$^{133}_{53}I_{80}$

1 Decay Scheme

I-133 disintegrates by beta minus emission to excited levels in Xe-133.
L' iode 133 se désexcite par émission beta moins vers les niveaux excités du xénon 133.

2 Nuclear Data

$T_{1/2}(^{133}I)$	:	20,87	(8)	h
$T_{1/2}(^{133}Xe)$	:	5,2474	(5)	d
$Q^{-}(^{133}I)$	:	1757	(4)	keV

2.1 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,13}$	167 (4)	0,414 (15)	Allowed	6,18
$\beta^-_{0,12}$	371 (4)	1,25 (4)	Allowed	6,81
$\beta^-_{0,11}$	407 (4)	0,397 (12)	Allowed	7,44
$\beta^-_{0,10}$	459 (4)	3,75 (7)	Allowed	6,64
$\beta^-_{0,9}$	521 (4)	3,12 (6)	Allowed	6,91
$\beta^-_{0,8}$	706 (4)	0,58 (5)	Allowed	8,09
$\beta^-_{0,7}$	846 (4)	0,026 (18)	(1st) Forbidden	9,7
$\beta^-_{0,6}$	882 (4)	4,16 (13)	allowed	7,59
$\beta^-_{0,5}$	1013 (4)	1,81 (6)	Unique (th) Forbidden	8,17
$\beta^-_{0,3}$	1227 (4)	83,42 (21)	Allowed	6,81
$\beta^-_{0,1}$	1524 (4)	1,07 (6)	1st Forbidden Unique	9,92

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{4,3}$(Xe)	150,382 (9)	0,029 (6)					
$\gamma_{(-1,1)}$(Xe)	167,97 (6)	0,078 (17)					
$\gamma_{13,12}$(Xe)	203,787 (31)	0,00432 (8)					
$\gamma_{1,0}$(Xe)	233,219 (15)	2,88 (2)	M4	6,24 (9)	2,035 (29)	0,453 (6)	8,84 (12)
$\gamma_{10,8}$(Xe)	245,837 (18)	0,035 (9)					
$\gamma_{2,0}$(Xe)	262,70 (6)	0,377 (13)	M1+E2	0,0497 (7)	0,00641 (9)	0,001300 (18)	0,0577 (8)
$\gamma_{3,2}$(Xe)	267,17 (6)	0,117 (7)					
$\gamma_{6,3}$(Xe)	345,459 (6)	0,104 (18)					
$\gamma_{9,6}$(Xe)	361,118 (7)	0,11 (4)					
$\gamma_{8,4}$(Xe)	372,143 (19)	0,009 (6)					
$\gamma_{7,3}$(Xe)	381,578 (30)	0,045 (5)					
$\gamma_{10,7}$(Xe)	386,784 (30)	0,059 (5)					
$\gamma_{4,2}$(Xe)	417,55 (6)	0,155 (10)	M1+E2	0,0139 (10)	0,001921 (27)	0,000392 (6)	0,0163 (11)
$\gamma_{10,6}$(Xe)	422,903 (7)	0,314 (10)	M1+E2	0,0128 (13)	0,00185 (3)	0,000379 (6)	0,0151 (13)
$\gamma_{11,7}$(Xe)	438,930 (34)	0,040 (5)					
$\gamma_{5,1}$(Xe)	510,531 (22)	1,81 (6)					
$\gamma_{12,6}$(Xe)	510,822 (9)	0,004 (5)					
$\gamma_{8,3}$(Xe)	522,525 (17)	0,04 (5)					
$\gamma_{3,0}$(Xe)	529,872 (3)	87,0 (2)	M1+E2	0,00691 (13)	0,000956 (14)	0,0001948 (29)	0,00810 (14)
$\gamma_{13,8}$(Xe)	537,543 (34)	0,035 (7)					
$\gamma_{10,5}$(Xe)	554,484 (17)	0,0004 (5)					
$\gamma_{9,4}$(Xe)	556,195 (10)	0,020 (3)					
$\gamma_{(-1,2)}$(Xe)	567,1 (4)	0,003 (3)					
$\gamma_{10,4}$(Xe)	617,98 (1)	0,542 (15)	M1+E2	0,0050 (7)	0,00066 (6)	0,000134 (12)	0,0059 (8)
$\gamma_{7,2}$(Xe)	648,75 (7)	0,056 (13)	M1	0,00510 (7)	0,000639 (9)	0,0001292 (18)	0,00590 (8)
$\gamma_{11,4}$(Xe)	670,126 (19)	0,042 (6)					
$\gamma_{13,7}$(Xe)	678,490 (42)	0,022 (7)					
$\gamma_{4,0}$(Xe)	680,254 (9)	0,648 (19)	M1	0,00460 (6)	0,000570 (8)	0,0001152 (16)	0,00527 (7)
$\gamma_{9,3}$(Xe)	706,577 (6)	1,496 (40)	M1+E2	0,0036 (6)	0,00047 (5)	0,000095 (10)	0,0042 (6)
$\gamma_{10,3}$(Xe)	768,362 (6)	0,459 (15)	M1+E2	0,00318 (22)	0,000402 (22)	0,000081 (4)	0,00368 (24)
$\gamma_{8,2}$(Xe)	789,70 (6)	0,050 (4)					
$\gamma_{11,3}$(Xe)	820,508 (17)	0,154 (6)	M1+E2	0,0026 (3)	0,00033 (3)	0,000068 (6)	0,0031 (4)
$\gamma_{12,3}$(Xe)	856,281 (9)	1,233 (40)	M1+E2	0,00202 (3)	0,000263 (4)	0,0000533 (8)	0,00235 (3)
$\gamma_{6,0}$(Xe)	875,331 (5)	4,48 (12)	E2+M3	0,001876 (26)	0,000245 (3)	0,0000496 (7)	0,00218 (3)
$\gamma_{13,4}$(Xe)	909,686 (31)	0,213 (9)	M1+E2	0,00222 (4)	0,000277 (5)	0,0000559 (9)	0,00257 (4)
$\gamma_{7,0}$(Xe)	911,45 (3)	0,046 (6)					
$\gamma_{(-1,3)}$(Xe)	1018,1 (5)	0,0060 (26)					
$\gamma_{10,2}$(Xe)	1035,53 (6)	0,0086 (18)					
$\gamma_{8,0}$(Xe)	1052,397 (17)	0,551 (16)					
$\gamma_{13,3}$(Xe)	1060,068 (30)	0,137 (7)	M1+E2	0,00143 (20)	0,000179 (22)	0,000036 (4)	0,00165 (23)
$\gamma_{11,2}$(Xe)	1087,68 (6)	0,0121 (18)					
$\gamma_{9,0}$(Xe)	1236,449 (5)	1,49 (4)					
$\gamma_{10,0}$(Xe)	1298,234 (5)	2,33 (7)	M1+E2	0,000822 (12)	0,0001026 (15)	0,00002070 (29)	0,000972 (14)
$\gamma_{13,2}$(Xe)	1327,24 (7)	0,00022 (22)					
$\gamma_{11,0}$(Xe)	1350,380 (17)	0,148 (5)	M1+E2	0,00085 (10)	0,000104 (12)	0,0000211 (23)	0,00101 (12)
$\gamma_{12,0}$(Xe)	1386,153 (8)	0,0086 (26)	[E2]				
$\gamma_{13,0}$(Xe)	1589,94 (3)	0,0029 (4)					

3 Atomic Data

3.1 Xe

ω_K	:	0,888	(5)
$\bar{\omega}_L$	:	0,097	(5)
n_{KL}	:	0,902	(4)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	29,459		53,98
	$K\alpha_1$	29,779		100
	$K\beta_3$	33,562	}	
	$K\beta_1$	33,625	}	
	$K\beta_5''$	33,881	}	28,99
	$K\beta_2$	34,415	}	
	$K\beta_4$	34,496	}	6,84
	$KO_{2,3}$	34,552	}	
X_L				
	$L\ell$	3,6378		
	$L\alpha$	4,0977 – 4,1103		
	$L\eta$	3,9576		
	$L\beta$	4,4176 – 4,7758		
	$L\gamma$	4,895 – 5,296		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	23,512 – 24,842	100
KLX	27,897 – 29,770	46,5
KXY	32,27 – 34,54	5,41
Auger L	2,4 – 5,2	

4 Electron Emissions

		Energy keV		Electrons per 100 disint.
e_{AL}	(Xe)	2,4 - 5,2		0,677 (4)
e_{AK}	(Xe)			0,072 (4)
	KLL	23,512 - 24,842	}	
	KLX	27,897 - 29,770	}	
	KXY	32,27 - 34,54	}	
$ec_{1,0\ T}$	(Xe)	198,655 - 233,207		2,59 (6)
$ec_{1,0\ K}$	(Xe)	198,655 (15)		1,828 (41)
$ec_{1,0\ L}$	(Xe)	227,766 - 228,437		0,596 (13)
$ec_{1,0\ M}$	(Xe)	232,070 - 232,542		0,1327 (29)
$ec_{3,0\ K}$	(Xe)	495,331 (3)		0,596 (11)
$ec_{3,0\ L}$	(Xe)	524,419 - 525,090		0,083 (12)
$\beta^-_{0,13}$	max:	167 (4)		0,414 (15)
$\beta^-_{0,13}$	avg:	45,1 (12)		
$\beta^-_{0,12}$	max:	371 (4)		1,25 (4)
$\beta^-_{0,12}$	avg:	108,8 (14)		
$\beta^-_{0,11}$	max:	407 (4)		0,397 (12)
$\beta^-_{0,11}$	avg:	120,8 (14)		
$\beta^-_{0,10}$	max:	459 (4)		3,75 (7)
$\beta^-_{0,10}$	avg:	138,7 (14)		
$\beta^-_{0,9}$	max:	521 (4)		3,12 (6)
$\beta^-_{0,9}$	avg:	160,4 (15)		
$\beta^-_{0,8}$	max:	706 (4)		0,58 (5)
$\beta^-_{0,8}$	avg:	228,4 (16)		
$\beta^-_{0,7}$	max:	846 (4)		0,026 (18)
$\beta^-_{0,7}$	avg:	283,1 (16)		
$\beta^-_{0,6}$	max:	882 (4)		4,16 (13)
$\beta^-_{0,6}$	avg:	297,4 (16)		
$\beta^-_{0,5}$	max:	1013 (4)		1,81 (6)
$\beta^-_{0,5}$	avg:	350,5 (17)		
$\beta^-_{0,3}$	max:	1227 (4)		83,42 (21)
$\beta^-_{0,3}$	avg:	439,4 (17)		
$\beta^-_{0,1}$	max:	1524 (4)		1,07 (6)
$\beta^-_{0,1}$	avg:	572,0 (17)		

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Xe)	3,6378 — 5,296		0,0724 (14)	
$XK\alpha_2$	(Xe)	29,459		0,163 (4)	} $K\alpha$
$XK\alpha_1$	(Xe)	29,779		0,303 (6)	}
$XK\beta_3$	(Xe)	33,562	}		
$XK\beta_1$	(Xe)	33,625	}	0,0877 (19)	$K'\beta_1$
$XK\beta_5''$	(Xe)	33,881	}		
$XK\beta_2$	(Xe)	34,415	}		
$XK\beta_4$	(Xe)	34,496	}	0,0207 (7)	$K'\beta_2$
$XKO_{2,3}$	(Xe)	34,552	}		

5.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{4,3}$(Xe)	150,382 (9)	0,029 (6)
$\gamma_{(-1,1)}$(Xe)	167,97 (6)	0,078 (17)
$\gamma_{13,12}$(Xe)	203,787 (31)	0,00432 (8)
$\gamma_{1,0}$(Xe)	233,219 (15)	0,293 (4)
$\gamma_{10,8}$(Xe)	245,837 (18)	0,035 (9)
$\gamma_{2,0}$(Xe)	262,70 (6)	0,356 (12)
$\gamma_{3,2}$(Xe)	267,17 (6)	0,117 (7)
$\gamma_{6,3}$(Xe)	345,459 (6)	0,104 (18)
$\gamma_{9,6}$(Xe)	361,118 (7)	0,11 (4)
$\gamma_{8,4}$(Xe)	372,143 (19)	0,009 (6)
$\gamma_{7,3}$(Xe)	381,578 (30)	0,045 (5)
$\gamma_{10,7}$(Xe)	386,784 (30)	0,059 (5)
$\gamma_{4,2}$(Xe)	417,55 (6)	0,153 (10)
$\gamma_{10,6}$(Xe)	422,903 (7)	0,309 (10)
$\gamma_{11,7}$(Xe)	438,930 (34)	0,040 (5)
$\gamma_{5,1}$(Xe)	510,530 (22)	1,81 (6)
$\gamma_{12,6}$(Xe)	510,821 (9)	0,004 (5)
$\gamma_{8,3}$(Xe)	522,524 (17)	0,04 (5)
$\gamma_{3,0}$(Xe)	529,8709 (30)	86,3 (2)
$\gamma_{13,8}$(Xe)	537,542 (34)	0,035 (7)
$\gamma_{10,5}$(Xe)	554,483 (17)	0,0004 (5)
$\gamma_{9,4}$(Xe)	556,194 (10)	0,020 (3)
$\gamma_{(-1,2)}$(Xe)	567,1 (4)	0,003 (3)
$\gamma_{10,4}$(Xe)	617,978 (10)	0,539 (15)
$\gamma_{7,2}$(Xe)	648,75 (7)	0,056 (13)

	Energy keV	Photons per 100 disint.
$\gamma_{11,4}$(Xe)	670,124 (19)	0,042 (6)
$\gamma_{13,7}$(Xe)	678,488 (42)	0,022 (7)
$\gamma_{4,0}$(Xe)	680,252 (9)	0,645 (19)
$\gamma_{9,3}$(Xe)	706,575 (6)	1,49 (4)
$\gamma_{10,3}$(Xe)	768,360 (6)	0,457 (15)
$\gamma_{8,2}$(Xe)	789,69 (6)	0,050 (4)
$\gamma_{11,3}$(Xe)	820,505 (17)	0,154 (6)
$\gamma_{12,3}$(Xe)	856,278 (9)	1,23 (4)
$\gamma_{6,0}$(Xe)	875,328 (5)	4,47 (12)
$\gamma_{13,4}$(Xe)	909,683 (31)	0,212 (9)
$\gamma_{7,0}$(Xe)	911,447 (30)	0,046 (6)
$\gamma_{(-1,3)}$(Xe)	1018,1 (5)	0,0060 (26)
$\gamma_{10,2}$(Xe)	1035,53 (6)	0,0086 (18)
$\gamma_{8,0}$(Xe)	1052,393 (17)	0,551 (16)
$\gamma_{13,3}$(Xe)	1060,063	0,137 (7)
$\gamma_{11,2}$(Xe)	1087,67 (6)	0,0121 (18)
$\gamma_{9,0}$(Xe)	1236,443 (5)	1,49 (4)
$\gamma_{10,0}$(Xe)	1298,227 (5)	2,33 (7)
$\gamma_{13,2}$(Xe)	1327,23 (7)	0,00022 (22)
$\gamma_{11,0}$(Xe)	1350,373 (17)	0,148 (5)
$\gamma_{12,0}$(Xe)	1386,145 (8)	0,0086 (26)
$\gamma_{13,0}$(Xe)	1589,93 (3)	0,0029 (4)

6 Main Production Modes

$\mathrm{Te} - 133(\beta^-)\ \mathrm{I} - 133$

Fissionproduct
Possible impurities : I – 131, I – 132, I – 134, I – 135

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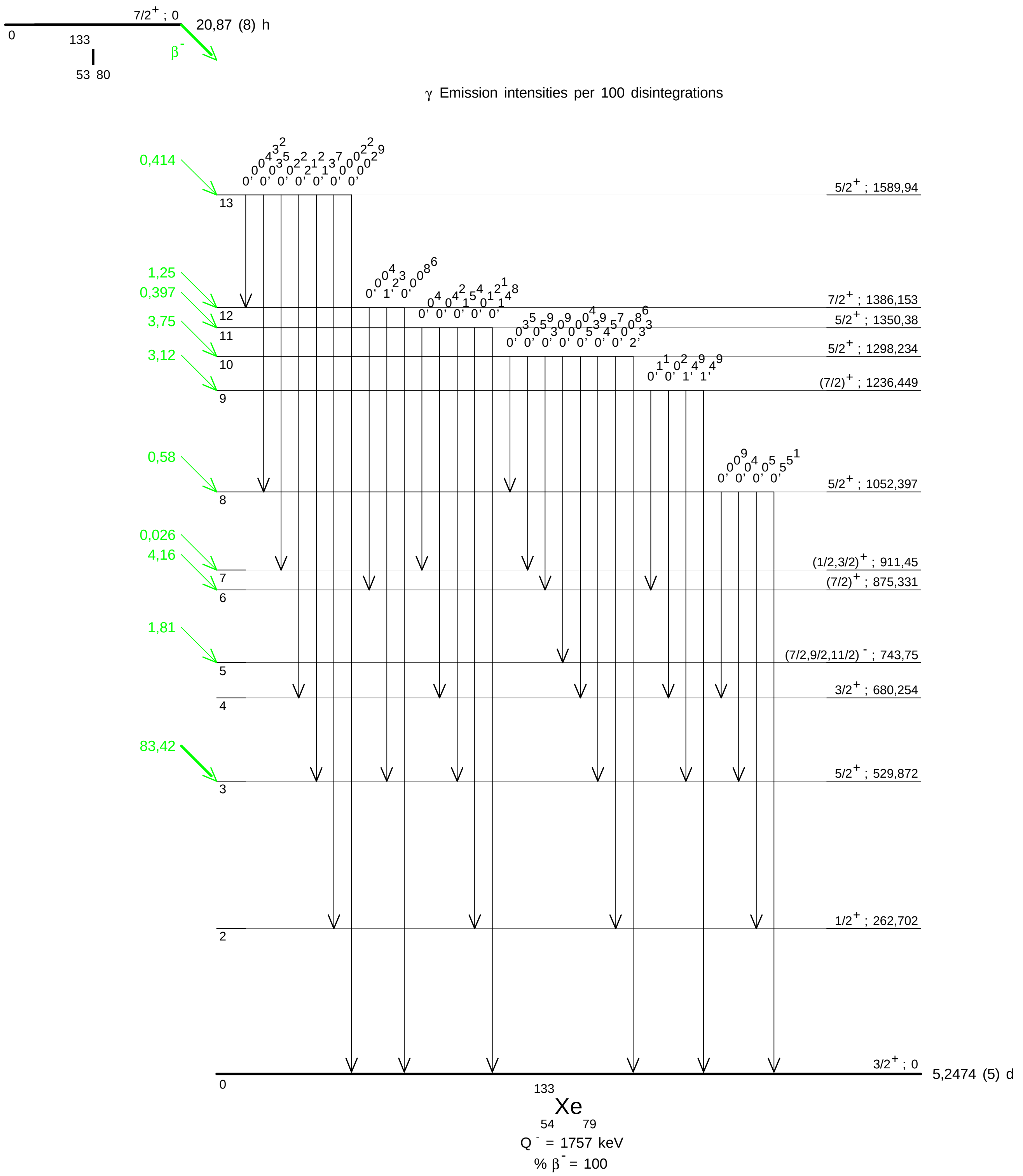
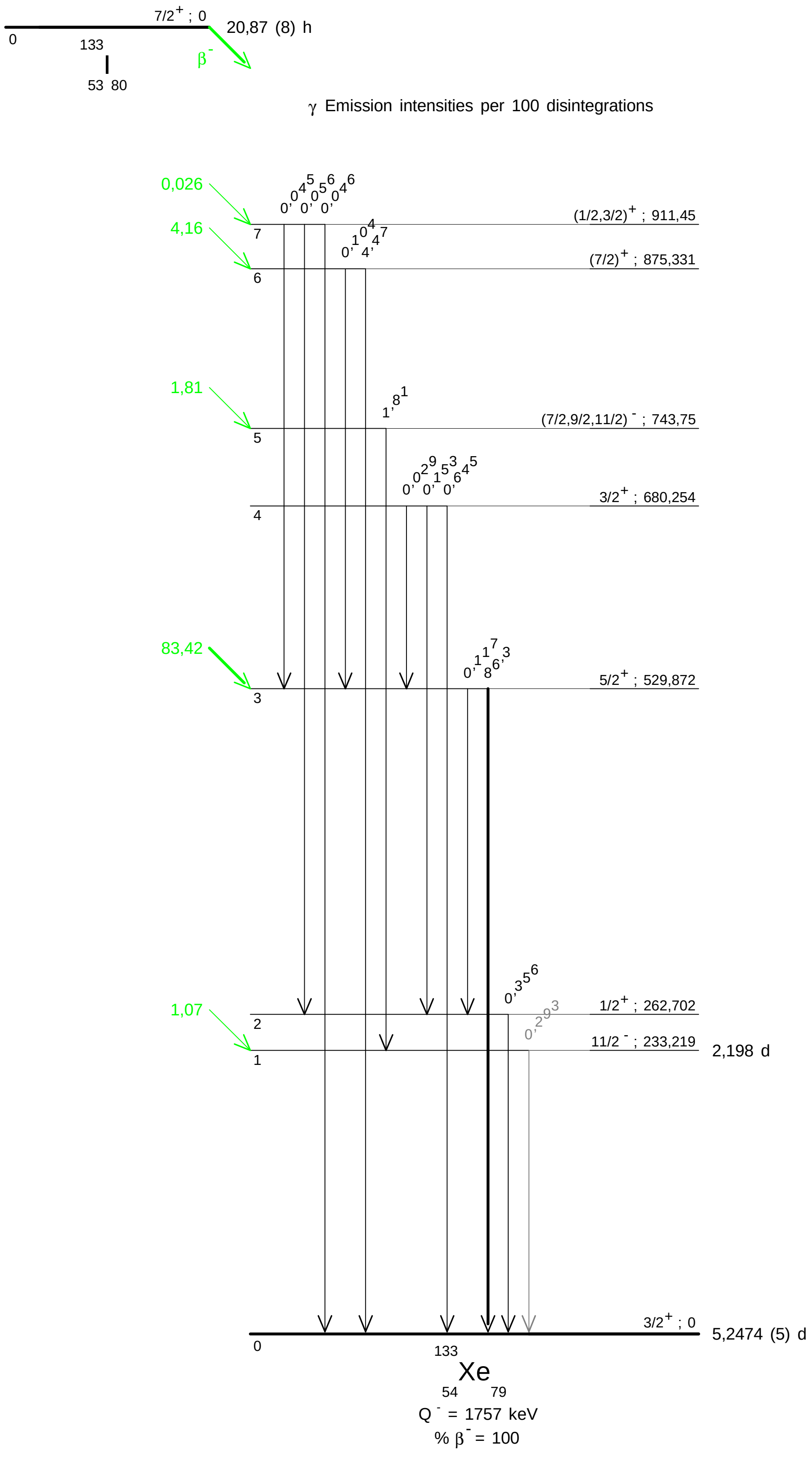

7/2+ ; 0
20,87 (8) h
0
133
53 80
β-
γ Emission intensities per 100 disintegrations
0,414
1,25
0,397
3,75
3,12
0,58
0,026
4,16
1,81
83,42
5/2+ ; 1589,94
7/2+ ; 1386,153
5/2+ ; 1350,38
5/2+ ; 1298,234
(7/2)+ ; 1236,449
5/2+ ; 1052,397
(1/2,3/2)+ ; 911,45
(7/2)+ ; 875,331
(7/2,9/2,11/2)- ; 743,75
3/2+ ; 680,254
5/2+ ; 529,872
1/2+ ; 262,702
3/2+ ; 0
5,2474 (5) d
133
Xe
54 79
Q- = 1757 keV
% β- = 100


7/2+ ; 0
20,87 (8) h
0
133
53 80
β-
γ Emission intensities per 100 disintegrations
0,026
4,16
1,81
83,42
1,07
7
6
5
4
3
2
1
0
(1/2,3/2)+ ; 911,45
(7/2)+ ; 875,331
(7/2,9/2,11/2) - ; 743,75
3/2+ ; 680,254
5/2+ ; 529,872
1/2+ ; 262,702
11/2 - ; 233,219
2,198 d
3/2+ ; 0
5,2474 (5) d
133
Xe
54 79
Q - = 1757 keV
% β- = 100