$^{223}_{88}\mathrm{Ra}_{135}$

1 Decay Scheme

Ra-223 decays by alpha emissions to excited levels in Rn-219.
Le radium 223 se désintègre par émissions alpha vers des niveaux excités du radon 219.

2 Nuclear Data

$T_{1/2}(^{223}\mathrm{Ra})$	:	11,43	(3)	d
$T_{1/2}(^{219}\mathrm{Rn})$	:	3,98	(3)	s
$Q^{\alpha}(^{223}\mathrm{Ra})$	:	5978,99	(21)	keV

2.1 α Transitions

	Energy keV	Probability × 100	F
$\alpha_{0,30}$	5106	∼ 0,00044	∼ 117
$\alpha_{0,29}$	5118	∼ 0,00063	∼ 97
$\alpha_{0,28}$	5128	∼ 0,0004	∼ 175
$\alpha_{0,27}$	5149	∼ 0,0002	∼ 468
$\alpha_{0,26}$	5179	∼ 0,0003	∼ 470
$\alpha_{0,25}$	5206	∼ 0,0006	∼ 339
$\alpha_{0,24}$	5231	∼ 0,0017	∼ 168
$\alpha_{0,23}$	5246,19 (23)	0,021	16,6
$\alpha_{0,22}$	5267,69 (23)	0,026	17,9
$\alpha_{0,21}$	5306,4 (5)	0,0053	147
$\alpha_{0,20}$	5332,89 (23)	0,041	27
$\alpha_{0,19}$	5355,31 (21)	0,042	35
$\alpha_{0,18}$	5380,27 (21)	0,093	21,8
$\alpha_{0,17}$	5384,89 (23)	0,16 (4)	13
$\alpha_{0,16}$	5437,00 (21)	∼ 0,13	∼ 32
$\alpha_{0,14}$	5464,49 (23)	∼ 0,13	∼ 45
$\alpha_{0,12}$	5532,17 (21)	0,50 (8)	27
$\alpha_{0,11}$	5533,96 (21)	1,60 (24)	9

	Energy keV	Probability × 100	F
$\alpha_{0,10}$	5581,9 (5)	∼ 0,008	∼ 3150
$\alpha_{0,8}$	5602,73 (21)	0,74 (25)	44
$\alpha_{0,6}$	5640,72 (21)	10,6 (10)	4,8
$\alpha_{0,5}$	5709,51 (21)	25,8 (11)	4,5
$\alpha_{0,4}$	5820,35 (21)	49,6 (12)	8,4
$\alpha_{0,3}$	5852,22 (21)	10,0 (3)	60
$\alpha_{0,2}$	5964,62 (21)	0,32 (4)	6480
$\alpha_{0,0}$	5978,99 (21)	1,0 (2)	2420

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{1,0}$(Rn)	4,47 (1)	54,9 (23)	E2			5100000	8600000
$\gamma_{2,1}$(Rn)	9,90 (2)	15,7 (21)	M1+E2			750 (30)	990 (40)
$\gamma_{2,0}$(Rn)	14,37 (1)	10,0 (8)	M1+E2			409 (11)	539 (15)
$\gamma_{4,3}$(Rn)	31,87 (2)	0,21 (4)	(E2)		1490 (22)	398 (6)	2010 (30)
$\gamma_{9,7}$(Rn)	34,5 (2)	0,14 (6)					
$\gamma_{12,9}$(Rn)	69,5 (1)	0,059 (25)	M1		5,60 (9)	1,33 (2)	7,36 (11)
$\gamma_{15,12}$(Rn)	70,9 (2)	0,0036 (11)					
$\gamma_{11,7}$(Rn)	102,2 (2)	0,0008 (4)					
$\gamma_{17,13}$(Rn)	103,2 (2)	0,064 (35)	M1+E2	5 (5)	3,5 (17)	0,9 (5)	9,6 (24)
$\gamma_{12,7}$(Rn)	104,04 (4)	0,20 (5)	M1+E2	5 (5)	3,3 (16)	0,9 (5)	9,4 (24)
$\gamma_{11,6}$(Rn)	106,78 (3)	0,277 (17)	(M1)	8,77 (13)	1,608 (23)	0,382 (6)	10,89 (16)
$\gamma_{12,6}$(Rn)	108,5 (2)	0,006 (3)					
$\gamma_{5,4}$(Rn)	110,856 (10)	0,369 (26)	E2	0,363 (5)	3,69 (6)	0,994 (14)	5,36 (8)
$\gamma_{22,18}$(Rn)	112,6	0,045					
$\gamma_{13,8}$(Rn)	114,7 (2)	0,010 (4)					
$\gamma_{3,1}$(Rn)	122,319 (10)	10,32 (21)	M1+E2	5,88 (9)	1,109 (17)	0,265 (4)	7,34 (11)
$\gamma_{20,14}$(Rn)	131,6 (2)	0,006 (3)					
$\gamma_{14,8}$(Rn)	138,3 (3)	0,0017 (7)					
$\gamma_{4,2}$(Rn)	144,27 (2)	18,8 (5)	M1+E2	3,69 (6)	0,684 (10)	0,1629 (23)	4,59 (7)
$\gamma_{17,12}$(Rn)	147,2 (3)	0,006 (3)					
$\gamma_{4,1}$(Rn)	154,208 (10)	28,2 (7)	M1	3,09 (5)	0,560 (8)	0,1331 (19)	3,83 (6)
$\gamma_{4,0}$(Rn)	158,635 (10)	3,18 (11)	M1+E2	2,77 (13)	0,523 (13)	0,125 (4)	3,46 (12)
$\gamma_{16,8}$(Rn)	165,8 (2)	0,0054 (28)					
$\gamma_{11,5}$(Rn)	175,65 (15)	0,017 (4)					
$\gamma_{12,5}$(Rn)	177,3 (1)	0,047 (4)					
$\gamma_{6,4}$(Rn)	179,54 (6)	0,480 (45)	M1+E2	1,62 (7)	0,376 (6)	0,0922 (16)	2,12 (7)
$\gamma_{20,12}$(Rn)	199,3 (3)	0,0030 (14)					
$\gamma_{18,9}$(Rn)	221,32 (24)	0,038 (6)	E1	0,0543 (8)	0,01005 (15)	0,00239 (4)	0,0675 (10)
$\gamma_{19,8}$(Rn)	247,2 (5)	0,0097 (28)					
$\gamma_{8,3}$(Rn)	249,49 (3)	0,061 (22)	M1+E2	0,5 (4)	0,125 (20)	0,031 (4)	0,6 (4)
$\gamma_{17,7}$(Rn)	251,6 (3)	0,088 (27)	M1+E2	0,4 (4)	0,122 (20)	0,030 (4)	0,6 (4)
$\gamma_{5,2}$(Rn)	255,2 (2)	0,048 (7)					
$\gamma_{17,6}$(Rn)	255,7 (3)	0,0055 (28)					
$\gamma_{18,6}$(Rn)	260,4 (3)	0,0067 (28)					
$\gamma_{5,0}$(Rn)	269,463 (10)	25,5 (6)	M1+E2	0,637 (12)	0,1157 (17)	0,0275 (4)	0,789 (14)
$\gamma_{10,3}$(Rn)	270,3 (4)	0,0007 (4)					
$\gamma_{23,12}$(Rn)	286,0 (4)	0,0011 (6)					

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{12,4}$(Rn)	288,18 (3)	0,167 (5)	E1	0,0295 (5)	0,00527 (8)	0,001249 (18)	0,0364 (6)
$\gamma_{6,2}$(Rn)	323,871 (10)	5,98 (14)	M1+E2	0,382 (15)	0,0691 (17)	0,0164 (4)	0,473 (17)
$\gamma_{7,2}$(Rn)	328,38 (3)	0,209 (10)	(E1)	0,0220 (3)	0,00387 (6)	0,000916 (13)	0,0271 (4)
$\gamma_{6,1}$(Rn)	334,01 (6)	0,110 (7)	(E2)	0,0546 (8)	0,0343 (5)	0,00895 (13)	0,1007 (15)
$\gamma_{6,0}$(Rn)	338,282 (10)	4,08 (9)	M1	0,348 (5)	0,0622 (9)	0,01475 (21)	0,430 (6)
$\gamma_{7,0}$(Rn)	342,78 (2)	0,232 (13)	E1	0,0200 (3)	0,00351 (5)	0,000828 (12)	0,0246 (4)
$\gamma_{23,9}$(Rn)	355,5 (2)	0,0043 (14)					
$\gamma_{14,4}$(Rn)	355,7 (2)	0,0028 (14)					
$\gamma_{8,2}$(Rn)	361,89 (2)	0,028 (7)					
$\gamma_{9,2}$(Rn)	362,9 (2)	0,016 (7)					
$\gamma_{22,7}$(Rn)	368,56 (12)	0,009 (4)					
$\gamma_{8,1}$(Rn)	371,676 (15)	0,665 (15)	M1	0,270 (4)	0,0481 (7)	0,01139 (16)	0,333 (5)
$\gamma_{9,1}$(Rn)	372,86 (6)	0,052	E1	0,01667 (24)	0,00289 (4)	0,000682 (10)	0,0205 (3)
$\gamma_{8,0}$(Rn)	376,26 (2)	0,013 (4)					
$\gamma_{16,4}$(Rn)	383,35 (2)	0,007 (4)					
$\gamma_{14,3}$(Rn)	387,7 (2)	0,016 (6)					
$\gamma_{23,7}$(Rn)	390,1 (2)	0,0046 (21)					
$\gamma_{11,2}$(Rn)	430,6 (3)	0,020 (6)					
$\gamma_{12,2}$(Rn)	432,45 (3)	0,0356 (29)					
$\gamma_{11,0}$(Rn)	445,033 (12)	1,542 (48)	M1	0,1661 (24)	0,0295 (5)	0,00698 (10)	0,205 (3)
$\gamma_{20,4}$(Rn)	487,5 (2)	0,011 (2)					
$\gamma_{(-1,1)}$(Rn)	490,8 (3)	0,0017 (7)					
$\gamma_{14,2}$(Rn)	500,0 (4)	0,0014 (6)					
$\gamma_{14,1}$(Rn)	510,0 (4)	0,0004 (3)					
$\gamma_{(-1,2)}$(Rn)	523,2 (4)	0,0014 (6)					
$\gamma_{16,2}$(Rn)	527,611 (13)	0,073 (4)					
$\gamma_{(-1,3)}$(Rn)	532,9 (4)	0,0014 (6)					
$\gamma_{16,1}$(Rn)	537,6 (1)	0,0021 (7)					
$\gamma_{16,0}$(Rn)	541,99 (2)	0,0014 (6)					
$\gamma_{21,3}$(Rn)	545,8 (5)	0,0011 (6)					
$\gamma_{23,4}$(Rn)	574,1 (7)	0,0011 (6)					
$\gamma_{17,2}$(Rn)	579,6 (3)	0,0014 (6)					
$\gamma_{18,2}$(Rn)	584,3 (3)	0,0014 (6)					
$\gamma_{17,0}$(Rn)	594,0 (3)	0,0014 (6)					
$\gamma_{18,0}$(Rn)	598,721 (24)	0,092 (4)					
$\gamma_{19,2}$(Rn)	609,31 (4)	0,057 (3)					
$\gamma_{19,1}$(Rn)	619,1 (4)	0,0036 (11)					
$\gamma_{19,0}$(Rn)	623,68 (4)	0,009 (4)					
$\gamma_{20,2}$(Rn)	631,7 (7)	0,0004 (3)					
$\gamma_{20,1}$(Rn)	641,7 (4)	0,0017 (7)					
$\gamma_{20,0}$(Rn)	646,1 (5)	0,0004 (4)					
$\gamma_{22,2}$(Rn)	696,9 (7)	0,0007 (3)					
$\gamma_{22,0}$(Rn)	711,3 (2)	0,0037 (10)					
$\gamma_{23,2}$(Rn)	718,4 (4)	0,0014 (6)					
$\gamma_{23,1}$(Rn)	728,4 (8)	0,00028 (14)					
$\gamma_{23,0}$(Rn)	732,8 (6)	0,0006 (3)					
$\gamma_{(-1,25)}$(Rn)	737,2 (8)	0,00028 (14)					

3 Atomic Data

3.1 Rn

ω_K : 0,967 (4)
$\bar{\omega}_L$: 0,428 (17)
n_{KL} : 0,804 (5)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	81,07		60,62
	$K\alpha_1$	83,78		100
	$K\beta_3$	94,247	}	
	$K\beta_1$	94,868	}	
	$K\beta_5''$	95,449	}	34,68
	$K\beta_2$	97,48	}	
	$K\beta_4$	97,853	}	11,097
	$KO_{2,3}$	98,357	}	
X_L				
	$L\ell$	10,1372		
	$L\alpha$	11,5981 – 11,7259		
	$L\eta$	12,8551		
	$L\beta$	13,5219 – 14,5189		
	$L\gamma$	16,2398 – 17,2578		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	62,017 – 68,885	100
KLX	75,744 – 83,785	57
KXY	89,45 – 98,39	8,12
Auger L	5,66 – 17,95	

4 α Emissions

	Energy keV	alpha per 100 disint.
$\alpha_{0,30}$	5014,3	~ 0,00044
$\alpha_{0,29}$	5026,1	~ 0,00063
$\alpha_{0,28}$	5035,9	~ 0,0004
$\alpha_{0,27}$	5056,5	~ 0,0002
$\alpha_{0,26}$	5086	~ 0,0003
$\alpha_{0,25}$	5112,5	~ 0,0006
$\alpha_{0,24}$	5137,1	~ 0,0017
$\alpha_{0,23}$	5151,98 (23)	0,021
$\alpha_{0,22}$	5173,10 (23)	0,026
$\alpha_{0,21}$	5211,1 (5)	0,0053
$\alpha_{0,20}$	5237,12 (23)	0,041
$\alpha_{0,19}$	5259,14 (21)	0,042
$\alpha_{0,18}$	5283,65 (21)	0,093
$\alpha_{0,17}$	5288,19 (23)	0,16 (4)
$\alpha_{0,16}$	5339,37 (21)	~ 0,13
$\alpha_{0,14}$	5366,37 (23)	~ 0,13
$\alpha_{0,12}$	5432,83 (21)	0,50 (8)
$\alpha_{0,11}$	5434,60 (21)	1,60 (24)
$\alpha_{0,10}$	5481,7 (5)	~ 0,008
$\alpha_{0,8}$	5502,12 (21)	0,74 (25)
$\alpha_{0,6}$	5539,43 (21)	10,6 (10)
$\alpha_{0,5}$	5606,99 (21)	25,8 (11)
$\alpha_{0,4}$	5715,84 (21)	49,6 (12)
$\alpha_{0,3}$	5747,14 (21)	10,0 (3)
$\alpha_{0,2}$	5857,52 (21)	0,32 (4)
$\alpha_{0,0}$	5871,63 (21)	1,0 (2)

5 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Rn)	5,66 - 17,95	30,1 (4)
e_{AK}	(Rn)		1,73 (21)
	KLL	62,017 - 68,885	}
	KLX	75,744 - 83,785	}
	KXY	89,45 - 98,39	}
$ec_{17,13\ K}$	(Rn)	4,8 (2)	0,03 (3)
$ec_{2,1\ M}$	(Rn)	5,4 - 7,0	11,8 (16)

		Energy keV	Electrons per 100 disint.
$ec_{12,7\ K}$	(Rn)	5,64 (4)	0,1 (1)
$ec_{11,6\ K}$	(Rn)	8,38 (3)	0,204 (13)
$ec_{2,1\ N}$	(Rn)	8,8 - 9,7	3,05 (41)
$ec_{2,0\ M}$	(Rn)	9,90 - 11,49	7,6 (6)
$ec_{5,4\ K}$	(Rn)	12,46 (1)	0,0211 (15)
$ec_{2,0\ N}$	(Rn)	13,28 - 14,15	1,96 (15)
$ec_{4,3\ L}$	(Rn)	13,82 - 17,26	0,156 (31)
$ec_{3,1\ K}$	(Rn)	23,92 (1)	7,28 (16)
$ec_{3,1\ T}$	(Rn)	23,922 - 122,276	9,09 (19)
$ec_{4,3\ M}$	(Rn)	27,40 - 28,99	0,042 (8)
$ec_{4,3\ N}$	(Rn)	30,78 - 31,65	0,0108 (22)
$ec_{4,2\ T}$	(Rn)	45,87 - 144,23	15,42 (44)
$ec_{4,2\ K}$	(Rn)	45,87 (2)	12,40 (36)
$ec_{12,9\ L}$	(Rn)	51,5 - 54,9	0,039 (17)
$ec_{4,1\ K}$	(Rn)	55,81 (1)	18,0 (5)
$ec_{4,1\ T}$	(Rn)	55,811 - 154,165	22,4 (6)
$ec_{4,0\ T}$	(Rn)	60,238 - 158,592	2,47 (10)
$ec_{4,0\ K}$	(Rn)	60,24 (1)	1,98 (10)
$ec_{6,4\ K}$	(Rn)	81,14 (6)	0,249 (25)
$ec_{17,13\ L}$	(Rn)	85,2 - 88,6	0,021 (15)
$ec_{12,7\ L}$	(Rn)	85,99 - 89,43	0,064 (32)
$ec_{11,6\ L}$	(Rn)	88,73 - 92,17	0,0375 (23)
$ec_{5,4\ L}$	(Rn)	92,808 - 96,250	0,214 (15)
$ec_{12,7\ M}$	(Rn)	99,57 - 101,16	0,017 (10)
$ec_{3,1\ L}$	(Rn)	104,271 - 107,710	1,373 (30)
$ec_{5,4\ M}$	(Rn)	106,383 - 107,972	0,0577 (41)
$ec_{5,4\ N}$	(Rn)	109,770 - 110,634	0,0150 (11)
$ec_{3,1\ M}$	(Rn)	117,846 - 119,435	0,328 (7)
$ec_{3,1\ N}$	(Rn)	121,230 - 122,097	0,0854 (19)
$ec_{4,2\ L}$	(Rn)	126,22 - 129,66	2,30 (6)
$ec_{4,1\ L}$	(Rn)	136,16 - 139,60	3,27 (9)
$ec_{4,2\ M}$	(Rn)	139,80 - 141,39	0,547 (15)
$ec_{4,0\ L}$	(Rn)	140,587 - 144,020	0,373 (12)
$ec_{4,2\ N}$	(Rn)	143,18 - 144,05	0,143 (4)
$ec_{4,1\ M}$	(Rn)	149,735 - 151,324	0,777 (21)
$ec_{8,3\ K}$	(Rn)	151,09 (3)	0,019 (16)
$ec_{4,1\ N}$	(Rn)	153,120 - 153,986	0,203 (5)
$ec_{17,7\ K}$	(Rn)	153,2 (3)	0,022 (22)
$ec_{4,0\ M}$	(Rn)	154,162 - 155,751	0,0891 (35)
$ec_{4,0\ N}$	(Rn)	157,540 - 158,413	0,0232 (9)
$ec_{6,4\ L}$	(Rn)	161,49 - 164,93	0,058 (5)
$ec_{5,0\ T}$	(Rn)	171,066 - 269,420	11,23 (32)
$ec_{5,0\ K}$	(Rn)	171,07 (1)	9,06 (27)
$ec_{6,4\ M}$	(Rn)	175,07 - 176,66	0,0142 (13)
$ec_{6,2\ K}$	(Rn)	225,47 (1)	1,55 (7)
$ec_{6,2\ T}$	(Rn)	225,474 - 323,828	1,92 (8)
$ec_{6,0\ K}$	(Rn)	239,88 (1)	0,992 (25)

		Energy keV	Electrons per 100 disint.
$ec_{6,0\ T}$	(Rn)	239,885 - 338,239	1,226 (31)
$ec_{5,0\ L}$	(Rn)	251,415 - 254,850	1,65 (4)
$ec_{5,0\ M}$	(Rn)	264,990 - 266,579	0,391 (10)
$ec_{5,0\ N}$	(Rn)	268,370 - 269,241	0,1019 (28)
$ec_{8,1\ K}$	(Rn)	273,279 (15)	0,135 (4)
$ec_{6,2\ L}$	(Rn)	305,823 - 309,260	0,281 (9)
$ec_{6,2\ M}$	(Rn)	319,398 - 320,987	0,0666 (21)
$ec_{6,0\ L}$	(Rn)	320,234 - 323,670	0,177 (5)
$ec_{6,2\ N}$	(Rn)	322,780 - 323,649	0,0174 (5)
$ec_{6,0\ M}$	(Rn)	333,809 - 335,398	0,0420 (11)
$ec_{6,0\ N}$	(Rn)	337,19 - 338,06	0,0109 (3)
$ec_{11,0\ K}$	(Rn)	346,636 (12)	0,213 (7)
$ec_{8,1\ L}$	(Rn)	353,628 - 357,070	0,0240 (6)
$ec_{11,0\ L}$	(Rn)	426,985 - 430,420	0,0378 (13)

6 Photon Emissions

6.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Rn)	10,1372 — 17,2578		22,1 (4)	
$XK\alpha_2$	(Rn)	81,07		14,86 (23)	} Kα
$XK\alpha_1$	(Rn)	83,78		24,5 (4)	}
$XK\beta_3$	(Rn)	94,247	}		
$XK\beta_1$	(Rn)	94,868	}	8,50 (18)	$K'\beta_1$
$XK\beta_5''$	(Rn)	95,449	}		
$XK\beta_2$	(Rn)	97,48	}		
$XK\beta_4$	(Rn)	97,853	}	2,72 (7)	$K'\beta_2$
$XKO_{2,3}$	(Rn)	98,357	}		

6.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Rn)	4,47 (1)	0,0000064
$\gamma_{2,1}$(Rn)	9,90 (2)	0,0158 (20)
$\gamma_{2,0}$(Rn)	14,37 (1)	0,0185 (13)

	Energy keV	Photons per 100 disint.
$\gamma_{4,3}$(Rn)	31,87 (2)	0,000105 (21)
$\gamma_{12,9}$(Rn)	69,5 (1)	0,007 (3)
$\gamma_{15,12}$(Rn)	70,9 (2)	0,0036 (11)
$\gamma_{11,7}$(Rn)	102,2 (2)	0,0008 (4)
$\gamma_{17,13}$(Rn)	103,2 (2)	0,006 (3)
$\gamma_{12,7}$(Rn)	104,04 (4)	0,0194 (21)
$\gamma_{11,6}$(Rn)	106,78 (3)	0,0233 (14)
$\gamma_{12,6}$(Rn)	108,5 (2)	0,006 (3)
$\gamma_{5,4}$(Rn)	110,856 (10)	0,058 (4)
$\gamma_{13,8}$(Rn)	114,7 (2)	0,010 (4)
$\gamma_{3,1}$(Rn)	122,319 (10)	1,238 (19)
$\gamma_{20,14}$(Rn)	131,6 (2)	0,006 (3)
$\gamma_{14,8}$(Rn)	138,3 (3)	0,0017 (7)
$\gamma_{4,2}$(Rn)	144,27 (2)	3,36 (8)
$\gamma_{17,12}$(Rn)	147,2 (3)	0,006 (3)
$\gamma_{4,1}$(Rn)	154,208 (10)	5,84 (13)
$\gamma_{4,0}$(Rn)	158,635 (10)	0,713 (16)
$\gamma_{16,8}$(Rn)	165,8 (2)	0,0054 (28)
$\gamma_{11,5}$(Rn)	175,65 (15)	0,017 (4)
$\gamma_{12,5}$(Rn)	177,3 (1)	0,047 (4)
$\gamma_{6,4}$(Rn)	179,54 (6)	0,154 (14)
$\gamma_{20,12}$(Rn)	199,3 (3)	0,0030 (14)
$\gamma_{18,9}$(Rn)	221,32 (24)	0,036 (6)
$\gamma_{19,8}$(Rn)	247,2 (5)	0,0097 (28)
$\gamma_{8,3}$(Rn)	249,49 (3)	0,038 (10)
$\gamma_{17,7}$(Rn)	251,6 (3)	0,055 (10)
$\gamma_{5,2}$(Rn)	255,2 (2)	0,048 (7)
$\gamma_{17,6}$(Rn)	255,7 (3)	0,0055 (28)
$\gamma_{18,6}$(Rn)	260,4 (3)	0,0067 (28)
$\gamma_{5,0}$(Rn)	269,463 (10)	14,23 (32)
$\gamma_{10,3}$(Rn)	270,3 (4)	0,0007 (4)
$\gamma_{23,12}$(Rn)	286,0 (4)	0,0011 (6)
$\gamma_{12,4}$(Rn)	288,18 (3)	0,161 (5)
$\gamma_{6,2}$(Rn)	323,871 (10)	4,06 (8)
$\gamma_{7,2}$(Rn)	328,38 (3)	0,203 (10)
$\gamma_{6,1}$(Rn)	334,01 (6)	0,100 (6)
$\gamma_{6,0}$(Rn)	338,282 (10)	2,85 (6)
$\gamma_{7,0}$(Rn)	342,78 (2)	0,226 (13)
$\gamma_{23,9}$(Rn)	355,5 (2)	0,0043 (14)
$\gamma_{14,4}$(Rn)	355,7 (2)	0,0028 (14)
$\gamma_{8,2}$(Rn)	361,89 (2)	0,028 (7)
$\gamma_{9,2}$(Rn)	362,9 (2)	0,016 (7)
$\gamma_{22,7}$(Rn)	368,56 (12)	0,009 (4)
$\gamma_{8,1}$(Rn)	371,676 (15)	0,499 (11)
$\gamma_{9,1}$(Rn)	372,86 (6)	0,051
$\gamma_{8,0}$(Rn)	376,26 (2)	0,013 (4)
$\gamma_{16,4}$(Rn)	383,35 (2)	0,007 (4)

	Energy keV	Photons per 100 disint.
$\gamma_{14,3}$(Rn)	387,7 (2)	0,016 (6)
$\gamma_{23,7}$(Rn)	390,1 (2)	0,0046 (21)
$\gamma_{11,2}$(Rn)	430,6 (3)	0,020 (6)
$\gamma_{12,2}$(Rn)	432,45 (3)	0,0356 (29)
$\gamma_{11,0}$(Rn)	445,033 (12)	1,28 (4)
$\gamma_{20,4}$(Rn)	487,5 (2)	0,011 (2)
$\gamma_{(-1,1)}$(Rn)	490,8 (3)	0,0017 (7)
$\gamma_{14,2}$(Rn)	500,0 (4)	0,0014 (6)
$\gamma_{14,1}$(Rn)	510,0 (4)	0,0004 (3)
$\gamma_{(-1,2)}$(Rn)	523,2 (4)	0,0014 (6)
$\gamma_{16,2}$(Rn)	527,611 (13)	0,073 (4)
$\gamma_{(-1,3)}$(Rn)	532,9 (4)	0,0014 (6)
$\gamma_{16,1}$(Rn)	537,6 (1)	0,0021 (7)
$\gamma_{16,0}$(Rn)	541,99 (2)	0,0014 (6)
$\gamma_{21,3}$(Rn)	545,8 (5)	0,0011 (6)
$\gamma_{23,4}$(Rn)	574,1 (7)	0,0011 (6)
$\gamma_{17,2}$(Rn)	579,6 (3)	0,0014 (6)
$\gamma_{18,2}$(Rn)	584,3 (3)	0,0014 (6)
$\gamma_{17,0}$(Rn)	594,0 (3)	0,0014 (6)
$\gamma_{18,0}$(Rn)	598,721 (24)	0,092 (4)
$\gamma_{19,2}$(Rn)	609,31 (4)	0,057 (3)
$\gamma_{19,1}$(Rn)	619,1 (4)	0,0036 (11)
$\gamma_{19,0}$(Rn)	623,68 (4)	0,009 (4)
$\gamma_{20,2}$(Rn)	631,7 (7)	0,0004 (3)
$\gamma_{20,1}$(Rn)	641,7 (4)	0,0017 (7)
$\gamma_{20,0}$(Rn)	646,1 (5)	0,0004 (4)
$\gamma_{22,2}$(Rn)	696,9 (7)	0,0007 (3)
$\gamma_{22,0}$(Rn)	711,3 (2)	0,0037 (10)
$\gamma_{23,2}$(Rn)	718,4 (4)	0,0014 (6)
$\gamma_{23,1}$(Rn)	728,4 (8)	0,00028 (14)
$\gamma_{23,0}$(Rn)	732,8 (6)	0,0006 (3)
$\gamma_{(-1,25)}$(Rn)	737,2 (8)	0,00028 (14)

7 Main Production Modes

U – 235 decay chain

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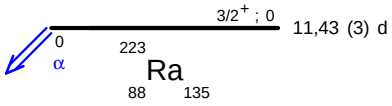
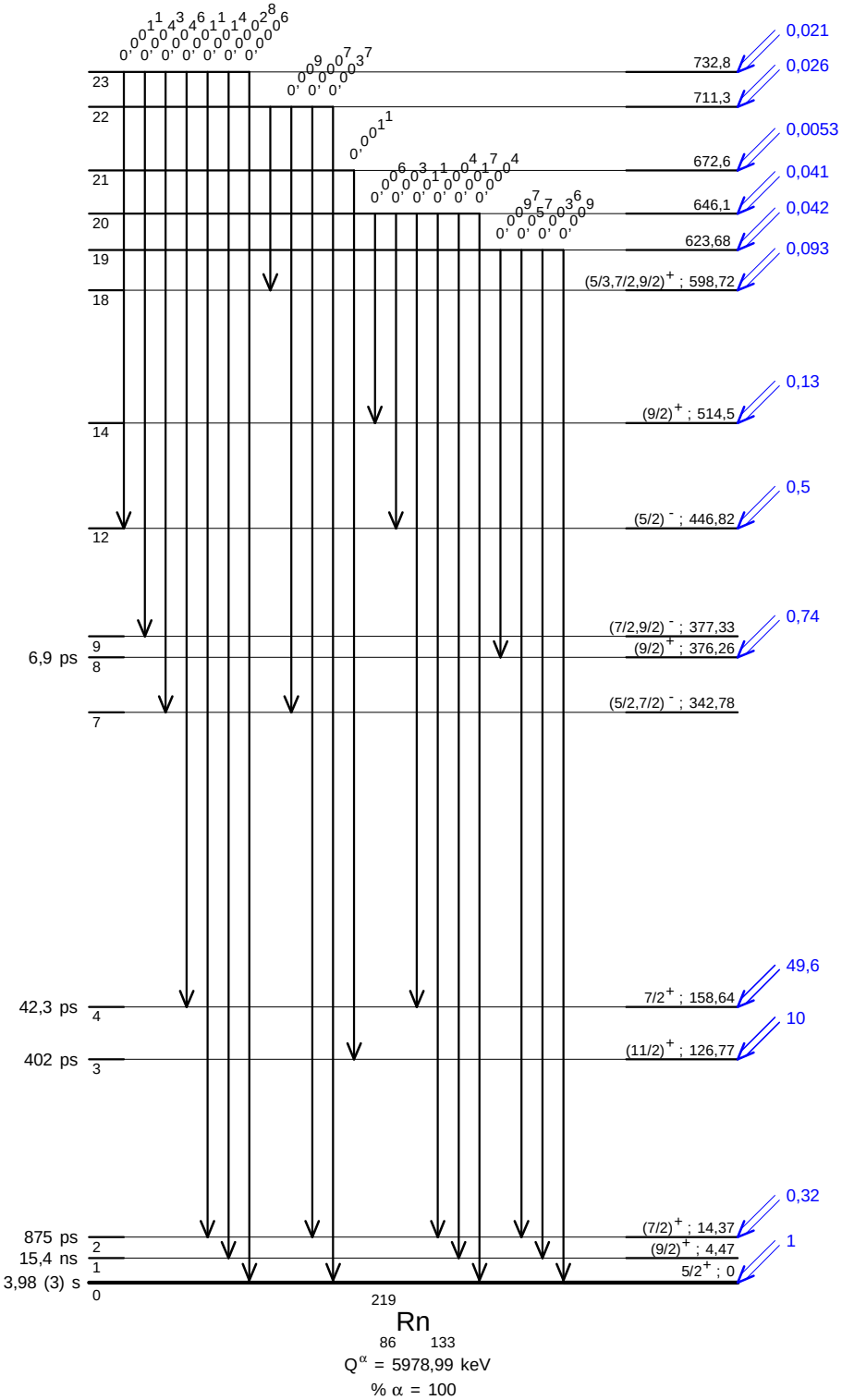
$^{223}_{88}Ra_{135}$



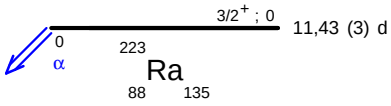
γ Emission intensities per 100 disintegrations



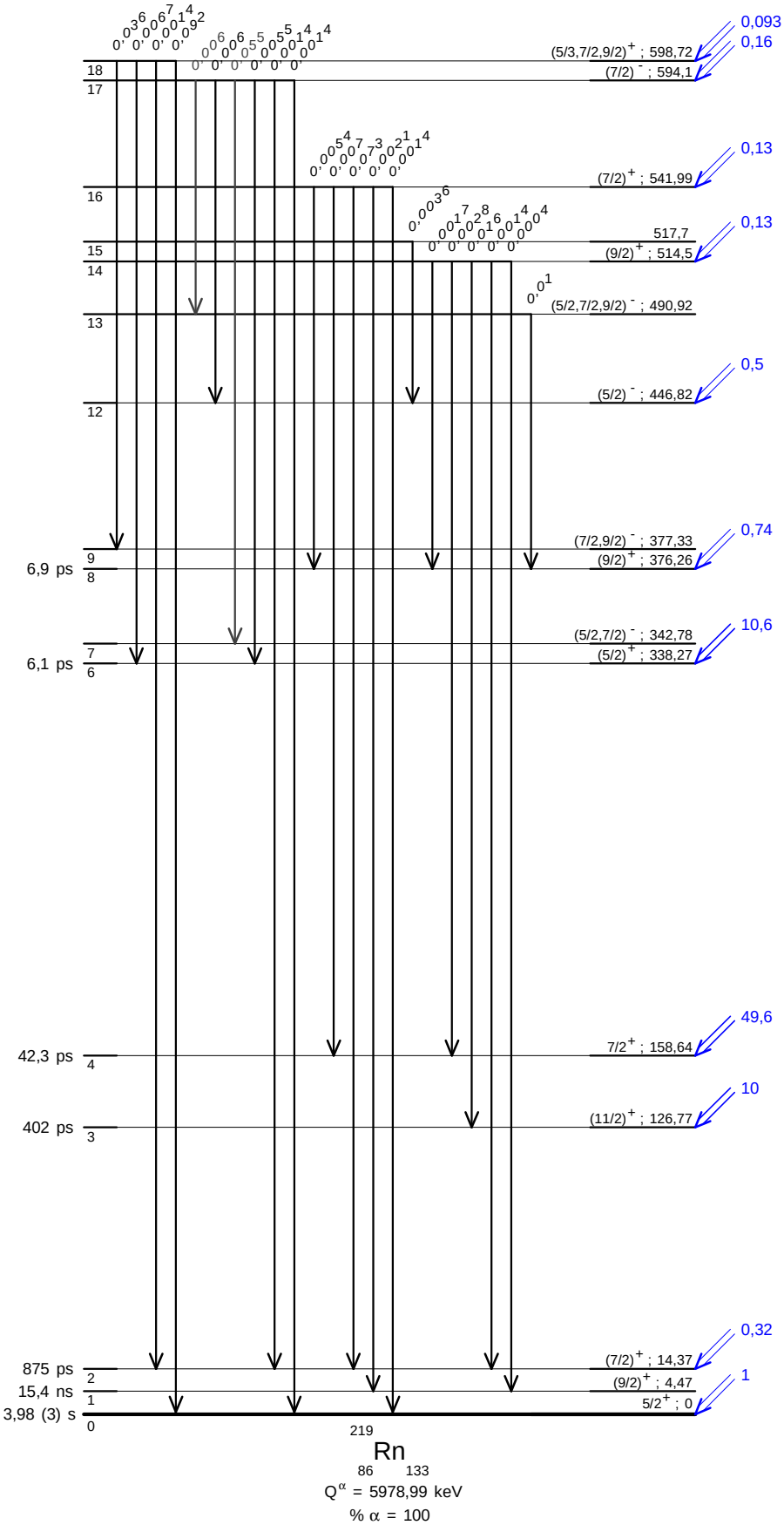
Q^{α} = 5978,99 keV

% α = 100

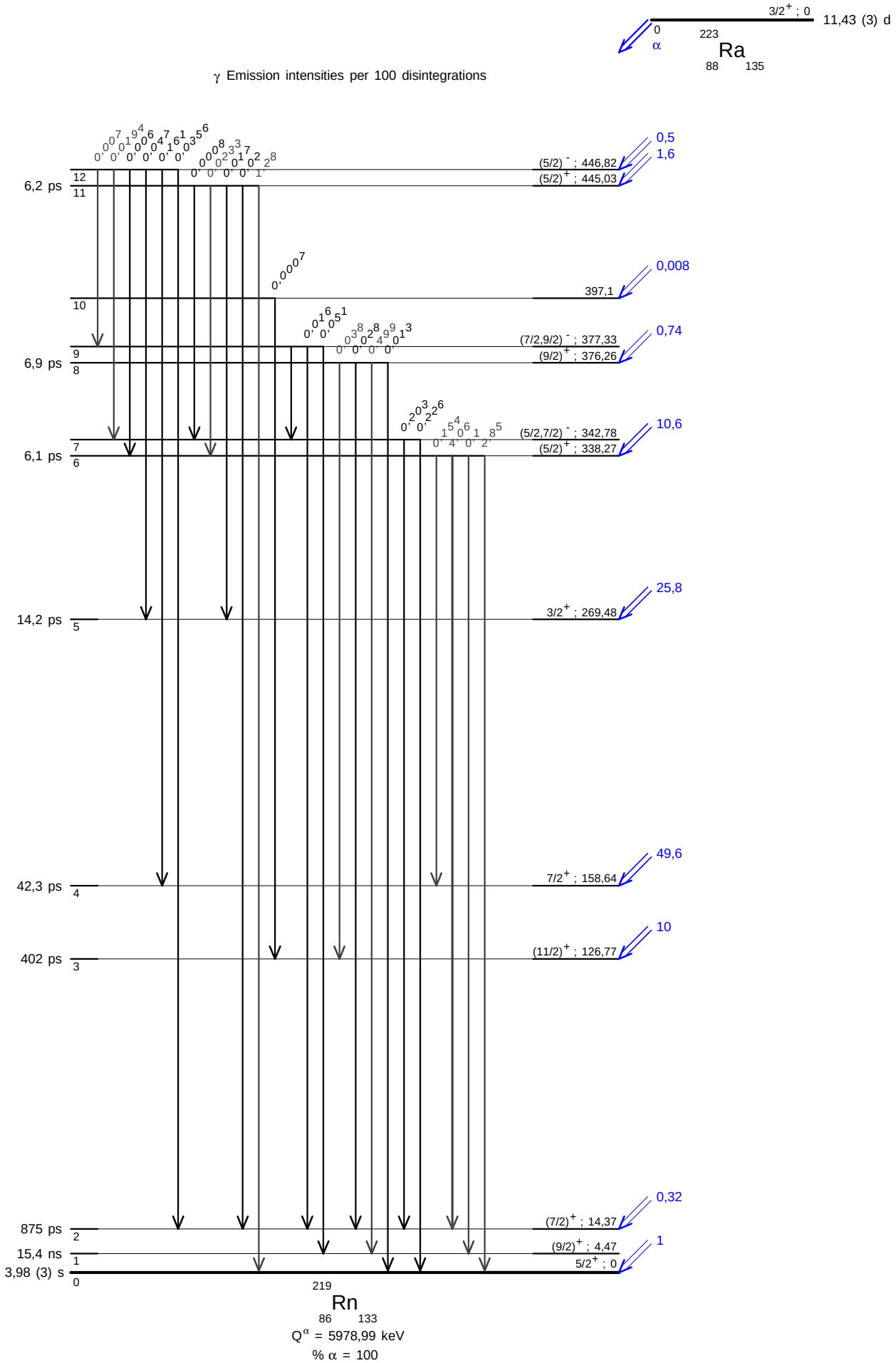
$^{223}_{88}Ra_{135}$

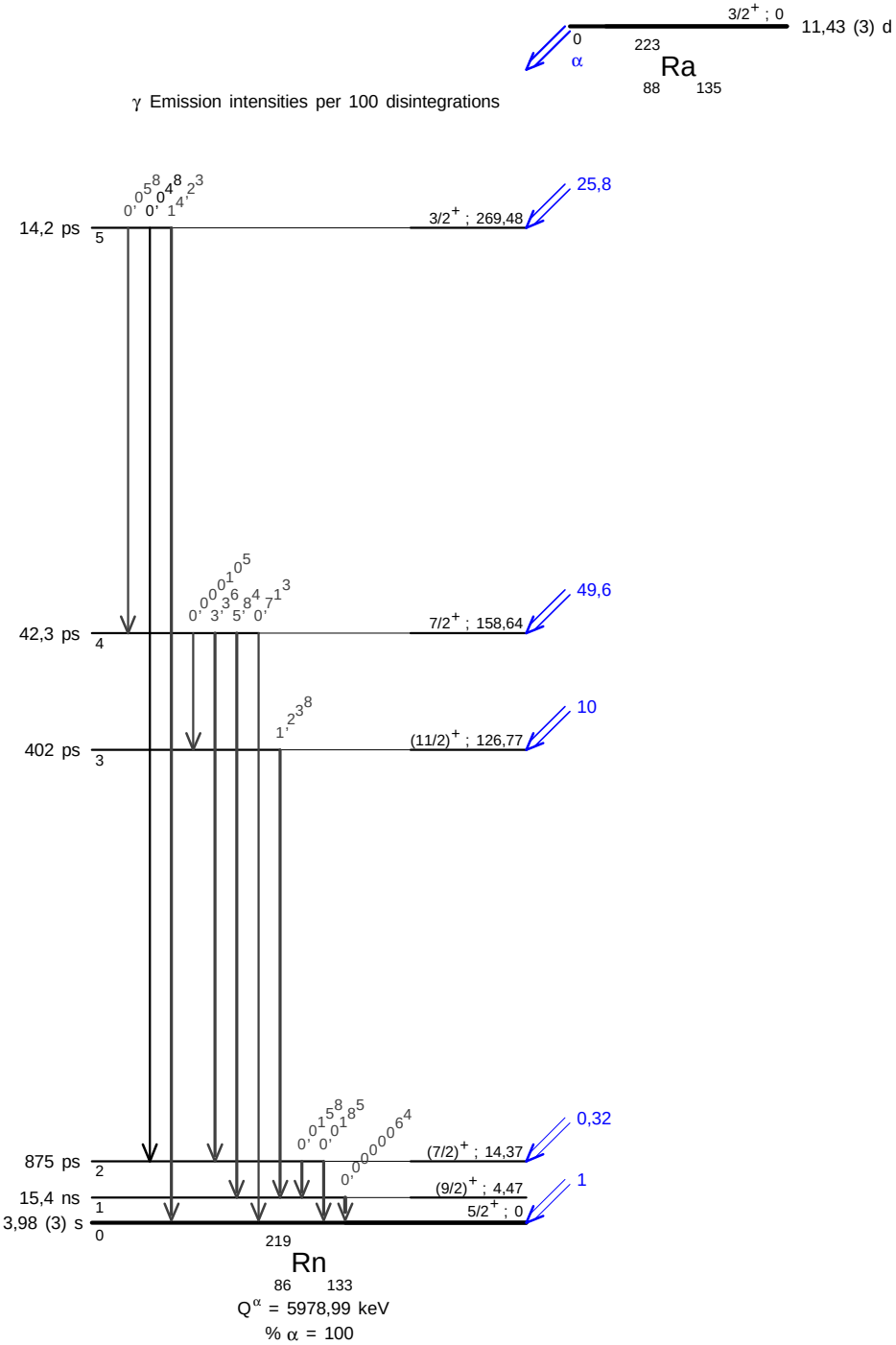


γ Emission intensities per 100 disintegrations



$^{223}_{88}Ra_{135}$


3/2+ ; 0
11,43 (3) d
0
α
223
Ra
88
135
γ Emission intensities per 100 disintegrations
0,5
1,6
(5/2) - ; 446,82
(5/2)+ ; 445,03
6,2 ps
12
11
0,008
397,1
10
0,74
(7/2,9/2) - ; 377,33
(9/2)+ ; 376,26
6,9 ps
9
8
10,6
(5/2,7/2) - ; 342,78
(5/2)+ ; 338,27
6,1 ps
7
6
25,8
3/2+ ; 269,48
14,2 ps
5
49,6
7/2+ ; 158,64
42,3 ps
4
10
(11/2)+ ; 126,77
402 ps
3
0,32
(7/2)+ ; 14,37
875 ps
2
(9/2)+ ; 4,47
15,4 ns
1
1
5/2+ ; 0
3,98 (3) s
0
219
Rn
86
133
Q α = 5978,99 keV
% α = 100


3/2+ ; 0
11,43 (3) d
0
α
223
Ra
88
135
γ Emission intensities per 100 disintegrations
25,8
3/2+ ; 269,48
14,2 ps
5
49,6
7/2+ ; 158,64
42,3 ps
4
10
(11/2)+ ; 126,77
402 ps
3
0,32
(7/2)+ ; 14,37
875 ps
2
1
(9/2)+ ; 4,47
15,4 ns
5/2+ ; 0
3,98 (3) s
1
0
219
Rn
86
133
Qα = 5978,99 keV
% α = 100