^{123}Te IT decay (119.2 d) 1992Ja15,1992Co11,1964Ch18

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

Parent: ^{123}Te: E=247.5 *2*; J$^{\pi}$=11/2^{-}; T$_{1/2}$=119.2 d *3*; %IT decay=100.0

^{123}Te-E,J$^{\pi}$,T$_{1/2}$: From Adopted Levels.

1992Ja15: measurement was performed at Physikalisch Technische Bundesanstalt (PTB), with a 4$\pi\beta$-γ-coin detector system, consisting of a NaI(Tl) crystal and a pressurized proportional counter. Measured Eγ, Iγ, E(ce), I(ce), γ-ce-coin. Deduced conversion coefficient, absolute γ emission probability for 159γ.

1992Co11: ^{123m}Te was produced from neutron irradiation at NIST. Conversion electrons were detected with a liquid scintillator and γ rays were detected with a HPGe detector. Measured Eγ, Iγ, E(ce), I(ce), total activity, γ(t). Deduced isomer halflife, absolute γ-ray emission probability of 159γ.

1992ScZZ: measurement was performed at PTB with a 4$\pi\beta$-γ-coin system. Measured Eγ, Iγ, E(ce), I(ce), γ-ce-coin. Deduced conversion coefficient, absolute γ emission probability for 159γ.

1973Ra32, 1972Ra07: ^{123m}Te from thermal-neutron irradiation. γ rays were detected with a Ge(Li) detector. Measured Eγ, Iγ. Deduced transition strength for 248γ (in 1973Ra32) and total conversion coefficient for 88γ (in 1972Ra07).

1964Ch18: measured conversion electrons with a double-focusing iron-magnet spectrometer at BNL. Deduced conversion coefficients. See also 1964Ch08 from the same author.

Others:

2003Vi13: measured Eγ, Iγ, $\gamma\gamma$-coin.

1987Ja13: measured isomer halflife with Ge(Li) detector.

1987Ni11: measured Iγ(θ,T,H). Deduced magnetic moment of the isomer.

1973Si26: Iγ(θ,T). Deduced magnetic moment of the isomer.

1972Ka31: measured conversion electrons with an UMB-1 prism magnetic β spectrometer. Deduced conversion coefficient ratios. Also 1972Ka61, 1972Ka60, 1969Ka32, 1968Ka20.

1970EmZY: measured isomer T$_{1/2}$.

1970Ro31: measured ce-γ(θ,H). Deduced magnetic moment for the 159 level.

1969To02: measured ce-γ-coin with a lens spectrometer for conversion electrons. Deduced mixing ratio of 159γ.

1968Ra02: measured ce-ce(t) at Andhra University in India. Deduced halflife for 159 level.

1966Ha03: measured ce-γ-coin with a magnetic spectrometer for conversion electrons and a NaI crystal for γ rays. Deduced conversion coefficients for 159γ.

1966Gu02: measured $\gamma\gamma$(θ). Deduced mixing ratio of 159γ.

1965An05: measured isomer halflife with NaI(Tl) and beta counter.

1964Ch08: measured γ rays with a NaI(Tl) scintillation counter and conversion electrons with a γ-ray spectrometer at BNL. Deduced conversion coefficient ratios and mixing ratio of 159γ.

1963Sc12: measured ce-ce(t) at BNL. Deduced halflife for 159 level.

1956Go23: measured conversion electrons.

1955Go61: measured ce-γ-coin with a lens spectrometer for conversion electrons and a NaI crystal for γ rays. Deduced mixing ratio of 159γ.

1953Gr07: measured ce-ce(t). Deduced halflife for 159 level.

1954Mc10: measured conversion electrons at ORNL.

1951Co34, 1951Hi80: measured isomer halflife.

1950Ka04: measured ce-γ-coin.

^{123}Te Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[‡]	Comments
0.0	1/2^{+}		
159.00 *3*	3/2^{+}	196 ps *10*	μ=0.71 *12* (1970Ro31) T$_{1/2}$: adopted value from this study as weighted average of 190 ps *30* (1953Gr07), 186 ps *20* (1963Sc12) and 199 ps *10* (1968Ra02), with all measured using (ce 88.46γ)(ce 159.00γ)(t). μ: from integral perturbed angular correlation (IPAC) in 1970Ro31 and adopted T$_{1/2}$=196 ps *10*, based on original value of 0.72 *12* in 1970Ro31 using T$_{1/2}$=199 ps *10* from 1968Ra02.

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^{123}Te IT decay (119.2 d) 1992Ja15,1992Co11,1964Ch18 (continued)

^{123}Te Levels (continued)

E(level)†	J^{π}‡	$T_{1/2}$‡	Comments
247.46 *5*	11/2⁻	119.2 d *3*	%IT=100 μ=−0.927 *8* (1987Ni11) $T_{1/2}$: adopted value from this study as unweighted average of 119.3 d *1* (1992Co11), 119.7 d *1* (1970EmZY) and 118.6 d *9* (1987Ja13). Others: 117 d *6* (1965An05), 104 d (1951Hi80), 121 d (1951Co34). μ: value from 1987Ni11 using nuclear magnetic resonance of oriented nuclei, sign from 1973Si26 with μ=−1.00 *5* measured using nuclear orientation with gamma detection (1973Si26).

† From a least-squares fit to γ-ray energies.
‡ From Adopted Levels. Data from this study are given in comments.

γ(^{123}Te)

Iγ normalization: From I(γ+ce)=100 for 159γ. See comments for 159γ for the measured absolute emission probability of 159γ.

E_{γ}	I_{γ}#	E_i(level)	J^{π}_i	E_f	J^{π}_f	Mult.‡	δ‡	α†	Comments
88.46 *3*	0.110 *4*	247.46	11/2⁻	159.00	3/2⁺	M4		1122	α(K)=481 *7*; α(L)=498 *7*; α(M)=118.4 *17* α(N)=22.8 *4*; α(O)=1.97 *3* E_{γ}: 1964Ch18 quote this value as from 1964Ch08 of the same author; but this value is not shown in 1964Ch08. The uncertainty is assumed (by the evaluator) to be the same as that of 159γ in 1964Ch08. Other: 88.5 *1* (1973Ra32). I_{γ}: from I(159.0γ)/I(88.5γ)=906 *33* (1972Ra07). Mult.: adopted assignment from ratios between α(K)=455 *9* (theoretical value for normalization), α(L1)exp=171 *10*, α(L2)exp=42.1 *40*, α(L3)exp=269 *9*,α(M1)exp=38.6 *35*, α(M2)exp+α(M3)exp=66.9 *35*, α(M4)exp+α(M5)exp=2.98 *50* (1964Ch18), and from K:L:M:N=0.93 *4*:1:0.236 *13*:0.058 *4* (1972Ka31). Total conversion coefficient α(exp)=1082 *17* from 1964Ch18, 1076 *42* from 1972Ra07 based on assumed α(K)=0.189 *14* for 159γ.
159.00 *3*	100	159.00	3/2⁺	0.0	1/2⁺	M1+E2	+0.079 *11*	0.187 *3*	α(K)=0.1611 *23*; α(L)=0.0209 *3*; α(M)=0.00417 *6* α(N)=0.000824 *12*; α(O)=8.91×10^{-5} *13* E_{γ}: from energies of conversion

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^{123}Te IT decay (119.2 d) 1992Ja15,1992Co11,1964Ch18 (continued)

$\gamma(^{123}Te)$ (continued)

E_γ	I_γ[#]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	α[†]	Comments
								electrons in 1964Ch08. Other: 159.0 *1* (1973Ra32). I_γ: absolute emission probability=0.839 *6* from measured activity with liquid scintillator and γ-ray intensity with a HPGe detector in 1992Co11; 0.8481 *32* (2π and 4π) and 0.8407 *9* (slope) from $4\pi\beta$-γ-coin in 1992Ja15; 0.832 *5* from $4\pi\beta$-γ-coin in 1992ScZZ; 0.8365 *43* deduced (by evaluator) from α(exp)=0.1954 *61* in 1964Ch18; 0.8348 *29* deduced (by evaluator) from α(exp)=0.1970 *41* in 1966Ha03. Mult.: α(K)exp=0.169 *6*, α(L1)exp=0.0201 *10*, α(L2)exp=0.00138 *10*, α(L3)exp=0.000389 *30*, α(M)exp=0.00454 *23* (1964Ch08, 1964Ch18); α(K)exp=0.170 *4*, α(L)exp=0.0229 *9*, α(M+N+...)=0.0050 *5* (1966Ha03); α(K)exp=0.165 *5*, K:L=6.6 *3* (1956Go23); α(K)exp=0.19 *2* (1954Mc10); α(K)exp=0.18 *8*, K:L=8.9 *8* (1950Ka04). The experimental total conversion coefficient α(exp)=0.192 *9* (deduced from %Iγ=0.839 *6* in 1992Co11), 0.202 *7* (deduced from %Iγ=0.832 *5* in 1992ScZZ), 0.1895 *13* (slope method) and 0.1932 *46* (2π and 4π methods) in 1992Ja15, 0.1954 *61* in 1964Ch08 and 0.1979 *41* in 1966Ha03 both from sum of all ce lines, with the weighted average equal to 0.1910 *14*. δ: values from this study: 0.103 *7* from δ^2=0.0107 *14*, unweighted average of 0.0119 *9* from ce-$\gamma(\theta)$ in 1969To02, 0.011 *8* from $\gamma\gamma(\theta)$ in 1966Gu02, 0.013 *1* from ce-$\gamma(\theta)$ in 1955Go61, 0.0067 *11* from ce data in 1964Ch08; 0.09 *+4−6* from all conversion coefficients given above (using the BrIccMixing code).
247.5 *2*	4.1×10^{-4} *4*	247.46	11/2$^-$	0.0	1/2$^+$	[E5]	7.83	α(K)=3.05 *5*; α(L)=3.77 *6*; α(M)=0.844 *13* α(N)=0.1573 *24*; α(O)=0.01227 *19* E_γ: from 1973Ra32. I_γ: from I(248γ)/I(159γ)=4.1×10^6 *4* in 1973Ra32.

† Additional information 1.
‡ From Adopted Gammas. Supporting data from this study are given in comments. Conversion coefficients of 88γ from 1964Ch18 are normalized toα(K)theory=455 *9*; those of 159γ quoted in 1964Ch18 are from absolute measurements in 1964Ch08.
# For absolute intensity per 100 decays, multiply by 0.8425 *28*.

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