

²³⁵U-Comments on evaluation of the decay data

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This evaluation was completed in 2008, and data available in the literature by June 2008 was included.

1 Decay Scheme

²³⁵U disintegrates 100 % by α emission to levels in ²³¹Th. ²³⁵U ground state has $J^\pi = 7/2^-$ (2003Br12). The spontaneous fission branching ratio is 7.0×10^{-9} (20) % (from $T_{1/2}(\text{SF}) = 1.0 (3) \times 10^{19}$ a (2000Ho27) and $T_{1/2} = 7.04 (1) \times 10^8$ a.)

The α decay scheme of ²³⁵U was built based on the measurements described in 1974Te03, 1975Va11 and 1977Ba72. A study of 2004Da24 showed the existence of weak α decay branches to some levels in ²³¹Th.

2 Nuclear Data

A Q value of 4678.3 (7) keV is given in 2003Au03 atomic mass adjustment.

Level energies have been obtained from a least-squares fit to γ -ray energies (GTOL computer code). Spin and parities are from 2003Br12.

The measured and evaluated ²³⁵U half-life values are listed in Table 1. Notice that the uncertainties in all the tables are in the two least significant digits.

Table 1: Measured half-life values of ²³⁵U and recommended value, in 10^8 a.

References	Original value (10^8 a)	Materials	Revised value by 2004Sc03	Comments
1939Ni03	7.13 (16)	Natural U	6.97 (24)	Pb/U activity ratio, Mass spectrometry
1950Kn17	7.53 (22)	Enriched U	7.11 (14)	Specific activity, Ionisation chamber
1951Sa30	7.07	Natural U	6.77 (21)	²³⁵ U/ ²³⁸ U activity ratio, Ionisation chamber
1952Fl20	7.13 (16)	Enriched U	7.12 (16)	Specific activity, Proportional counter
1957Cl16	7.67	Natural U	7.64 (43)	Activity ratio, Ionisation chamber
1957Wu39	6.84 (15)	Natural U	6.95 (16)	²³⁵ U/ ²³⁴ U activity ratios, Ionization chamber
1965De06	6.92 (9)	Natural U		²³⁵ U/ ²³⁸ U activity ratio, Solid-state detector, Updated by 1974De19
1965Wh05	7.13 (9)	Enriched U	7.12 (9)	Specific activity, Solid-state detector
1971Ja07	7.0381 (48)	Highly enriched U	7.04 (1)	Specific activity, Proportional counter
1974De19	6.85 (9)	Highly enriched U	6.79 (13)	²³⁵ U central peak branching ratio, Solid-state detector
1993Bu10	7.04 (1)	Enriched U		Specific activity, (gas + NaI scintillator) Systematic error excluded
2003Br12	7.04 (1)			NDS weighted average with 1993Bu10, 1974De19, 1971Ja07, 1965Wh05, 1965De06 and 1957Wu39
			7.06 (9)	Unweighted mean
			7.04 (1)	Weighted mean, $\chi^2=1.12$. Recommended value

The evaluators have chosen to follow the recommendations given by R. Schön (2004Sc03), who studied in detail various problems with the measurements of the half-life of ²³⁵U and decided to recommend the half-life given by 1971Ja07, but multiplied by 2 its original uncertainty in order to include the systematic uncertainties that had not been considered in 1971Ja07. The weighted mean is the same as this precise measurement given in 1971Ja07.

The measured and evaluated ²³⁵U spontaneous fission half-life values are listed in Table 2. The value in 1981Vo02 is recommended here.

Table 2: Measured spontaneous fission half-life values of ²³⁵U and recommended value, in 10¹⁹ a.

T _{1/2} (10 ¹⁹ a)	References	measurement method
0.018	1952Se67	Ionisation chamber; not used
0.035 (9)	1966Al23	Fission track detectors; not used
> 0.18	1974GrZA	Rotating bubble chamber; no corrections; not used
0.98 (28)	1981Vo02	99.76 % enriched; rotating bubble chamber; corrected for the (α, n, f) reaction
1.0 (3)	2003Br12	NDS, from evaluation of 2000Ho27
0.98 (28)	Recommended value	From 1981Vo02

2.1 γ-Ray Transitions

The γ-ray transition probabilities were deduced from the γ-ray emission probabilities and the relevant internal conversion coefficients.

Multipolarities and mixing ratios of γ-ray transitions are from 2001Br31.

Theoretical internal conversion coefficients (ICC) and their associated uncertainties for γ-ray transitions have been obtained using the BrIcc computer program (2008Ki07), which uses the “Frozen Orbital” approximation (2002Ba85).

2.2 α-Particle Transitions

Measured energies of alpha particles are listed in Table 3. Our recommended values are from 1975Va11, 1991Ry01, 2004Da24, Q_α(2003Au03) and level energies.

Table 3: Measured and recommended values of α-particle energies (in keV) from ²³⁵U α decay.

1960Ba44	1962Pi06	1966Ga03	1975Va11	1991Ry01	2004Da24	Calc. from level energy and Q(α)	Recommended
		3977 (10)			3976 (5)	3897.2 (7)	3897.2 (7)
						3975.3 (7)	3976 (5)
						3990.5 (9)	3990.5 (9)
						4013.2 (8)	4013.2 (8)
						4053.9 (7)	4053.9 (7)
		4069 (10)			4077	4077.5 (7)	4077.5 (7)
	4153	4140 (3)	4145 (6)		4152 (5)	4154.2 (7)	4152 (5)
4214	4210	4210 (3)	4209 (4)	4214.7 (19)	4215.8 (5)	4217.4 (7)	4214.7 (19) ^b
						4219.6 (7)	4219.6 (7)

1960Ba44	1962Pi06	1966Ga03	1975Va11	1991Ry01	2004Da24	Calc. from level energy and Q(α)	Recommended
			4219 (6)			4227.6 (7)	4227.6 (7)
		4240 (10)			4248 (5)	4252.6 (7)	4248 (5)
	4261				4266 (5)	4270 (4)	4266 (5)
		4267 (10)				4279.3 (7)	4279.3 (7)
			4280		4282 (5) ^a	4286.9 (7)	4286.9 (7)
		4289 (10)	4295			4302.1 (7)	4302.1 (7)
4320	4318	4319 (3)	4322 (4)		4322.9 (6) ^a	4325.4 (7)	4322 (4)
4326						4327.9 (7)	4327.9 (7)
					4364.3 (4) ^a	4361.9 (7)	4361.9 (7)
4368	4361	4362 (3)	4358 (4)	4366.1 (20)		4365.8 (7)	4366.1 (20) ^b
		4368 (5)				4381.1 (7)	4381.1 (7)
4394	4391	4394 (3)	4392 (3)	4397.8 (13)	4395.3 (4)	4396.8 (7)	4397.8 (13) ^b
4412	4414	4411 (5)	4411 (5)		4414.9 (5)	4416.1 (7)	4414.9 (5)
4438	4440	4424 (5)	4435 (5)		4437.9 (40)	4439.3 (7)	4437.9 (40)
4496	4497	4496 (3)	4501 (4)		4502.4 (7)	4504.2 (7)	4502.4 (7)
4550	4551	4550 (3)	4555 (3)		4556.0 (4)	4557.4 (7)	4556.0 (4)
4592	4592	4592 (3)	4597 (3)	4596.4 (13)	4597.3 (4)	4598.7 (7)	4596.4 (13) ^b

^a: May be a multiplet.

^b: From 1991Ry01.

Experimental and recommended α -particle emission probabilities are listed in Table 4. Our recommended alpha particle emission probabilities are LWM average values of measured α -particle intensities given in 1975Va11, 2004Da24 and 2005Ga36. Other recommended values are from results deduced from γ -ray transition intensity balance at each nuclear level.

Table 4: Measured and recommended values of α -particle emission probabilities from ²³⁵U decay.

E_α (keV)	P_α (%)						Deduced from I_γ	LWM	Recommended [†]
	1960Ba44	1962Pi06	1966Ga03	1975Va11	2004Da24	2005Ga36			
3976					~ 0.007		≈ 0.0011		≈ 0.0011
4013.2							0.040 (1)		0.0396 (10)
4077.5							0.016 (12)		0.016 (12)
4152		~ 0.3	1.0	0.9 (2) ^a	0.31 (2)	0.286 (18)	0.506 (14)	0.297 (13)	0.294 (13)
4214.7	5.5	5.5	6.2	5.7 (6)	6.28 (11)	5.91 (7)	6.0 (4)	6.01 (12)	5.95 (12)
4219.6							0.0175 (2)		0.01732 (12)
4227.6				~ 0.9			0.123 (6)		0.122 (6)
4248?			< 0.5		0.07 (1)		0.07 (1)		0.069 (10) ?
4266					0.26 (2)	0.200 (16)	0.22 (8)	0.22 (3)	0.22 (3)
4279.3			< 0.3				0.0332 (4)		0.0329 (5)
4286.9		0.6			0.14 (1) ^a	0.066 (13)	0.096 (12)		0.065 (13)

E_{α} (keV)	P_{α} (%)						Deduced from I_{γ}	LWM	Recommended [†]
	1960Ba44	1962Pi06	1966Ga03	1975Va11	2004Da24	2005Ga36			
4302.1	< 0.5						0.00969 (12)		0.00959 (13)
4322	3	2.9	3.5	4.7 (5) ^a	3.78 (8) ^a	3.37 (6)	3.3 (7)		3.33 (6)
4327.9	11						0.409 (13)		0.405 (13)
4361.9							0.208 (21)		0.206 (21)
4366.1	6	19	12.3	17 (2) ^a	18.8 (2) ^a	19.00 (13)	19 (5)		18.80 (13)
4381.1	6.1						0.107 (16)		0.106 (16)
4397.8	62	58	53.0 (13)	54 (3)	57.11 (41)	57.98 (22)	58 (5)	57.8 (3)	57.19 (20)
4414.9	2	~ 4	2.3	2.1 (2)	3.07 (7)	3.11 (6)	3.5 (22)	3.04 (16)	3.01 (16)
4437.9	3	~ 0.6	1.8	~ 0.7)	0.27 (2)	0.219 (16)	0.206 (16)	0.239 (25)	0.236 (25)
4502.4	1	1.2	1.4	1.7 (2)	1.32 (5)	1.25 (4)	1.23 (24)	1.29 (5)	1.28 (5)
4556.0	3	3.7	1.7	4.5 (5)	3.74 (8)	3.87 (6)	3 (3)	3.83 (6)	3.79 (6)
4596.4	< 1	4.7	1.2	5.4 (5)	4.84 (9)	4.74 (7)	4 (4)	4.79 (6)	4.74 (6)

[†]: Normalized to a total of 100 %.

^a: May be a multiplet.

3. Atomic data

Atomic fluorescence yields ($\omega_K, \omega_L, \omega_M, \eta_{KL}$ and η_{LM}) are from Schönfeld (1996Sc06).

The X-ray and Auger electron emission probabilities have been deduced from γ -ray and conversion electron data by using the computer code RADLST. The deduced K X-ray emission probabilities $P_{K\alpha 1} = 5.75$ (14) agree with the measured value of 5.55 (14) in 1996Ru11, thus confirming the completeness of the decay scheme.

4. Electron Emissions.

The conversion electron emission probabilities have been deduced from γ -ray transition data using theoretical internal conversion coefficients.

5. Photon Emissions

5.1 γ -ray energy values

The experimental and our recommended γ -ray energies from ^{235}U α decay are listed in table 6. Our recommended values are mainly from the LWM averages based on measurements of 1971Cl03, 1974Te03, 1975Va11, 1977Ba72 and 1984He12 unless otherwise specified. Values in 1986LoZT are from the CRP evaluations done in 1986.

5.2 Absolute γ -ray emission probabilities

Measured relative and absolute γ -ray intensities from ^{235}U are listed together with evaluated values in Table 7. Among these measurements, 1966Ga03, 1971Cl03, 1971KrZH, 1974Te03, 1975Va11, 1977Ba72 and 1996Ru11 are measured relative γ -ray intensities. Other values reported in 1982Va04, 1983BaZZ, 1983OI01, 1984He12, 1992Li05 and 2006Al28 are measured absolute γ -ray intensities. Thus we evaluated and recommended the γ -ray emission probability of the 185.7-keV reference line firstly.

There are 7 independent measurements of the absolute γ -ray emission probability of the 185.7-keV reference line. Among these absolute measurements, 1982Va04, 1983BaZZ and 1984He12 belong to CRP measurements. The measurement reported in 2006Al28 has not been recommended because of interference with gamma rays from a ^{226}Ra impurity.

The CRP evaluations done in 1986 are reported in 1986LoZT where a recommended $P_{\gamma}(185.7) = 57.2$ (2) is given. We re-calculated $P_{\gamma}(185.7)$ and found that the LWM average value based on CRP measurements reported in 1982Va04, 1983BaZZ and 1984He12 is 57.3 (4), and LWM of 1982Va04, 1983BaZZ, 1983OI01, 1984He12 is 57.1 (3). Our recommended value is taken from the LWM average of values given (Table 5) in 1982Va04, 1983BaZZ, 1983OI01, 1984He12, 1992Li05 and 1999Ch12, that is, $P_{\gamma}(185.7) = (57.1 \pm 0.3)$ %. (Maybe to be more clear, put one table here, for example, with the values used to calculate the 185.7-keV reference line)

Table 5: Experimental 185.7-keV absolute gamma-ray emission probabilities.

References	Experimental values (%)	Comments
R. Vaninbroukx (1982Va04)	57.5 (9)	
C. Baktash (1983BaZZ)	57.3 (6)	
D. G. Olson (1983OI01)	56.1 (8)	
R. G. Helmer (1984He12)	57.2 (5)	
W.-J. Lin (1992Li05)	56.8 (13)	
H. Chatani (1999Ch12)	58 (2)	
Recommended value	57.1 (3)	$\chi^2 = 0.43$

Results for most γ rays given in 1966Ga03 and 1977Ba72 were not used because they did not have uncertainties, unless these were the only measurements for such γ -rays. Relative γ -ray intensities reported in 1971Cl03, 1971KrZH, 1974Te03, 1975Va11 and 1996Ru11 have been normalized using the present recommended $P_{\gamma} = (57.1 \pm 0.3)$ % for the 185.7 keV reference line.

Our “best” recommended absolute γ -ray emission probabilities are mainly from LWM averages of measurements reported in 1971Cl03, 1971KrZH, 1974Te03, 1975Va11, 1982Va04, 1983BaZZ, 1983OI01, 1984He12, 1992Li05 and 1996Ru11 unless otherwise specified.

Table 6: Measured and recommended values of γ -ray energies for ^{235}U α decay.

1966Ga03	1971Cl03	1974Te03	1975Va11	1977Ba72	1984He12	1986LoZT	LWM	Recommended
			19.59	19.55 (5)				19.55 (5)
		31.50 (20)	31.59 (14)	31.60 (5)			31.60 (5)	31.60 (5)
				34.7 (1)				34.7 (1) ^x
		41.70 (15)	41.1			41.4 (3)		41.4 (3) ^a
		41.96 (15)	42.1 (1)	41.95 (10)		41.96 (15)	42.01 (6)	42.01 (6)
		51.20 (10)	51.7 (4)	51.20 (5)			51.21 (4)	51.21 (4)
				54.1 (1)				54.1 (1)
			54.1	54.25 (5)				54.25 (5)
				64.45 (5)				64.45 (5)
			72.7 (2)			72.7 (2)		72.7 (2)
				73.72 (5)				73.72 (5)
	74.923 (23)	74.76 (20)	75.02 (5)			75.02 (5)	74.94 (3)	74.94 (3)
			95.7					95.7
		96.09 (2)	96.1	96.2				96.09 (2)
97 (4)								97 (4)
109 (4)	109.120 (8)	109.145 (10)	109.25 (5)	109.25 (5)		109.16 (2)	109.19 (7)	109.19 (7)
115 (4)	115.2 (3)		115.5 (2)	115.45 (5)			115.45 (5)	115.45 (5)
			120.0	120.35 (5)				120.35 (5)
			136.6	136.55 (5)				136.55 (5)
	140.75 (10)	140.758 (20)	140.80 (8)	140.75 (5)		140.76 (4)	140.76 (2)	140.76 (2)
				142.40 (5)				142.40 (5)
144 (2)	143.776 (10)	143.753 (8)	143.77 (2)	143.75 (5)	143.768 (3)	143.76 (2)	143.767 (3)	143.767 (3)
			147.0					147
151 (4)	150.960 (33)	150.939 (20)	150.94 (3)	150.85 (5)		150.93 (2)	150.936 (15)	150.936 (15)
	163.363 (10)	163.349 (9)	163.36 (2)	163.25 (5)	163.357 (3)	163.33 (2)	163.356 (3)	163.356 (3)
			173.0 (10)					173 (1)

1966Ga03	1971Cl03	1974Te03	1975Va11	1977Ba72	1984He12	1986LoZT	LWM	Recommended
			182.1					182.1
	182.72 (20)	182.65 (15)	182.7 (2)	182.60 (5)		182.61 (5)	182.62 (5)	182.62 (5)
184 (2)	185.718 (11)	185.712 (10)	185.72 (2)	185.65 (5)	185.722 (4)	185.715 (5)	185.720 (4)	185.720 (4)
196 (4)	194.941 (9)	194.938 (10)	194.94 (2)	194.95 (5)		194.94 (1)	194.940 (6)	194.940 (6)
	198.91 (15)	198.898 (15)	198.88 (6)	198.75 (10)		198.90 (2)	198.894 (14)	198.894 (14)
				199.6 (1)				199.6 (1) ^x
	202.133 (14)	202.105 (12)	202.12 (2)	202.05 (5)		202.11 (2)	202.12 (1)	202.12 (1)
	205.311 (12)	205.312 (10)	205.31 (2)	205.25 (5)	205.318 (4)	205.311 (10)	205.316 (4)	205.316 (4)
		215.26 (20)	215.28 (5)	215.3 (1)			215.28 (4)	215.28 (4)
	221.375 (40)	221.397 (25)	221.38 (2)	221.40 (5)		221.38 (2)	221.386 (14)	221.386 (14)
			228.78 (5)	228.7 (1)			228.76 (5)	228.76 (5)
	233.53 (4)	233.49 (3)	233.50 (3)	233.55 (10)		233.50 (3)	233.50 (2)	233.50 (2)
	240.93 (4)	240.95 (4)	240.87 (3)	240.75 (5)		240.87 (3)	240.88 (4)	240.88 (4)
	246.83 (4)	246.59 (10)	246.84 (2)	246.85 (5)		246.84 (4)	246. (83 (2)	246.83 (2)
				251.5 (1)				251.5 (1) ^x
	266.44 (8)	266.40 (10)	266.50 (5)				266.47 (4)	266.47 (4)
		275.35 (15)						275.35 (15)
			275.24 (20)	275.50 (5)			275.49 (6)	275.49 (6)
				279.50 (5)				279.50 (5) ^x
			281.42 (5)					281.42 (5)
285 (5)			282.92 (5)	283.0 (1)			282.94 (5)	282.94 (5)
			289.56 (4)					289.56 (4)
			291.2					291.2
		291.58 (15)	291.65 (3)	291.65 (5)			291.65 (3)	291.65 (3)
				294.3 (1)				294.3 (1) ^x
			301.7 (1)					301.7 (1)
			310.69 (6)					310.69 (6)
			317.10 (8)					317.10 (8)

1966Ga03	1971Cl03	1974Te03	1975Va11	1977Ba72	1984He12	1986LoZT	LWM	Recommended
				325.8 (1)				325.8 (1)
			343.5 (2)					343.5 (2)
				345.4 (1)				345.4 (1) ^x
		345.84 (15)	345.93 (3)	345.90 (5)			345.92 (3)	345.92 (3)
350 (5)								350 (5)
			356.03 (5)					356.03 (5)
				368.5 (1) ?				368.5 (1) ?
				371.8 (1)				371.8 (1) ^x
		387.79 (15)	387.84 (3)	387.85 (10)			387.84 (3)	387.84 (3)
		390.27 (20)						390.27 (20)
			410.29 (4)					410.29 (4)
430 (5)				~ 433.0 (5)				433.0 (5)
			448.40 (6)					448.40 (6)
			455.1 (1)					455.1 (1) ^x
			517.9 (2)					517.9 (2) ^x
			742.5 (2)					742.5 (2) ^x
			794.7 (1)					794.7 (1) ^x

^x: Not placed in level scheme.

^a: From 1986LoZT.

Table 7: Measured and recommended absolute γ -ray emission probabilities for ²³⁵U.

E_γ (keV)	1966Ga03 ^a	1971Cl03 ^a	1971KrZH ^a	1974Te03 ^a	1975Va11 ^a	1977Ba72 ^a	1982Va04	1983BaZZ	1983OI01	1984He12	1986LoZT	1992Li05	1996Ru11 ^a	LWM	Adopted*
19.55															60 (1) [#]
31.60				0.017 (6)		0.046									0.017 (6)
34.7 ^x						0.037									0.037
41.4				0.029 (11)											0.029 (11)
42.01			0.053	0.04 (2)	0.0169	0.063		0.06 (1)			0.06 (1)			0.056 (9)	0.056 (9)
51.21				0.004 (2) ^b	0.034 (7)	0.017									0.034 (7)
54.1						0.03 ?									\approx 0.00115 [#]
54.25						0.03 ?									\approx 0.0285 [#]
64.45						0.018									0.018
72.7					0.116										0.116
73.72						0.01									0.01
74.94		0.0012 (1) ^b	0.137	0.051 (6)	0.074			0.51 (5) ^b			0.06 (1)				0.051 (6)
95.7															
96.09				0.091 (11)											0.091 (11)
97	< 1														0.016 (4) [#]
109.19	5.1	1.60 (12)	1.59 (21)	1.77 (17)	1.48 (21)	1.03		1.53 (5)			1.54 (5)	2.17 (17)	1.80 (6)	1.66 (13)	1.66 (13)
115.45	< 1	0.14 (1) ^b	0.12 (3) ^b		0.033 (12)	0.017									0.03 (1)
120.35						0.026									0.026
136.55						0.012									0.012
140.76		0.183 (13)	0.18 (2)	0.26 (3)	0.22 (3)	0.171		0.214 (15)			0.22 (2)			0.200 (12)	0.20 (1)
142.40						0.0051									0.0051
143.767	11.7	10.3 (8)	10.3 (6)	11.2 (11)	11.1 (12)	9.92	10.9 (2)	10.7 (2)	10.93 (15)	11.01 (8)	10.96 (8)	10.99 (61)	10.9 (2)	10.94 (6)	10.94 (6)
147															
150.936	< 1	0.114 (9)	0.116 (32)	0.080 (11)	0.080 (11)	0.074		0.066 (10)			0.08 (1)			0.088 (26)	0.09 (3)
163.356		4.9 (4)	4.9 (3)	4.99 (51)	5.1 (5)	4.16	5.0 (1)	4.97 (10)	5.07 (8)	5.12 (4)	5.08 (4)	4.98 (12)	5.08 (5)	5.076 (26)	5.08 (3)
173			0.016		0.006 (5)										0.006 (5)

E_i (keV)	1966Ga03 ^a	1971Cl03 ^a	1971KrZH ^a	1974Te03 ^a	1975Va11 ^a	1977Ba72 ^a	1982Va04	1983BaZZ	1983O101	1984He12	1986LoZT	1992Li05	1996Ru11 ^a	LWM	Adopted*
182.1															
182.62		0.43 (3)	0.42 (4)	0.42 (14)	0.44 (10)	0.312		0.339 (17)			0.34 (2)	0.803 (103)	0.43 (5)	0.39 (5)	0.39 (5)
185.720							57.5 (9)	57.3 (6)	56.1 (8)	57.2 (5)	57.2 (2)	56.8 (13)		57.1 (3)	57.1 (3)
194.940	4.7	0.69 (5)	0.69 (6)	0.61 (9)	0.62 (6)	0.67		0.626 (13)			0.63 (1)	0.618 (48)	0.61 (2)	0.626 (10)	0.63 (1)
198.894		0.032 (3)	0.032	0.046 (6)	0.033 (5)	0.097 ?		0.047 (6)			0.42 (6)			0.036 (2)	0.036 (2)
199.6 ^x						0.097 ?									~ 0.06 ^{&}
202.12		1.06 (8)	1.1 (5)	1.07 (11)	1.07 (11)	1.25		1.08 (2)			1.08 (2)	1.16 (7)	1.06 (4)	1.080 (17)	1.08 (2)
205.316		5.3 (4)	5.18 (32)	4.9 (4)	5.0 (5)	5.51	5.0 (2)	5.05 (5)	5.03 (9)	4.96 (5)	5.01 (5)	4.98 (14)	5.03 (5)	5.015 (26)	5.02 (3)
215.28			0.42	0.029 (6)	0.029 (3)	0.025								0.029 (3)	0.029 (3)
221.386		0.126 (9)	0.08	0.12 (3)	0.116 (11)	0.125		0.114 (6)			0.12 (1)			0.118 (5)	0.118 (5)
228.76			0.0085		0.0074	0.0011									0.0074
233.50		0.042 (3)	0.021	0.034 (11)	0.032			0.029 (5)			0.029 (5)			0.038 (4)	0.038 (4)
240.88		0.074 (6)	0.0032	0.063 (17)	0.085	0.089		0.076 (6)			0.075 (6)			0.074 (4)	0.074 (4)
246.83		0.063 (5)	0.021	0.046 (17)	0.085	0.067 ?		0.053 (3)			0.053 (3)			0.055 (3)	0.055 (3)
251.5 ^x						0.067 ?									~ 0.012 [^]
266.47		0.0080 (6)	0.0053	0.0063 (17)	0.0095									0.0078 (6)	0.0078 (6)
275.35				0.051 (6)											0.051 (6)
275.49			0.042		0.032	0.114									0.032
279.5 ^x						0.264									0.264
281.42					0.0063										0.0063
282.94	0.001		0.0032		0.0063	0.004									0.0063
289.56					0.0074										0.0074
291.2															
291.65			0.021	0.040 (6)	0.032	0.095									0.040 (6)
294.3 ^x						0.033									0.033
301.7					0.0053										0.0053
310.69			0.0017		0.0053										0.0053
317.10					0.0011										0.0011

E_{γ} (keV)	1966Ga03 ^a	1971Cl03 ^a	1971KrZH ^a	1974Te03 ^a	1975Va11 ^a	1977Ba72 ^a	1982Va04	1983BaZZ	1983O101	1984He12	1986LoZT	1992Li05	1996Ru11 ^a	LWM	Adopted*
325.8						0.004									0.004
343.5					0.0032										0.0032
345.4 ^x						0.072 ?									~ 0.03 ⁺
345.92			0.0017	0.040 (6)	0.074	0.072 ?									0.040 (6)
350	0.006														0.006
356.03					0.0053										0.0053
371.8 ^x						0.069 ?									
387.84				0.040 (6)	0.0085	0.159									0.040 (6)
390.27				0.040 (1)											0.040 (1)
410.29					0.0032										0.0032
433.0	0.001					0.004									0.004
448.40					0.0011										0.0011
455.1 ^x					0.0085										0.0085
517.9 ^x					0.00042										0.00042
742.5 ^x					0.00042										0.00042
794.7 ^x					0.00063										0.00063

×: Not placed in level scheme.

#: From intensity balance.

&: From $P_{\gamma}(198.9 + 199.6) = 0.097\%$.

^: From $P_{\gamma}(246.8 + 251.5) = 0.067\%$.

+: From $P_{\gamma}(345.4 + 345.9) = 0.072\%$.

*: Deduced using the LWM statistical method, unless otherwise specified.

a: The P_{γ} values have been deduced from the measured relative intensities and normalized to $P_{\gamma} = (57.1 \pm 0.3)\%$ for the 185.7 keV reference line.

b: This value, which deviates by a factor of about 10 from the results of the other measurements, was not used in the calculation of the recommended value.

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