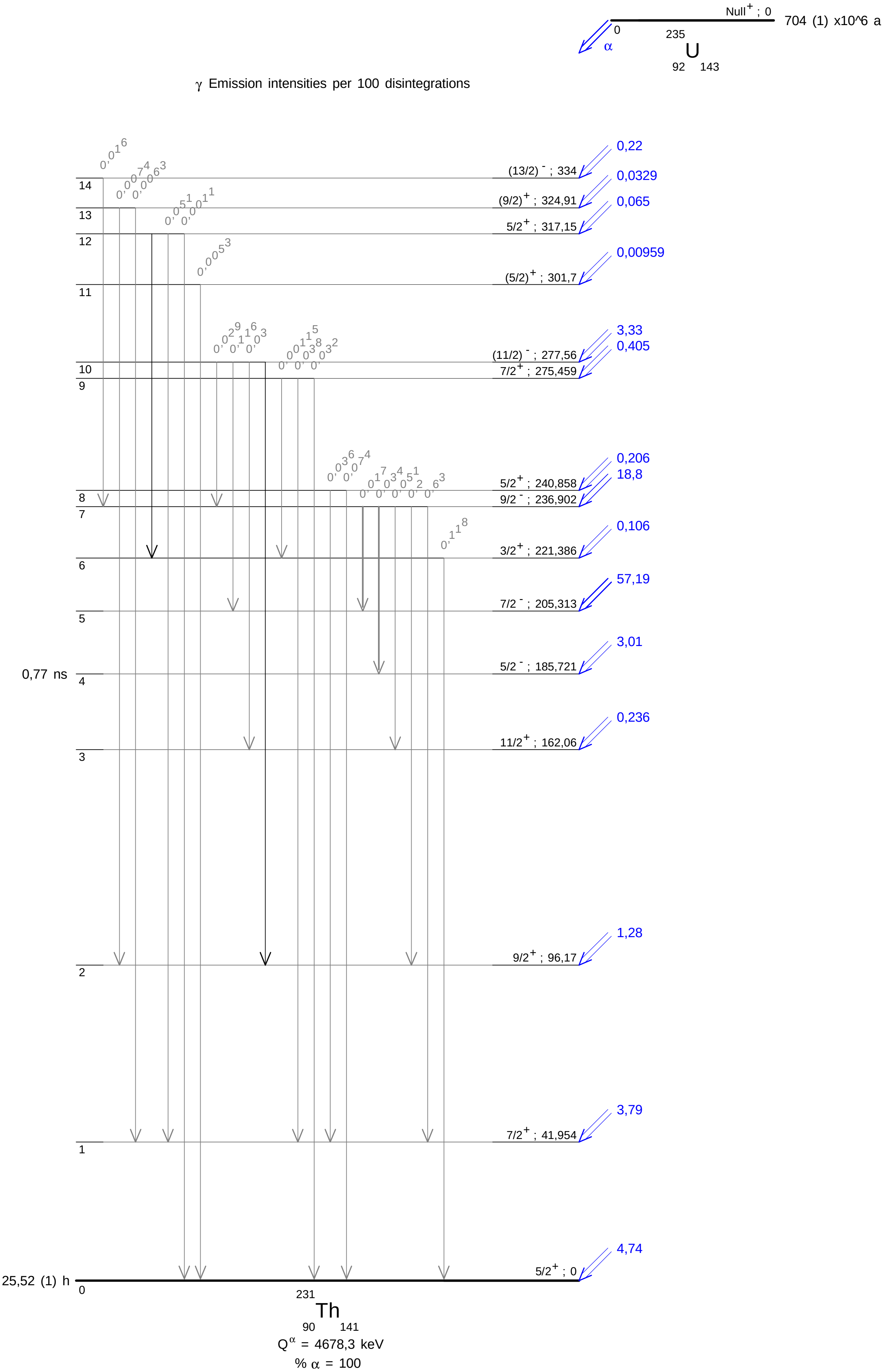

Null+ ; 0
704 (1) x10^6 a
α
235 U 92 143
γ Emission intensities per 100 disintegrations
7/2 - ; 634,12
0,0011
5/2 - ; 595,58
0,0396
(11/2) - ; 530,24
0,016
9/2 - ; 452,182
0,294
7/2 - ; 387,841
5,95
(11/2)+ ; 385,72
0,01732
(7/2)+ ; 377,5
0,122
7/2+ ; 351,565
0,069
5/2+ ; 240,858
0,206
9/2 - ; 236,902
18,8
7/2 - ; 205,313
57,19
5/2 - ; 185,721
3,01
0,77 ns
11/2+ ; 162,06
0,236
9/2+ ; 96,17
1,28
7/2+ ; 41,954
3,79
5/2+ ; 0
4,74
25,52 (1) h
231 Th 90 141
Qα = 4678,3 keV
% α = 100


Null+ ; 0
704 (1) x10^6 a
0
α
235
U
92 143
γ Emission intensities per 100 disintegrations
(13/2)- ; 334
0,22
(9/2)+ ; 324,91
0,0329
5/2+ ; 317,15
0,065
(5/2)+ ; 301,7
0,00959
(11/2)- ; 277,56
3,33
7/2+ ; 275,459
0,405
5/2+ ; 240,858
0,206
9/2- ; 236,902
18,8
3/2+ ; 221,386
0,106
7/2- ; 205,313
57,19
5/2- ; 185,721
3,01
0,77 ns
11/2+ ; 162,06
0,236
9/2+ ; 96,17
1,28
7/2+ ; 41,954
3,79
5/2+ ; 0
4,74
25,52 (1) h
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Th
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Qα = 4678,3 keV
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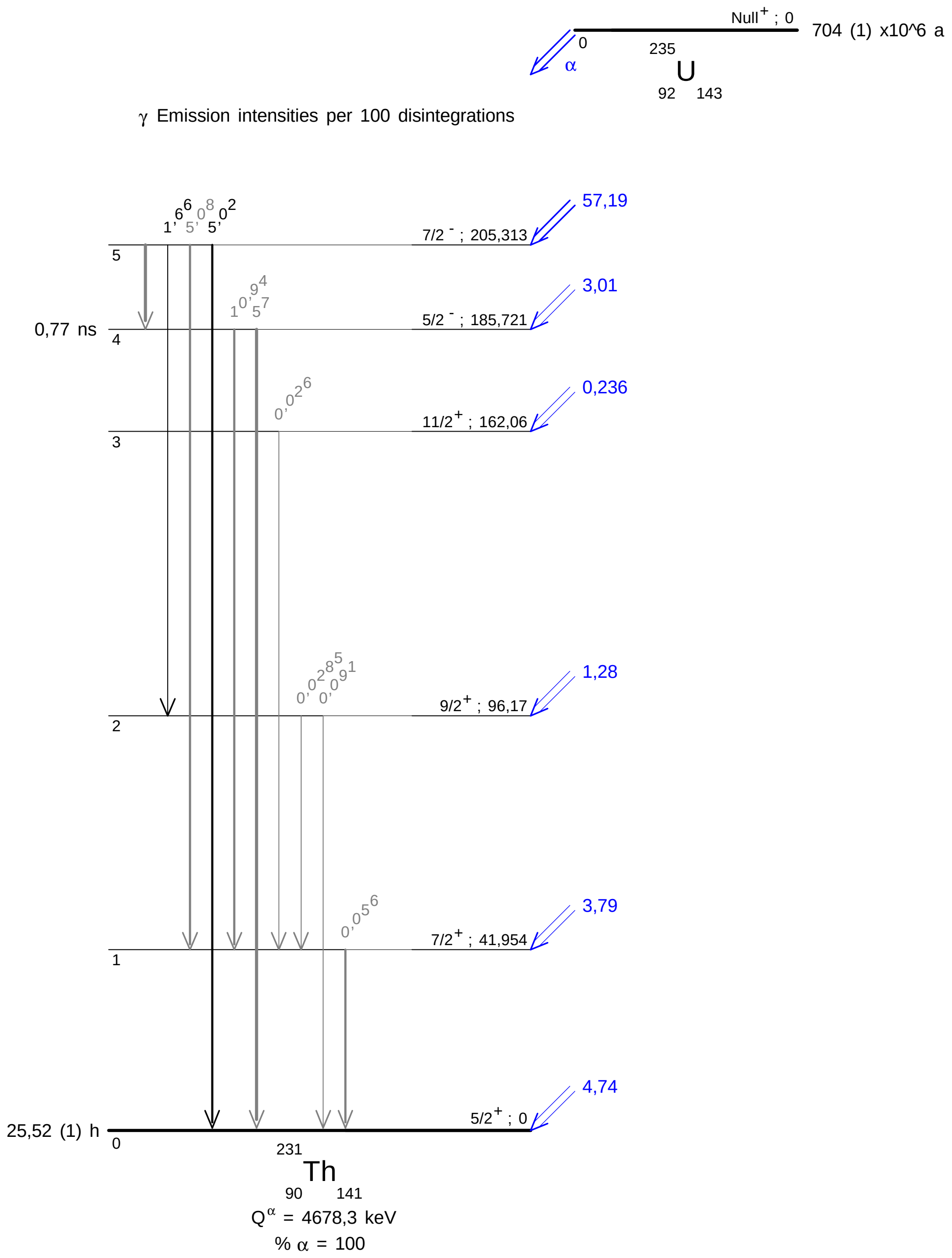
Null+ ; 0
704 (1) x10^6 a
0
235
U
92 143
α
γ Emission intensities per 100 disintegrations
57,19
3,01
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1,28
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7/2- ; 205,313
5/2- ; 185,721
11/2+ ; 162,06
9/2+ ; 96,17
7/2+ ; 41,954
5/2+ ; 0
0,77 ns
25,52 (1) h
231
Th
90 141
Qα = 4678,3 keV
% α = 100