^{148}Nd(^{19}F,4nγ),^{130}Te(^{37}Cl,4nγ) 1991Je04,1992JeZW

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich, Balraj Singh	NDS 111, 1211 (2010)	12-Apr-2010

Additional information 1.

1991Je04 (also 1992JeZW and 1994JeZZ): ^{148}Nd(^{19}F,4nγ), E=85 MeV, ^{130}Te(^{37}Cl,4nγ) E=166 MeV. Enriched targets. Nordball Ge detector array with BaF_2 total energy/multiplicity array. Measured γ, $\gamma\gamma$.

1997Mi24, 1995Le20 (also 1995He19): ^{130}Te(^{37}Cl,4nγ) E=166 MeV. Measured $\gamma\gamma$, $\gamma\gamma\gamma$ with Nordball array (19 Compton-suppressed Ge detectors and 39 BaF_2 inner ball detectors.) Study of γ-multiplicity, rotational transition strengths, and damping of rotational motion through the analysis of 2D and 3D $\gamma\gamma$ coincidence data. Lifetime data from DSAM reported by 1997Mi24.

The 1/2[541] α=−1/2 (unfavored) signature band with a reported (1992JeZW) E2 cascade (43/2$^-$ down to 15/2$^-$) 739-692-647-594-535-470-410 and dipole interband transitions of 781 (27/2$^-$ to 25/2$^-$), 742 (23/2$^-$ to 19/2$^-$), 680 (19/2$^-$ to 17/2$^-$), 584 (15/2$^-$ to 13/2$^-$) have been retracted (1994JeZZ). Also, 1991Je04 find no evidence for the 534.5 and 851.7 transitions which were suggested (1977Fo08) to depopulate the 15/2 and 19/2 states in this band.

^{163}Tm Levels

1997Mi24 give the following $T_{1/2}$ from Doppler-shift attenuation method for the ridge structures in the continuum region of the γ-ray spectrum: 0.25 ps *5* for 820 keV, 0.24 ps *7* for 880 keV and 0.20 ps *4* for the 940-keV ridges. These values correspond to B(E2)(W.u.)≈400.

E(level)†	Jπ‡	E(level)†	Jπ‡
0.0[c]	1/2$^+$	1661.5[c] *7*	(21/2$^+$)
13.54[b] *3*	3/2$^+$	1785.7[e] *3*	(25/2$^-$)
23.28 *6*	(7/2)$^+$	1803.9[f] *3*	(25/2$^-$)
86.90[d] *7*	(7/2)$^-$	1826.6[b] *4*	(23/2$^+$)
144.4[c] *4*	(5/2)$^+$	2046.3[d] *3*	(27/2$^-$)
174.60[e] *17*	(9/2)$^-$	2206.1[c] *8*	(25/2$^+$)
175.0[b] *3*	(7/2)$^+$	2356.4[e] *3*	(29/2$^-$)
217.15&[f] *4*	(1/2)$^-$&	2376.7[f] *3*	(29/2$^-$)
248.0?[af] *5*	(5/2$^-$)	2397.2[b] *3*	(27/2$^+$)
290.30[d] *17*	(11/2$^-$)	2626.2[d] *3*	(31/2$^-$)
369.1[f] *4*	(9/2$^-$)	2741.6[c] *10*	(29/2$^+$)
383.1[c] *4*	(9/2$^+$)	2921.0[e] *3*	(33/2$^-$)
436.9[e] *2*	(13/2$^-$)	2932.6[b] *5*	(31/2$^+$)
451.2[b] *3*	(11/2$^+$)	3014.5[f] *4*	(33/2$^-$)
586.5[f] *3*	(13/2$^-$)	3171.5[d] *4*	(35/2$^-$)
603.6[d] *2*	(15/2$^-$)	3206.5[c] *11*	(33/2$^+$)
728.0[c] *5*	(13/2$^+$)	3420.4[b] *6*	(35/2$^+$)
804.8[e] *2*	(17/2$^-$)	3427.7[e] *4*	(37/2$^-$)
829.7[b] *3*	(15/2$^+$)	3689.6[d] *4*	(39/2$^-$)
900.5[f] *3*	(17/2$^-$)	3713.6[f] *5*	(37/2$^-$)
1011.52[d] *24*	(19/2$^-$)	3722.2[c] *12*	(37/2$^+$)
1159.5[c] *6*	(17/2$^+$)	3964.8[b] *7*	(39/2$^+$)
1261.12[e] *24*	(21/2$^-$)	3967.6[e] *4*	(41/2$^-$)
1294.5[b] *4*	(19/2$^+$)	4266.4[d] *4*	(43/2$^-$)
1308.4[f] *3*	(21/2$^-$)	4319.8[c] *13*	(41/2$^+$)
1498.4[d] *3*	(23/2$^-$)	4443.2?[f] *7*	(41/2$^-$)

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^{148}Nd(^{19}F,4nγ),^{130}Te(^{37}Cl,4nγ) 1991Je04,1992JeZW (continued)

^{163}Tm Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	$T_{1/2}$
4586.6[e] 4	(45/2⁻)	5285.9[e] 4	(49/2⁻)	0.388[#] ps 14
4588.4[b] 7	(43/2⁺)	5740.3[c] 15	(49/2⁺)	
4918.5[d] 4	(47/2⁻)	6056.9?[@e]	(53/2⁻)	0.353[#] ps 21
4996.8[c] 14	(45/2⁺)	6569.3[c] 16	(53/2⁺)	
5172.2?[f] 9	(45/2⁻)	6844.9?[@e]	(57/2⁻)	0.347[#] ps 21

† From least-squares fit to Eγ's.
‡ From band assignment and deexcitation pattern, except as noted. Most of the assignments are given in parentheses (evaluators) since the details of $\gamma(\theta)$ and/or $\gamma\gamma(\theta)$ data are not available in the literature. See also Adopted Levels for assignments.
# From 1997Mi24. Doppler-shift attenuation method for 699γ, 771γ and 788γ assigned (1997Mi24) as transitions in an yrast band. It is assumed (evaluators) that the 699γ in 1997Mi24 is the same as the 49/2⁻ to 45/2⁻ transition in 1991Je04 and that the 771γ and 788γ form a cascade above the 49/2⁻ level.
@ Added by the evaluators assuming that the 771γ and 788γ from 1997Mi24 form the yrast members above the 49/2⁻ level.
& From Adopted Levels.
[a] This member of the π1/2[541] band was suggested to be a state at 253.4 in 1977Fo08.
[b] Band(A): π1/2[411] band, α=−1/2.
[c] Band(B): π1/2[411] band, α=+1/2.
[d] Band(C): π7/2[523] band, α=−1/2.
[e] Band(D): π7/2[523] band, α=+1/2.
[f] Band(E): π1/2[541] band, α=+1/2.

γ(^{163}Tm)

Uncertainties are assigned from a comment by 1994JeZZ stating the following: for the π1/2[411] band, 0.3 to 0.5 keV for positive signature and 0.2-0.3 keV for negative signature. For the π7/2[523] and π1/2[541] bands, 0.2 keV. For interband transitions, 0.3-0.5 keV.

Eγ†	E_i(level)	J^π_i	E_f	J^π_f	Eγ†	E_i(level)	J^π_i	E_f	J^π_f
9.74‡ 5	23.28	(7/2)⁺	13.54	3/2⁺	234.5[#b] 5	248.0?	(5/2⁻)	13.54	3/2⁺
13.53‡ 3	13.54	3/2⁺	0.0	1/2⁺	237.3 2	1498.4	(23/2⁻)	1261.12	(21/2⁻)
63.62‡ 3	86.90	(7/2)⁻	23.28	(7/2)⁺	238.7 5	383.1	(9/2⁺)	144.4	(5/2)⁺
87.7 2	174.60	(9/2)⁻	86.90	(7/2)⁻	243.2 3	829.7	(15/2⁺)	586.5	(13/2⁻)
115.7 2	290.30	(11/2⁻)	174.60	(9/2)⁻	249.6 2	1261.12	(21/2⁻)	1011.52	(19/2⁻)
121.1[#b] 2	369.1	(9/2⁻)	248.0?	(5/2⁻)	250.4 2	3171.5	(35/2⁻)	2921.0	(33/2⁻)
130.9 5	144.4	(5/2)⁺	13.54	3/2⁺	256.4 2	3427.7	(37/2⁻)	3171.5	(35/2⁻)
135.3 5	586.5	(13/2⁻)	451.2	(11/2⁺)	260.6 2	2046.3	(27/2⁻)	1785.7	(25/2⁻)
144.4 5	144.4	(5/2)⁺	0.0	1/2⁺	261.9 2	3689.6	(39/2⁻)	3427.7	(37/2⁻)
146.6 2	436.9	(13/2⁻)	290.30	(11/2⁻)	262.3 2	436.9	(13/2⁻)	174.60	(9/2)⁻
161.5 3	175.0	(7/2)⁺	13.54	3/2⁺	269.8 2	2626.2	(31/2⁻)	2356.4	(29/2⁻)
166.7 2	603.6	(15/2⁻)	436.9	(13/2⁻)	276.2 3	451.2	(11/2⁺)	175.0	(7/2)⁺
194.1 5	369.1	(9/2⁻)	175.0	(7/2)⁺	276.8 5	728.0	(13/2⁺)	451.2	(11/2⁺)
201.2 2	804.8	(17/2⁻)	603.6	(15/2⁻)	278.0 2	3967.6	(41/2⁻)	3689.6	(39/2⁻)
203.4 2	290.30	(11/2⁻)	86.90	(7/2)⁻	287.3 2	1785.7	(25/2⁻)	1498.4	(23/2⁻)
206.7 2	1011.52	(19/2⁻)	804.8	(17/2⁻)	294.7 2	2921.0	(33/2⁻)	2626.2	(31/2⁻)
208.1 5	383.1	(9/2⁺)	175.0	(7/2)⁺	298.8 2	4266.4	(43/2⁻)	3967.6	(41/2⁻)
217.4 2	586.5	(13/2⁻)	369.1	(9/2⁻)	310.1 2	2356.4	(29/2⁻)	2046.3	(27/2⁻)

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^{148}Nd(^{19}F,4nγ),^{130}Te(^{37}Cl,4nγ) 1991Je04,1992JeZW (continued)

γ(^{163}Tm) (continued)

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	E_i(level)	J_i^π	E_f	J_f^π
313.3 *2*	603.6	(15/2$^-$)	290.30	(11/2$^-$)	542.8[b] *5*	1803.9	(25/2$^-$)	1261.12	(21/2$^-$)
314.0 *2*	900.5	(17/2$^-$)	586.5	(13/2$^-$)	544.4 *3*	3964.8	(39/2$^+$)	3420.4	(35/2$^+$)
320.2 *2*	4586.6	(45/2$^-$)	4266.4	(43/2$^-$)	544.5 *5*	2921.0	(33/2$^-$)	2376.7	(29/2$^-$)
330[#&] *1*	1159.5	(17/2$^+$)	829.7	(15/2$^+$)	544.6 *5*	2206.1	(25/2$^+$)	1661.5	(21/2$^+$)
331.9 *2*	4918.5	(47/2$^-$)	4586.6	(45/2$^-$)	545.1 *2*	3171.5	(35/2$^-$)	2626.2	(31/2$^-$)
344.9 *5*	728.0	(13/2$^+$)	383.1	(9/2$^+$)	547.9 *2*	2046.3	(27/2$^-$)	1498.4	(23/2$^-$)
367[#&] *1*	1661.5	(21/2$^+$)	1294.5	(19/2$^+$)	552.5[b] *5*	2356.4	(29/2$^-$)	1803.9	(25/2$^-$)
367.4 *2*	5285.9	(49/2$^-$)	4918.5	(47/2$^-$)	564.5 *2*	2921.0	(33/2$^-$)	2356.4	(29/2$^-$)
367.9 *2*	804.8	(17/2$^-$)	436.9	(13/2$^-$)	570.7 *2*	2356.4	(29/2$^-$)	1785.7	(25/2$^-$)
378.5 *3*	829.7	(15/2$^+$)	451.2	(11/2$^+$)	570.7 *3*	2397.2	(27/2$^+$)	1826.6	(23/2$^+$)
394.0 *3*	1294.5	(19/2$^+$)	900.5	(17/2$^-$)	572.9 *2*	2376.7	(29/2$^-$)	1803.9	(25/2$^-$)
407.9 *2*	1011.52	(19/2$^-$)	603.6	(15/2$^-$)	576.8 *2*	4266.4	(43/2$^-$)	3689.6	(39/2$^-$)
407.9 *2*	1308.4	(21/2$^-$)	900.5	(17/2$^-$)	579.9 *2*	2626.2	(31/2$^-$)	2046.3	(27/2$^-$)
431.4 *5*	1159.5	(17/2$^+$)	728.0	(13/2$^+$)	591.1[#b] *5*	2376.7	(29/2$^-$)	1785.7	(25/2$^-$)
456.3 *2*	1261.12	(21/2$^-$)	804.8	(17/2$^-$)	593.4 *3*	2397.2	(27/2$^+$)	1803.9	(25/2$^-$)
464.8 *3*	1294.5	(19/2$^+$)	829.7	(15/2$^+$)	597.6 *5*	4319.8	(41/2$^+$)	3722.2	(37/2$^+$)
464.9 *5*	3206.5	(33/2$^+$)	2741.6	(29/2$^+$)	619.0 *2*	4586.6	(45/2$^-$)	3967.6	(41/2$^-$)
477.3 *5*	1785.7	(25/2$^-$)	1308.4	(21/2$^-$)	623.6 *3*	4588.4	(43/2$^+$)	3964.8	(39/2$^+$)
486.9 *2*	1498.4	(23/2$^-$)	1011.52	(19/2$^-$)	637.7 *2*	3014.5	(33/2$^-$)	2376.7	(29/2$^-$)
487.8 *3*	3420.4	(35/2$^+$)	2932.6	(31/2$^+$)	652.1 *2*	4918.5	(47/2$^-$)	4266.4	(43/2$^-$)
495.5 *2*	1803.9	(25/2$^-$)	1308.4	(21/2$^-$)	658.1 *5*	3014.5	(33/2$^-$)	2356.4	(29/2$^-$)
502.0 *5*	1661.5	(21/2$^+$)	1159.5	(17/2$^+$)	677.0 *5*	4996.8	(45/2$^+$)	4319.8	(41/2$^+$)
506.8 *2*	3427.7	(37/2$^-$)	2921.0	(33/2$^-$)	699.1 *2*	3713.6	(37/2$^-$)	3014.5	(33/2$^-$)
515.7 *5*	3722.2	(37/2$^+$)	3206.5	(33/2$^+$)	699.3 *2*	5285.9	(49/2$^-$)	4586.6	(45/2$^-$)
518.2 *3*	1826.6	(23/2$^+$)	1308.4	(21/2$^-$)	729.0[@b] *5*	5172.2?	(45/2$^-$)	4443.2?	(41/2$^-$)
518.3 *2*	3689.6	(39/2$^-$)	3171.5	(35/2$^-$)	729.6[b] *5*	4443.2?	(41/2$^-$)	3713.6	(37/2$^-$)
524.6 *2*	1785.7	(25/2$^-$)	1261.12	(21/2$^-$)	743.5 *5*	5740.3	(49/2$^+$)	4996.8	(45/2$^+$)
532.1 *3*	1826.6	(23/2$^+$)	1294.5	(19/2$^+$)	771[ab]	6056.9?	(53/2$^-$)	5285.9	(49/2$^-$)
535.3 *3*	2932.6	(31/2$^+$)	2397.2	(27/2$^+$)	788	6844.9?	(57/2$^-$)	6056.9?	(53/2$^-$)
535.5 *5*	2741.6	(29/2$^+$)	2206.1	(25/2$^+$)	829.0[ab] *5*	6569.3	(53/2$^+$)	5740.3	(49/2$^+$)
539.9 *2*	3967.6	(41/2$^-$)	3427.7	(37/2$^-$)					

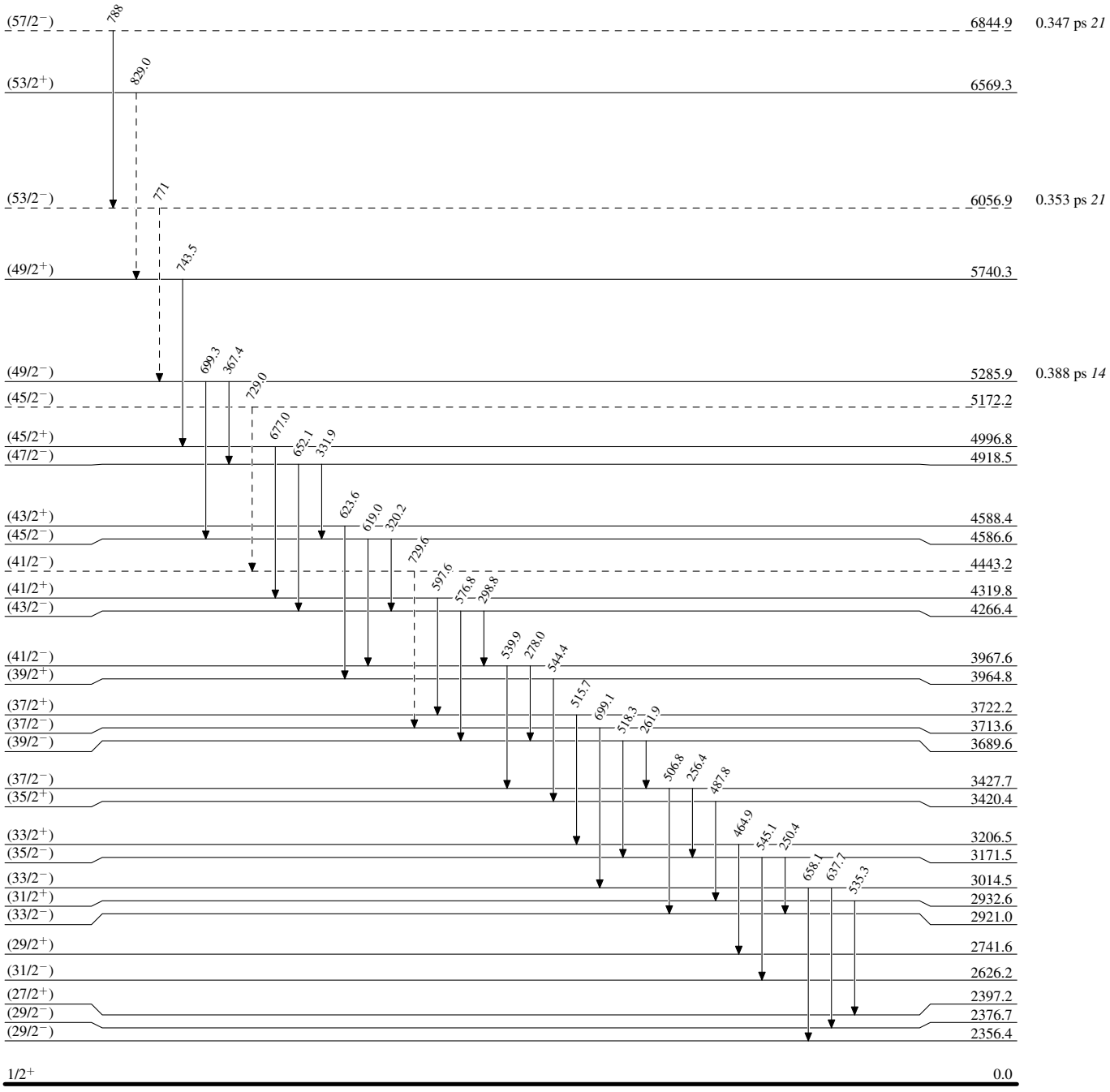
† From 1991Je04 for the π7/2[523] and π1/2[541] bands; from 1992JeZW for the π1/2[411] band.
‡ From the Adopted Gammas.
# Weak γ.
@ Revised transition from 1994JeZZ. Earlier the 45/2$^-$ to 41/2$^-$ transition was given (1991Je04) as 656.6.
& From level energy difference.
a From 1997Mi24.
b Placement of transition in the level scheme is uncertain.

Legend

^{148}Nd(^{19}F,4nγ),^{130}Te(^{37}Cl,4nγ) 1991Je04,1992JeZW

Level Scheme

γ Decay (Uncertain)



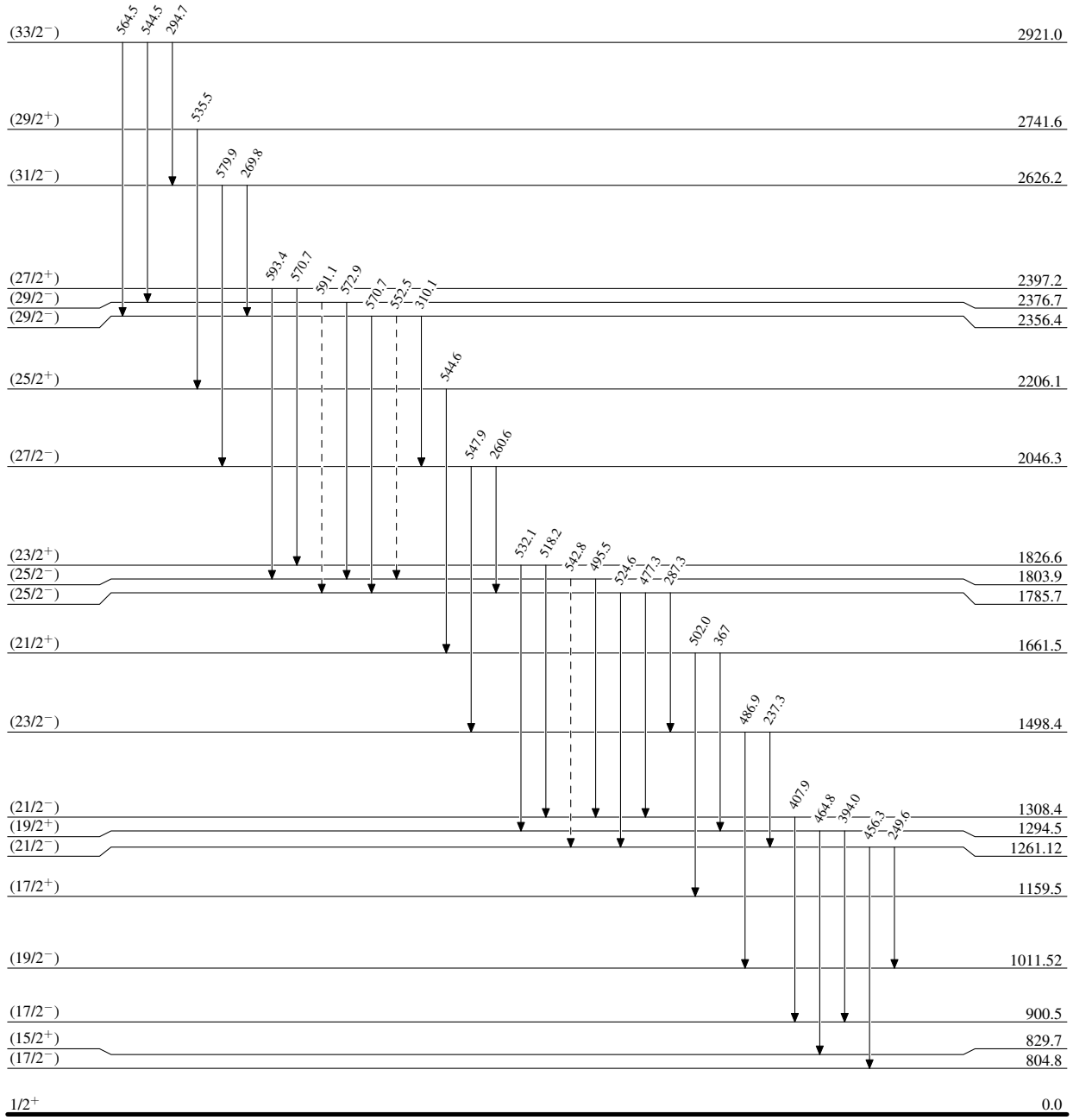
$^{163}_{69}Tm_{94}$

^{148}**Nd(**^{19}**F,4n**γ**),**^{130}**Te(**^{37}**Cl,4n**γ**)** **1991Je04,1992JeZW**

Legend

γ Decay (Uncertain)

Level Scheme (continued)



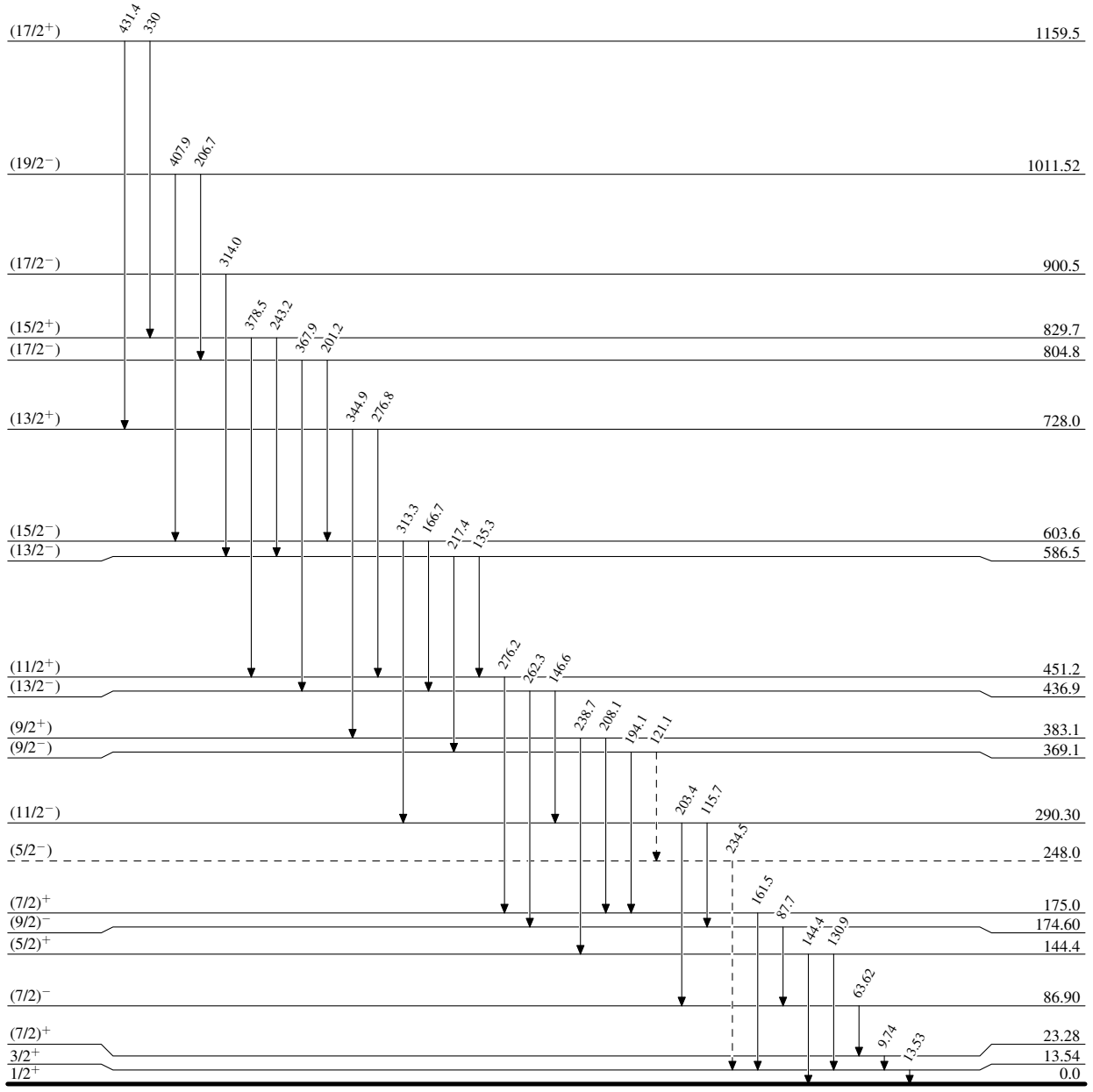
$^{163}_{69}Tm_{94}$

Legend

^{148}Nd(^{19}F,4nγ),^{130}Te(^{37}Cl,4nγ) 1991Je04,1992JeZW

Level Scheme (continued)

γ Decay (Uncertain)



$^{163}_{69}Tm_{94}$

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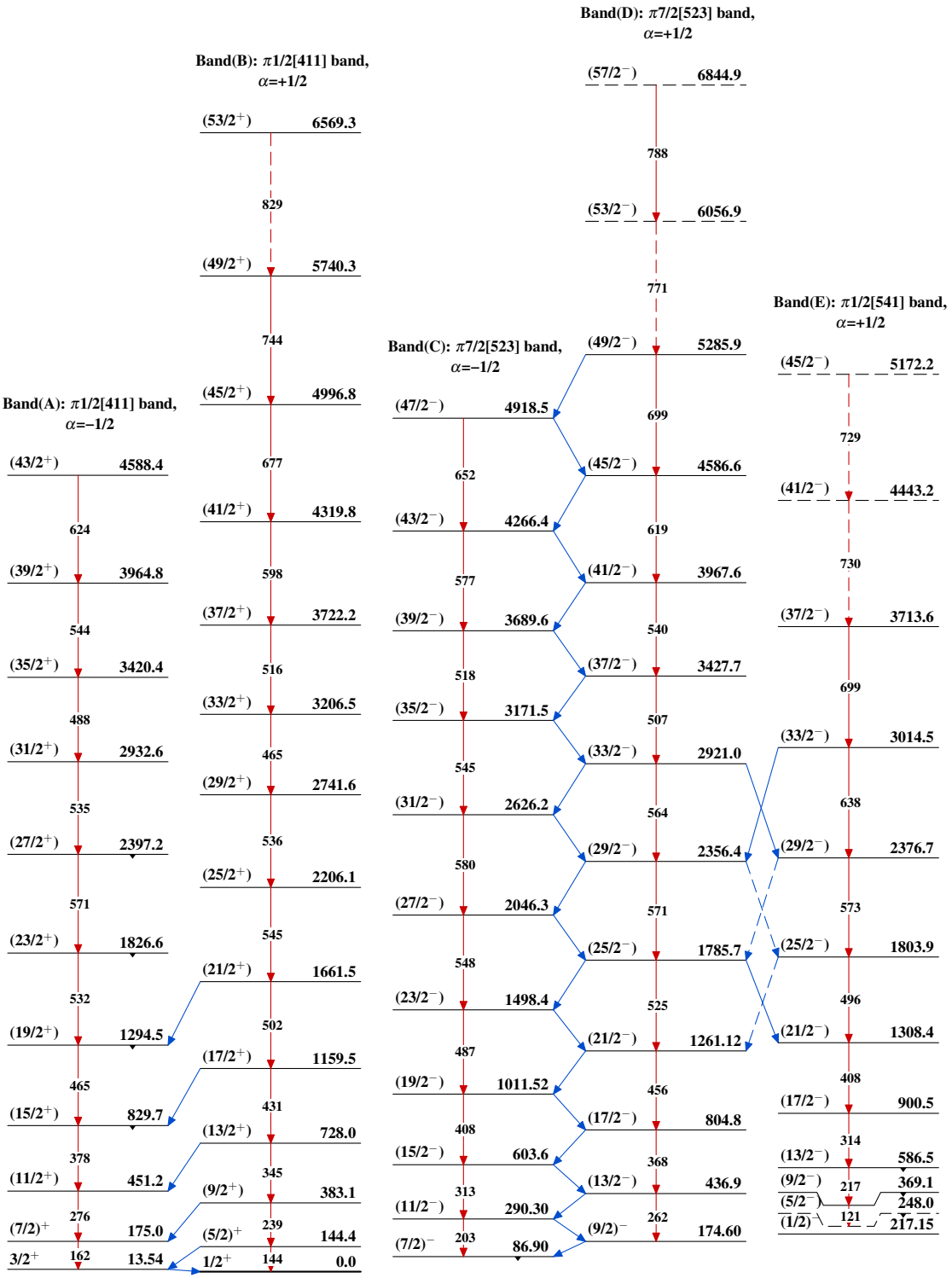

$^{163}_{69}Tm_{94}$