Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Alexander A. Rodionov And Yuri L. Khazov	NDS 109,517 (2008)	22-Jan-2008

Q(β^-)=6061 *6*; S(n)=3263 *4*; S(p)=10996 *4*; Q(α)=−2881 *7* 2012Wa38
Note: Current evaluation has used the following Q record 5888 13 *3340* 90 *10*.95E310 −2940 *90* 2003Au03,2007Fo02.
Q(β^-): from β(870γ) coin (2007Fo02). 2003Au03 give Q(β^-)=5960 *90*.
S(n): 2007Fo02 deduce 3414 *19*.
Additional information 1.
Structure calculations: 2004Sa35 (levels and transition probabilities from shell-model calculations), 1996Lo01 (levels from quasiparticle+ phonon coupling model).
Mass measurement: 2004Ge18 (Schottky mass spectrometer).
Mass excess from $\beta\gamma$ coin data: −77902 *15* (2007Fo02).

^{135}Te Levels

Cross Reference (XREF) Flags

A	^{135}Sb β^- decay (1.679 s)	D	^{248}Cm SF decay
B	^{135}Te IT decay (0.511 μs)	E	^{252}Cf SF decay
C	^{136}Sb β^-n decay (0.923 s)	F	^{134}Te(^{9}Be,^{8}Beγ),(^{13}C,^{12}Cγ)

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
0.0[d]	(7/2$^-$)[b]	19.0 s *2*	ABCDEF	%β^-=100 μ=−0.69 *5* (2006Si40) Q=0.29 *9* (2006Si40) μ,Q: from hyperfine structure study using laser spectroscopy at COMPLIS-ISOLDE-CERN facility. J$^\pi$: this assignment is also consistent with N=83 isotones (7/2$^-$ g.s. in ^{137}Xe, ^{139}Ba, ^{141}Ce, ^{143}Nd, ^{145}Sm) as well as with strong β transition from (7/2$^+$) g.s. in ^{135}Sb to this state, possibly from $\pi g_{7/2}$ to $\nu f_{7/2}$ orbitals. Configuration=$\nu f_{7/2}$. T$_{1/2}$: weighted average of 18.6 s *4* (1985Sa15), 19.2 s *2* (1974Gr29), 18 s *1* (1973Bo42), 18 s *2* (1969De13). Others: 11 s *3* (1970De15), 16.6 s *9* (1969ScZY). Method: γ timing.
658.65 *10*	(3/2$^-$)[&]		A F	J$^\pi$: probable $\nu p_{3/2}$ state.
1083.3 *4*	(1/2$^-$)[&]		A F	J$^\pi$: probable $\nu p_{1/2}$ state.
1127.06 *8*	(5/2$^-$)[&]		A F	J$^\pi$: γ's to (7/2$^-$) and (3/2$^-$); log *ft*=6.55 from (7/2$^+$); systematics support 5/2 with configuration=$\nu f_{5/2}$.
1179.88[d] *9*	(11/2$^-$)[b]	≤0.3 ns	AB DEF	
1246.18 *10*	(9/2$^-$)[&]		A F	J$^\pi$: γ to (7/2$^-$); log *ft*=6.5 from (7/2$^+$); systematics support 9/2 with probable configuration of $\nu h_{9/2}$.
1380.14 *9*	(7/2$^-$,9/2)		A	J$^\pi$: γ to (7/2$^-$); possible γ to (11/2$^-$); log *ft*=6.4 from (7/2$^+$).
1400?			F	E(level): from systematics, 2002Ra46 state that this tentative level may be a better candidate for $\nu f_{5/2}$ state than the 1127 level.
1442.22 *10*	(5/2$^-$,7/2,9/2$^-$)		A	J$^\pi$: weak γ's to (5/2$^-$) and (9/2$^-$); log *ft*=6.4 from (7/2$^+$).
1504.88[d] *14*	(15/2$^-$)[b]	≤0.6 ns	B DE	
1554.89[d] *16*	(19/2$^-$)[b]	0.511 μs *20*	B DE	%IT=100 μ=−3.8 *4* (1989Ra17) μ: DPAC (1989Ra17 quote from abstract Particle normalization-13 in Sixth International Conference on Hyperfine Interactions, Groningen,

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Adopted Levels, Gammas (continued)

^{135}Te Levels (continued)

E(level)[†]	J^{π}	$T_{1/2}$[‡]	XREF	Comments
				Netherlands, July 1983.). See also 2005St24 compilation. $T_{1/2}$: from delayed γ timing, weighted average of 0.512 μs *22* (2001Mi22) and 0.510 μs *20* (1980Ka30).
1653.97 *8*	$(5/2^-)$		A	J^{π}: γ's to $(1/2^-)$ and $(9/2^-)$.
1702.34 *23*	$(7/2^-,9/2,11/2^-)$		A	J^{π}: γ's to $(7/2^-)$ and $(11/2^-)$.
1837.19 *10*	$(3/2^-,5/2^-)$		A F	XREF: F(?). J^{π}: γ's to $(7/2^-)$ and $(1/2^-)$.
2016.13[d] *17*	$(17/2^-)$[b]		DE	
2017.88 *15*	$(3/2^-,5/2,7/2^-)$		A	J^{π}: γ's to $(7/2^-)$ and $(3/2^-)$.
2108.9 *10*	$(13/2^+)$		F	J^{π}: ΔJ=1, dipole γ to $(11/2^-)$; possible $\nu i_{13/2}$ state from systematics of N=83 isotones.
2193.80 *13*	$(3/2^-$ to $9/2^-)$		A	J^{π}: γ's to $(7/2^-)$ and $(5/2^-)$.
2208.17 *17*	$(19/2^-)$		DE	J^{π}: γ to $(19/2^-)$; possibly configuration=$\pi(g_{7/2}d_{5/2})\otimes\nu f_{7/2}$.
2339.07 *22*	$(3/2^-$ to $9/2^-)$		A	J^{π}: γ to $(5/2^-)$; log *ft*=7.4 from $(7/2^+)$.
2370.56 *11*	$(7/2^-,9/2^-)$		A	J^{π}: γ's to $(5/2^-)$ and $(11/2^-)$.
2376.6 *5*	$(3/2^-,5/2,7/2^-)$		A	J^{π}: γ to $(3/2^-)$; log *ft*=7.7 from $(7/2^+)$.
2448.76 *14*	$(7/2^-,9/2)$		A	J^{π}: γ to $(11/2^-)$; log *ft*=6.7 from $(7/2^+)$.
2569.43 *20*	$(5/2,7/2,9/2)$		A	J^{π}: γ to $(7/2^-)$; log *ft*=6.4 from $(7/2^+)$.
2602.26 *14*	$(1/2$ to $7/2^-)$		A	J^{π}: γ to $(3/2^-)$.
2639.89 *17*	$(21/2^-)$[a]		DE	J^{π}: γ to $(19/2^-)$; probable configuration=$\pi g^2_{7/2}\otimes\nu h_{9/2}$ (1997Bh06).
3122.05 *12*	$(7/2^-,9/2,11/2^-)$		A	J^{π}: γ's to $(7/2^-)$ and $(11/2^-)$.
3150.03 *19*			E	
3164.24 *19*			E	
3233.31 *17*	$(25/2^+)$[a]	<4 ns	DE	J^{π}: γ's to $(19/2^-)$ and $(21/2^-)$; probable configuration=$\pi g_{7/2}\pi h_{11/2}\nu f_{7/2}$ (1997Bh06). $T_{1/2}$: $\gamma\gamma$(t) in ^{248}Cm SF decay (2001Fo02).
3312.60 *19*			E	
3470.60 *17*	$(21/2^+)$		DE	J^{π}: γ's to $(19/2^-)$ and $(21/2^-)$; possible $(21/2^+)$ member of configuration=$\pi g_{7/2}\pi h_{11/2}\nu f_{7/2}$ (2001Fo02).
3774.75 *19*			E	
4023.01[e] *16*	$(19/2^-)$[c]		DE	J^{π}: γ's to $(15/2^-)$ and $(19/2^-)$.
4061.60 *19*	$(21/2,23/2,25/2^+)$		D	J^{π}: γ to $(21/2^+)$.
4342.11 *19*	$(25/2,27/2,29/2^+)$		DE	J^{π}: γ to $(25/2^+)$; γ from $(27/2^+)$.
4393.19[e] *16*	$(21/2^-)$[c]		DE	J^{π}: γ's to $(19/2^-)$ and $(21/2^+)$.
4590.73 *18*	$(27/2^+)$[a]		DE	J^{π}: γ to $(25/2^+)$; probable configuration=$\pi g^2_{7/2}\otimes\nu i_{13/2}$ or configuration=$\pi(g_{7/2}\chi_{11/2})\otimes\nu h_{9/2}$ (1997Bh06).
4798.63[e] *17*	$(23/2^-)$[c]		DE	J^{π}: γ's to $(19/2^-)$, $(21/2^+)$ and $(21/2^-)$.
5080?[#] *90*	$(9/2^+)$[@]		A	
5170.34[e] *17*	$(25/2^-)$[c]		DE	J^{π}: γ's to $(25/2^+)$ and $(21/2^-)$.
5470[#] *90*	$(9/2^+)$[@]		A	
5524.94[e] *17*	$(27/2^-)$[c]		DE	J^{π}: γ's to $(23/2^-)$, $(25/2^-)$ and $(25/2^+)$.
5641.33 *18*	$(31/2^-)$		DE	J^{π}: γ's to $(25/2^+)$ and $(27/2^+)$; possible configuration=$\pi g^2_{7/2}\otimes\nu f^2_{7/2}\otimes\nu h^{-1}_{11/2}$ (1997Bh06).
5650?[#] *90*	$(7/2^+)$[@]		A	
5790.15[e] *18*	$(29/2^-)$[c]		DE	J^{π}: γ's to $(25/2^-)$ and $(27/2^-)$.
6010[#] *90*	$(7/2^+)$[@]		A	
6080[#] *90*	$(7/2^+)$[@]		A	
6109.39[e] *19*	$(31/2^-)$[c]		DE	J^{π}: γ's to $(29/2^-)$ and $(31/2^-)$.
6151.56 *21*	$(27/2^-,29/2,31/2^+)$		DE	J^{π}: γ's to $(27/2^+)$ and $(31/2^-)$. 2003Ha49 suggest $(31/2^-)$.
6170[#] *90*	$(5/2^+)$[@]		A	
6240[#] *90*	$(7/2^+)$[@]		A	
6382.64 *21*	$(31/2$ to $35/2^-)$		DE	J^{π}: γ to $(31/2^-)$. 2001Lu16 and 2003Ha49 suggest $(33/2^-)$.
6454.74[e] *21*	$(33/2^-)$[c]		DE	J^{π}: γ to $(31/2^-)$.

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Adopted Levels, Gammas (continued)

^{135}Te Levels (continued)

E(level)[†]	J^{π}	XREF	Comments
6669.20[e] *21*	(35/2$^-$)[c]	DE	J^{π}: γ to (31/2$^-$), it should Be noted that the dipole (M1) transition to (33/2$^-$) level is not reported, which is expected if this level is a member of the magnetic-rotational band.

[†] From least-squares fit to Eγ's, assuming Δ(Eγ)=0.1 keV when not stated, except that 1 keV is assumed when Eγ quoted to nearest keV.
[‡] From ^{135}Te IT decay for excited states.
[#] This level is reported to decay by neutron emission.
[@] From the best agreement between neutron-branching ratios and optical-model transmission-coefficient ratios (1979Kr03). Allowed log *ft* value from (7/2$^+$) suggests (5/2$^+$,7/2$^+$,9/2$^+$).
[&] Systematics of odd-A, N=83 nuclides (^{137}Xe, ^{139}Ba, ^{141}Ce, ^{143}Nd, ^{145}Sm) (1989Ho08).
[a] Shell-model predictions.
[b] From possible assignment to a $\pi g^2_{7/2}\otimes\nu f_{7/2}$ multiplet (1997Bh06).
[c] From assignment to a magnetic-rotational band with possible configuration=$\pi g^2_{7/2}\otimes\nu(f^2_{7/2}h^{-1}_{11/2})$.
[d] Band(A): $\pi g^2_{7/2}\otimes\nu f_{7/2}$ multiplet (1997Bh06). The pattern is consistent with shell-model calculations.
[e] Band(B): Possible magnetic-rotational band based on (19/2$^-$). Possible configuration=$\pi g^2_{7/2}\otimes\nu(f^2_{7/2}h^{-1}_{11/2})$. VMI analysis: parameter Δ=57 keV.

$\gamma(^{135}Te)$

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡	α#	Comments
658.65	(3/2⁻)	658.57 *10*	100	0.0	(7/2⁻)			
1083.3	(1/2⁻)	424.7 *5*	100	658.65	(3/2⁻)			
1127.06	(5/2⁻)	468.5 *5*	1.3 *6*	658.65	(3/2⁻)			
		1127.03 *10*	100 *5*	0.0	(7/2⁻)			
1179.88	(11/2⁻)	1179.94 *10*	100	0.0	(7/2⁻)	[E2]		B(E2)(W.u.)>0.020 E_γ: from ^{135}Sb β^- decay.
1246.18	(9/2⁻)	1246.19 *10*	100	0.0	(7/2⁻)			
1380.14	(7/2⁻,9/2)	200.1 *5*	≈2.4	1179.88	(11/2⁻)			
		1380.01 *10*	100 *4*	0.0	(7/2⁻)			
1400?		1400@		0.0	(7/2⁻)			
1442.22	(5/2⁻,7/2,9/2⁻)	196.2 *5*	≈1.5	1246.18	(9/2⁻)			
		315.2 *5*	1.0 *5*	1127.06	(5/2⁻)			
		1442.20 *10*	100 *3*	0.0	(7/2⁻)			
1504.88	(15/2⁻)	325.0 *1*	100	1179.88	(11/2⁻)	[E2]	0.0298	B(E2)(W.u.)>6.1 E_γ: from ^{135}Te IT decay.
1554.89	(19/2⁻)	50.0 *1*	100	1504.88	(15/2⁻)	E2	20.7	B(E2)(W.u.)=3.92 *20* E_γ: from ^{135}Te IT decay. Mult.: from α(K)exp and α(exp) in ^{135}Te IT decay.
1653.97	(5/2⁻)	407.8 *5*	3.4 *11*	1246.18	(9/2⁻)			
		526.84 *10*	79 *3*	1127.06	(5/2⁻)			
		570.7 *10*	2.1	1083.3	(1/2⁻)			
		1654.04 *10*	100 *3*	0.0	(7/2⁻)			
1702.34	(7/2⁻,9/2,11/2⁻)	456.2 *5*	70 *30*	1246.18	(9/2⁻)			
		522.2 *5*	67	1179.88	(11/2⁻)			
		1702.4 *3*	100 *14*	0.0	(7/2⁻)			
1837.19	(3/2⁻,5/2⁻)	753.9 *5*	3.7 *21*	1083.3	(1/2⁻)			
		1837.18 *10*	100 *5*	0.0	(7/2⁻)			
2016.13	(17/2⁻)	461.24		1554.89	(19/2⁻)			
		512		1504.88	(15/2⁻)			
2017.88	(3/2⁻,5/2,7/2⁻)	892.0 *5*	38 *18*	1127.06	(5/2⁻)			
		1358.9 *2*	66 *7*	658.65	(3/2⁻)			
		2018.0 *2*	100 *7*	0.0	(7/2⁻)			
2108.9	(13/2⁺)	929		1179.88	(11/2⁻)	D		
2193.80	(3/2⁻ to 9/2⁻)	1066.74 *10*	100 *5*	1127.06	(5/2⁻)			
		2193.8 *5*	9 *4*	0.0	(7/2⁻)			
2208.17	(19/2⁻)	653.28	100	1554.89	(19/2⁻)			
2339.07	(3/2⁻ to 9/2⁻)	1212.0 *2*	100	1127.06	(5/2⁻)			
2370.56	(7/2⁻,9/2⁻)	716.9 *5*	23 *11*	1653.97	(5/2⁻)			
		990.30 *10*	75 *6*	1380.14	(7/2⁻,9/2)			
		1124.7 *8*	54	1246.18	(9/2⁻)			
		1191.0 *5*	48 *18*	1179.88	(11/2⁻)			

Adopted Levels, Gammas (continued)

γ(^{135}Te) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.‡
2370.56	(7/2⁻,9/2⁻)	2370.9 *2*	100 *8*	0.0	(7/2⁻)	
2376.6	(3/2⁻,5/2,7/2⁻)	1717.9 *5*	100	658.65	(3/2⁻)	
2448.76	(7/2⁻,9/2)	1268.87 *10*	100	1179.88	(11/2⁻)	
2569.43	(5/2,7/2,9/2)	2569.4 *2*	100	0.0	(7/2⁻)	
2602.26	(1/2 to 7/2⁻)	1943.6	100	658.65	(3/2⁻)	
2639.89	(21/2⁻)	1084.99	100	1554.89	(19/2⁻)	
3122.05	(7/2⁻,9/2,11/2⁻)	1741.8 *3*	20 *4*	1380.14	(7/2⁻,9/2)	
		1942.22 *10*	100	1179.88	(11/2⁻)	
		3121.5 *3*	62 *3*	0.0	(7/2⁻)	
3150.03		1595.13	100	1554.89	(19/2⁻)	
3164.24		1609.34	100	1554.89	(19/2⁻)	
3233.31	(25/2⁺)	593.42	6.3	2639.89	(21/2⁻)	[M2]
		1026		2208.17	(19/2⁻)	[E3]
		1678.41	100	1554.89	(19/2⁻)	[E3]
3312.60		1757.7	100	1554.89	(19/2⁻)	
3470.60	(21/2⁺)	830.71	41	2639.89	(21/2⁻)	
		1262.42	53	2208.17	(19/2⁻)	
		1915.7	100	1554.89	(19/2⁻)	
3774.75		2219.84	100	1554.89	(19/2⁻)	
4023.01	(19/2⁻)	710.4@		3312.60		
		2006.86	31	2016.13	(17/2⁻)	
		2468.1	100	1554.89	(19/2⁻)	
		2518.1	16	1504.88	(15/2⁻)	
4061.60	(21/2,23/2,25/2⁺)	591		3470.60	(21/2⁺)	
4342.11	(25/2,27/2,29/2⁺)	1108.80	100	3233.31	(25/2⁺)	
4393.19	(21/2⁻)	370.18	100	4023.01	(19/2⁻)	
		922.58	25	3470.60	(21/2⁺)	
		2185.0	48	2208.17	(19/2⁻)	
		2838.28	60	1554.89	(19/2⁻)	
4590.73	(27/2⁺)	248.61	5.0	4342.11	(25/2,27/2,29/2⁺)	
		1357.41	100	3233.31	(25/2⁺)	
4798.63	(23/2⁻)	405.44	100	4393.19	(21/2⁻)	
		775.62	10	4023.01	(19/2⁻)	
		1328.02	36	3470.60	(21/2⁺)	
5170.34	(25/2⁻)	371.70	100	4798.63	(23/2⁻)	
		777.14	47	4393.19	(21/2⁻)	
		829		4342.11	(25/2,27/2,29/2⁺)	
		1937.01	16	3233.31	(25/2⁺)	
5524.94	(27/2⁻)	354.60	100	5170.34	(25/2⁻)	
		726.30	31	4798.63	(23/2⁻)	
		2291.61	100	3233.31	(25/2⁺)	

Adopted Levels, Gammas (continued)

$\gamma(^{135}Te)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]
5641.33	(31/2$^-$)	1050.6	9.5	4590.73	(27/2$^+$)	[M2]
		2408.01	100	3233.31	(25/2$^+$)	[E3]
5790.15	(29/2$^-$)	265.21	100	5524.94	(27/2$^-$)	
		619.81	8.4	5170.34	(25/2$^-$)	
6109.39	(31/2$^-$)	319.25	100	5790.15	(29/2$^-$)	
		468.06	21	5641.33	(31/2$^-$)	
		584.46[@]		5524.94	(27/2$^-$)	
6151.56	(27/2$^-$,29/2,31/2$^+$)	512		5641.33	(31/2$^-$)	
		1560.8	100	4590.73	(27/2$^+$)	
6382.64	(31/2 to 35/2$^-$)	741.31	100	5641.33	(31/2$^-$)	
6454.74	(33/2$^-$)	345.35		6109.39	(31/2$^-$)	
		664.6[@]		5790.15	(29/2$^-$)	
6669.20	(35/2$^-$)	559.8		6109.39	(31/2$^-$)	

† Weighted averages of all available data. Most values are from either ^{135}Sb β^- decay for low-spin (J<11/2) levels and from ^{252}Cf SF decay for high-spin (J>9/2) levels.

‡ From $\gamma(\theta)$ in ^{134}Te(^{9}Be,^{8}Beγ),(^{13}C,^{12}Cγ), unless otherwise stated.

Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Placement of transition in the level scheme is uncertain.

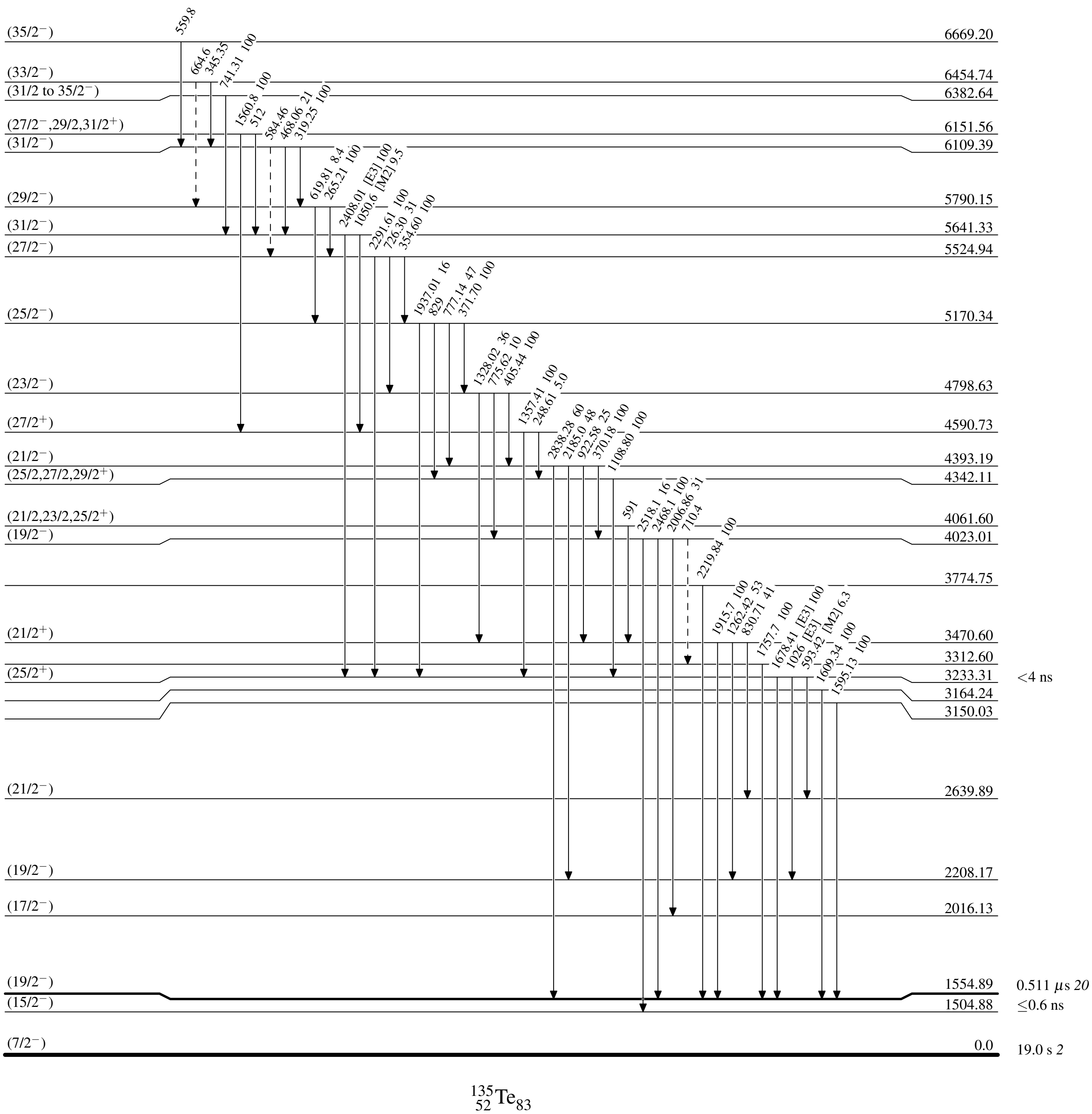
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



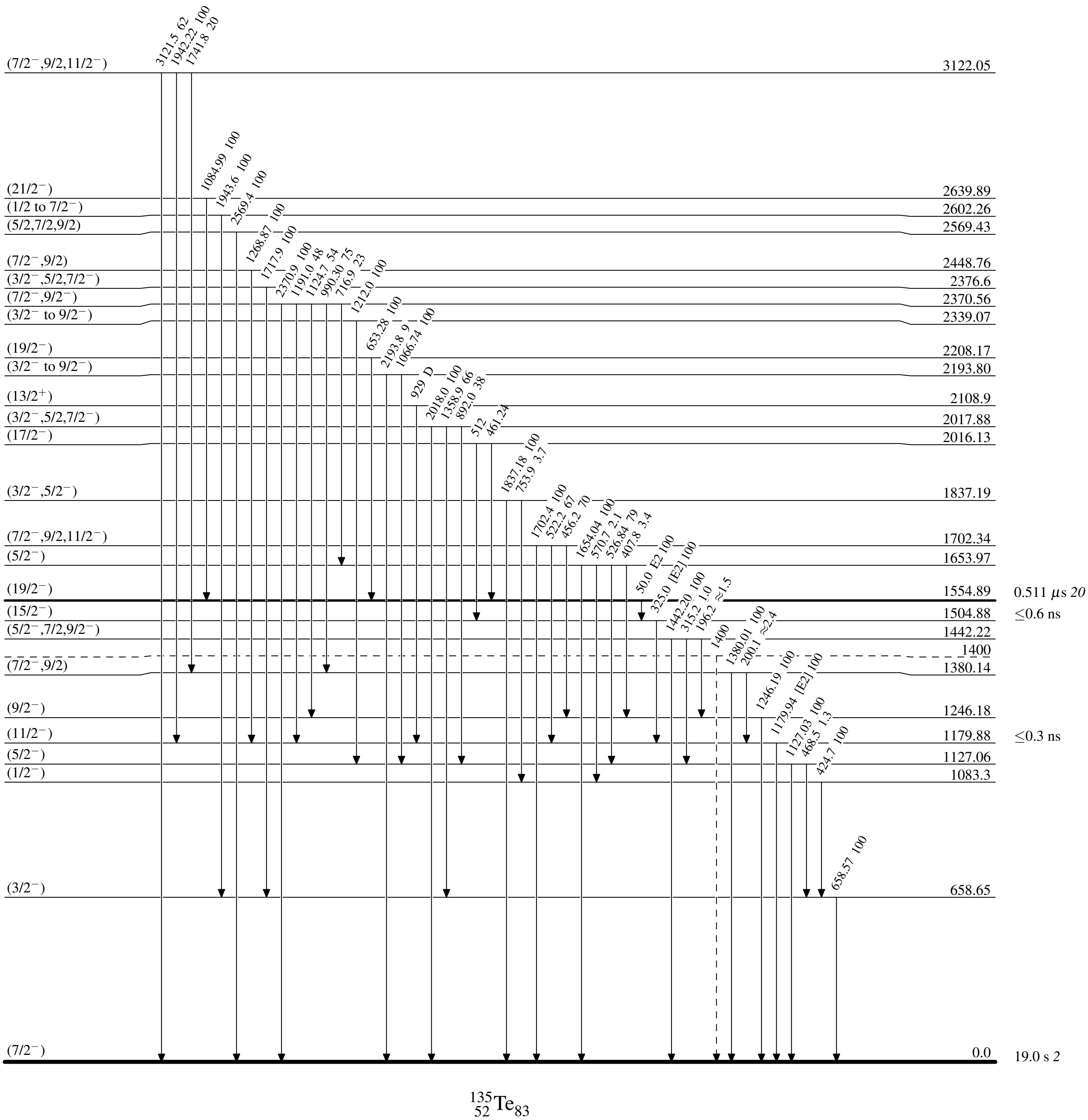
Adopted Levels, Gammas

Level Scheme (continued)

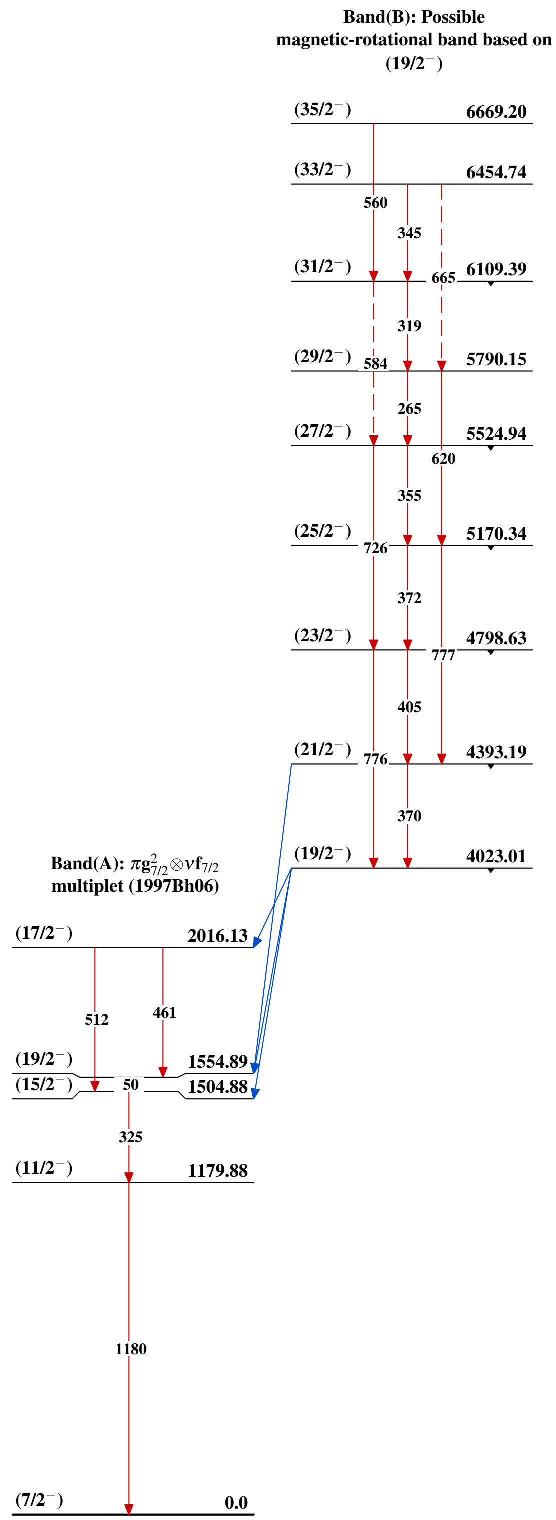
Intensities: Relative photon branching from each level

Legend

γ Decay (Uncertain)



Adopted Levels, Gammas



$^{135}_{52}Te_{83}$