^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 126, 151 (2015)	1-Feb-2015

^{170}Er(^{14}N,4nγ): E(^{14}N)=71 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$(t), $\gamma\gamma(\theta)$(DCO) using OSIRIS spectrometer consisting of six Compton-suppressed HPGe detectors. Measured E(ce), I(ce) (in energy range of 200-600 keV) using a mini-orange spectrometer; deduced conversion coefficients.

^{181}Ta(α,5nγ): E(α)=35-90 MeV. Measured Eγ, Iγ, excitation function, $\gamma\gamma$, $\gamma\gamma$(t), $\gamma(\theta)$ using four Ge(Li) detectors and four BGO detectors (filter for high-multiplicity cascades).

^{180}Re Levels

The ^{180}Re level scheme consists of three groups of levels (and rotational bands) with no γ-ray transitions interconnecting them, where six well-identified rotational bands, and one uncertain one, have been identified. The corresponding level energies are on different scales unrelated to the ground state.

Configuration assignments are based on energy systematics of Nilsson orbitals in neighboring odd-A nuclei; on the comparison of gyromagnetic ratios deduced from experimental γ-ray branchings and mixing ratios with theoretical values calculated for various quasiparticle Nilsson configurations; and on a comparison of rotational band alignments with values for neighboring odd-proton and odd-neutron nuclei. Spin and configuration assignments should be considered tentative, because the de-excitation of the bandheads to ^{180}Re g.s. is unknown.

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[f]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
0.0+x	$(4^-,5^-)$		2231.7+x[@] 3	(12^+)	25.0+y[b] 4	(3^-)
92.2+x 2	(6^-)		2239.5+x[#] 3	(14^-)	78.1+y[c] 2	(2^-)
134.6+x[#] 2	(6^-)		2290.9+x[&] 4	(13^-)	117.2+y[b] 3	(4^-)
213.4+x[a] 2	(7^+)	73 ns 3	2350.5+x 3	(13^+)	184.5+y[c] 2	(3^-)
343.4+x[#] 2	(7^-)		2403.7+x 3	(14^-)	266.6+y[b] 3	(5^-)
347.8+x[a] 2	(8^+)		2462.4+x[a] 3	(16^+)	318.0+y[c] 2	(4^-)
524.6+x[a] 2	(9^+)		2546.6+x[#] 3	(15^-)	449.2+y[b] 3	(6^-)
571.9+x[#] 2	(8^-)		2558.8+x[@] 3	(13^+)	477.5+y[c] 2	(5^-)
734.6+x[a] 2	(10^+)		2582.3+x[&] 4	(14^-)	651.0+y[c] 3	(6^-)
817.8+x[#] 2	(9^-)		2639.7+x 3	(14^+)	670.0+y[b] 3	(7^-)
972.2+x[a] 2	(11^+)		2801.9+x[a] 3	(17^+)	860.1+y[c] 3	(7^-)
1079.3+x[#] 2	(10^-)		2851.9+x[#] 3	(16^-)	903.5+y[b] 3	(8^-)
1233.7+x[a] 2	(12^+)		2878.3+x[@] 3	(14^+)	1086.7+y[c] 3	(8^-)
1332.3+x 2	(10^+)		2889.8+x[&] 4	(15^-)	1159.2+y[b] 3	(9^-)
1354.7+x[#] 2	(11^-)		3139.1+x[a] 3	(18^+)	1333.8+y[c] 4	(9^-)
1496.0+x[e] 2	(11^-)	70 ns 3	3164.8+x[#] 3	(17^-)	1436.9+y[b] 3	(10^-)
1516.7+x[a] 2	(13^+)		3203.0+x[@] 4	(15^+)	1597.9+y[c] 5	(10^-)
1630.4+x[@] 2	(10^+)		3214.3+x[&] 4	(16^-)	1722.7+y[b] 4	(11^-)
1641.4+x[#] 2	(12^-)		3480.8+x[a] 3	(19^+)	1881.1+y[c] 5	(11^-)
1750.8+x[&] 4	(11^-)		3543.8+x[@] 4	(16^+)	2029.9+y[b] 4	(12^-)
1776.4+x 2	(12^-)		3555.5+x[&] 4	(17^-)	2177.4+y[c] 5	(12^-)
1818.0+x[a] 3	(14^+)		3791.0+x[a] 3	(20^+)	2330.2+y[b] 5	(13^-)
1859.4+x 3	(11^+)		3913.1+x[&] 4	(18^-)	2492.0+y[c] 6	(13^-)
1920.9+x[@] 3	(11^+)		4135.0+x[a] 3	(21^+)	2815.5+y[c] 6	(14^-)
1937.6+x[#] 3	(13^-)		4287.8+x[&] 5	(19^-)	3158.1+y[c] 7	(15^-)
2014.6+x[&] 4	(12^-)		4454.9+x[a] 4	(22^+)	3505.1+y[c] 8	(16^-)
2077.9+x 3	(13^-)		4677.1+x[&] 5	(20^-)	3866.0+y[c] 8	(17^-)
2090.6+x 3	(12^+)		4818.1+x[a] 4	(23^+)	0.0+z[d]	(7^-)
2135.0+x[a] 3	(15^+)		0.0+y	(1^-)	89.0+z[d] 2	(8^-)

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^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07 (continued)

^{180}Re Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]	E(level)[†]	J$^{\pi}$[‡]
193.5+z[d] *2*	(9$^-$)	725.0+z[d] *3*	(12$^-$)	1408.4+z[d] *3*	(15$^-$)	2689.6+z[d] *5*	(19$^-$)
349.3+z[d] *2*	(10$^-$)	902.1+z[d] *3*	(13$^-$)	1791.9+z[d] *3*	(16$^-$)	3438.4+z[d] *6*	(21$^-$)
494.9+z[d] *2*	(11$^-$)	1209.4+z[d] *3*	(14$^-$)	2008.8+z[d] *4*	(17$^-$)		

[†] From a least-squares fit to Eγ, except where noted.
[‡] Spin and parity assignments proposed by 1990Ve07; based on measured γ-ray multipolarities, decay patterns, angular distribution measurements, assumed band structure and comparison of gyromagnetic ratios deduced from experimental γ-ray branchings and mixing ratios with theoretical values calculated for various quasiparticle Nilsson configurations. Assignments differ from those proposed in ^{176}Yb(^{10}B,6nγ),^{174}Yb(^{11}B,5nγ). See the Adopted Levels for values adopted by the evaluator.
[#] K^{π}=(6$^-$) two quasiparticle band. Configuration=((π5/2[402])(ν7/2[514])) singlet.
[@] K^{π}=(10$^+$) four quasi-particle band. Configuration=((π5/2[402])(π7/2[404])(π1/2[541])(ν7/2[514]))10$^+$.
[&] K^{π}=(11$^-$) four quasi-particle band. Configuration=((π5/2[402])(π7/2[404])(π1/2[541])(ν9/2[624]))11$^-$.
[a] K^{π}=(7$^+$) two quasiparticle band. Configuration=((π5/2[402])(ν9/2[624])) triplet.
[b] K^{π}=(3$^-$) two quasiparticle band. Configuration=((π5/2[402])(ν1/2[521])) singlet.
[c] K^{π}=(2$^-$) two quasiparticle band. Configuration=((π5/2[402])(ν1/2[521])) triplet.
[d] K^{π}=(7$^-$) two quasiparticle band. Configuration=((π1/2[541])(ν9/2[624])).
[e] Configuration=((π5/2[402])(π9/2[514])(π1/2[541])(ν7/2[514])) 11$^-$.
[f] From $\gamma\gamma$(t) measurement.

γ(^{180}Re)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.[#]	δ[#]	α[&]	Comments
(25.0)		25.0+y	(3$^-$)	0.0+y	(1$^-$)				
42.6 *3*	8.0 *4*	134.6+x	(6$^-$)	92.2+x	(6$^-$)				
[x]54.0[‡] *4*									
78.1 *3*		78.1+y	(2$^-$)	0.0+y	(1$^-$)				
78.6 *3*	31 *6*	213.4+x	(7$^+$)	134.6+x	(6$^-$)	E1		0.718	α(exp)=0.8 *3* from transition intensity balance. Mult.: D from $\gamma(\theta)$; E1 from α(exp).
88.9 *4*	13 *3*	89.0+z	(8$^-$)	0.0+z	(7$^-$)	D(+Q)	−0.04 *4*		
92.2[a] *2*	52[a] *5*	92.2+x	(6$^-$)	0.0+x	(4$^-$,5$^-$)	M1			α(exp)=7.2 *4* from transition intensity balance. Mult.: from α(exp).
92.2[a] *2*	52[a] *5*	117.2+y	(4$^-$)	25.0+y	(3$^-$)	(D+Q)			
104.3 *2*	20 *3*	193.5+z	(9$^-$)	89.0+z	(8$^-$)	D(+Q)	−0.02 *4*		
106.3 *2*	15 *4*	184.5+y	(3$^-$)	78.1+y	(2$^-$)	D+Q	−0.10 *9*		
120.4 *3*	47 *7*	1750.8+x	(11$^-$)	1630.4+x	(10$^+$)	E1		0.240	α(exp)=0.4 *2* from transition intensity balance. Mult.: D from $\gamma(\theta)$; E1 from α(exp).
121.3 *3*	195 *16*	213.4+x	(7$^+$)	92.2+x	(6$^-$)	E1		0.235	α(exp)=0.2 *2* from transition intensity balance. Mult.: D from $\gamma(\theta)$; E1 from α(exp).
133.2 *3*	8 *3*	318.0+y	(4$^-$)	184.5+y	(3$^-$)	D(+Q)	−0.05 *6*		
134.2 *1*	83 *12*	1630.4+x	(10$^+$)	1496.0+x	(11$^-$)	E1		0.180	α(exp)=0.4 *1* from transition intensity balance. Mult.: from α(exp).
134.4 *1*	73 *7*	347.8+x	(8$^+$)	213.4+x	(7$^+$)	D+Q[@]			

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^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07 (continued)

γ(^{180}Re) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	α[&]	Comments
134.5 3	36 22	134.6+x	(6⁻)	0.0+x	(4⁻,5⁻)	M1+E2			α(exp)=2.0 8 from transition intensity balance. Mult.: from α(exp).
141.3 2	5.7 13	1496.0+x	(11⁻)	1354.7+x	(11⁻)	M1		1.99	α(exp)=2.1 3 from transition intensity balance. Mult.: from α(exp).
145.6 2	12.3 24	494.9+z	(11⁻)	349.3+z	(10⁻)				
149.3 2	49 11	266.6+y	(5⁻)	117.2+y	(4⁻)	D+Q	+0.23 2		
155.6 2	17 3	349.3+z	(10⁻)	193.5+z	(9⁻)				
159.4 2	5.1 17	477.5+y	(5⁻)	318.0+y	(4⁻)	D+Q	−0.37 23		
163.9 1	10.3 17	1496.0+x	(11⁻)	1332.3+x	(10⁺)	E1		0.108	α(exp)=0.4 3 from transition intensity balance. Mult.: from α(exp).
173.4 2	3.8 13	651.0+y	(6⁻)	477.5+y	(5⁻)	D+Q	−1.3 10		
176.7 1	90 7	524.6+x	(9⁺)	347.8+x	(8⁺)	D+Q	+0.20 2		
177.0 2	6.9 17	902.1+z	(13⁻)	725.0+z	(12⁻)				
182.5 2	43 7	449.2+y	(6⁻)	266.6+y	(5⁻)	D+Q	+0.41 9		
184.5 2	22 4	184.5+y	(3⁻)	0.0+y	(1⁻)	Q			
193.5 2	7.2 12	193.5+z	(9⁻)	0.0+z	(7⁻)				
198.9 2	1.5 6	1408.4+z	(15⁻)	1209.4+z	(14⁻)				
201.6 3	7.7 17	651.0+y	(6⁻)	449.2+y	(6⁻)				
208.8 1	82 9	343.4+x	(7⁻)	134.6+x	(6⁻)	D+Q	+0.21 2		
210.0 1	66 7	734.6+x	(10⁺)	524.6+x	(9⁺)	D+Q	+0.25 3		
211.1 3	8.9 18	477.5+y	(5⁻)	266.6+y	(5⁻)				
220.7 2	20 3	670.0+y	(7⁻)	449.2+y	(6⁻)	D+Q	+0.23 3		
228.4 1	74 7	571.9+x	(8⁻)	343.4+x	(7⁻)	D+Q	+0.28 5		
229.0 1	15.0 13	1859.4+x	(11⁺)	1630.4+x	(10⁺)				
230.1 2	12.0 24	725.0+z	(12⁻)	494.9+z	(11⁻)				
231.2 1	8.1 11	2090.6+x	(12⁺)	1859.4+x	(11⁺)	D+Q	+0.34 8		
233.3 2	13.0 20	903.5+y	(8⁻)	670.0+y	(7⁻)				
237.5 1	46 5	972.2+x	(11⁺)	734.6+x	(10⁺)	D+Q	+0.27 4		
240.1 2	35 7	318.0+y	(4⁻)	78.1+y	(2⁻)	Q			
241.3 4	10 3	266.6+y	(5⁻)	25.0+y	(3⁻)				
246.0 1	54 5	817.8+x	(9⁻)	571.9+x	(8⁻)	D+Q	+0.20 2		
251.1 3	5.8 9	343.4+x	(7⁻)	92.2+x	(6⁻)				
252.3 3	7.5 15	903.5+y	(8⁻)	651.0+y	(6⁻)				
255.6 2	7.4 16	1159.2+y	(9⁻)	903.5+y	(8⁻)				
259.9 1	5.6 6	2350.5+x	(13⁺)	2090.6+x	(12⁺)				
260.4 2	11.1 21	349.3+z	(10⁻)	89.0+z	(8⁻)	Q			
261.5[a] 1	42[a] 7	1079.3+x	(10⁻)	817.8+x	(9⁻)				
261.5[a] 1	42[a] 7	1233.7+x	(12⁺)	972.2+x	(11⁺)	D+Q[@]			
262.4 1	5 3	1496.0+x	(11⁻)	1233.7+x	(12⁺)				
263.8 1	37 3	2014.6+x	(12⁻)	1750.8+x	(11⁻)	D+Q	+0.50 16		
275.3 1	17.9 20	1354.7+x	(11⁻)	1079.3+x	(10⁻)	D+Q	+0.33 7		
276.3 1	19.8 17	2290.9+x	(13⁻)	2014.6+x	(12⁻)	D+Q	+0.6 3		
277.6 2	4.8 10	1436.9+y	(10⁻)	1159.2+y	(9⁻)	D+Q	+0.19 3		
280.2 1	4.0 7	1776.4+x	(12⁻)	1496.0+x	(11⁻)	D+Q	+2.2 7		
283.1 1	22.4 25	1516.7+x	(13⁺)	1233.7+x	(12⁺)	D+Q	+0.15 4		
286.1 4	4.9 10	1722.7+y	(11⁻)	1436.9+y	(10⁻)	D+Q			
286.7 1	5.7 11	1641.4+x	(12⁻)	1354.7+x	(11⁻)	D+Q	+0.34 8		
289.2 2	2.8 6	2639.7+x	(14⁺)	2350.5+x	(13⁺)				
290.5 1	21.0 19	1920.9+x	(11⁺)	1630.4+x	(10⁺)				
291.4 1	9.6 16	2582.3+x	(14⁻)	2290.9+x	(13⁻)	D+Q	+0.47 14		
293.0 2	29 5	477.5+y	(5⁻)	184.5+y	(3⁻)	Q			
296.2 1	6.2 18	1937.6+x	(13⁻)	1641.4+x	(12⁻)	D+Q	+0.10 2		

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$^{170}Er(^{14}N,4n\gamma),^{181}Ta(\alpha,5n\gamma)$ 1990Ve07 (continued)

$\gamma(^{180}Re)$ (continued)

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ#	α&	Comments
300.6 *5*	2.0 *10*	2330.2+y	(13⁻)	2029.9+y	(12⁻)				
301.2 *1*	14.6 *16*	1818.0+x	(14⁺)	1516.7+x	(13⁺)	(D+Q)			
301.5 *2*	15.9 *22*	494.9+z	(11⁻)	193.5+z	(9⁻)	(Q)			
301.6 *2*	3.0 *6*	2077.9+x	(13⁻)	1776.4+x	(12⁻)				
302.0 *2*	4.0 *13*	2239.5+x	(14⁻)	1937.6+x	(13⁻)				
305.2 *2*	2.2 *5*	2851.9+x	(16⁻)	2546.6+x	(15⁻)				
307.2 *2*	2.8 *5*	2546.6+x	(15⁻)	2239.5+x	(14⁻)				
307.4 *2*	3.6 *10*	1209.4+z	(14⁻)	902.1+z	(13⁻)				
307.5 *1*	5.9 *6*	2889.8+x	(15⁻)	2582.3+x	(14⁻)				
307.5 *3*	3.1 *12*	2029.9+y	(12⁻)	1722.7+y	(11⁻)				
310.1 *2*	1.8 *8*	3791.0+x	(20⁺)	3480.8+x	(19⁺)	D+Q@			
310.8 *1*	7.0 *7*	2231.7+x	(12⁺)	1920.9+x	(11⁺)				
311.2 *2*	9.6 *14*	524.6+x	(9⁺)	213.4+x	(7⁺)				
312.7 *2*	1.6 *4*	3164.8+x	(17⁻)	2851.9+x	(16⁻)				
317.0 *2*	8.2 *14*	2135.0+x	(15⁺)	1818.0+x	(14⁺)	D+Q	+0.42 *14*		
319.6 *2*	2.0 *9*	2878.3+x	(14⁺)	2558.8+x	(13⁺)				
319.8 *2*	1.1 *5*	4454.9+x	(22⁺)	4135.0+x	(21⁺)	D+Q@			
324.6 *2*	4.7 *13*	3214.3+x	(16⁻)	2889.8+x	(15⁻)	D+Q	+0.53 *21*		
325.7 *2*	1.2 *6*	2403.7+x	(14⁻)	2077.9+x	(13⁻)				
327.1 *2*	4.6 *7*	2558.8+x	(13⁺)	2231.7+x	(12⁺)	(D+Q)			
327.3 *2*	5.1 *10*	2462.4+x	(16⁺)	2135.0+x	(15⁺)	(D+Q)			
332.6 *4*	23 *3*	449.2+y	(6⁻)	117.2+y	(4⁻)	Q			
333.2 *2*	35 *6*	651.0+y	(6⁻)	318.0+y	(4⁻)	Q			
337.2 *2*	3.1 *10*	3139.1+x	(18⁺)	2801.9+x	(17⁺)	D+Q@			
339.6 *2*	4.9 *11*	2801.9+x	(17⁺)	2462.4+x	(16⁺)	D+Q@			
341.0 *1*	3.4 *12*	3555.5+x	(17⁻)	3214.3+x	(16⁻)				
341.5 *2*	2.6 *10*	3480.8+x	(19⁺)	3139.1+x	(18⁺)	D+Q@			
344.0 *2*	1.3 *5*	4135.0+x	(21⁺)	3791.0+x	(20⁺)	D+Q@			
357.5 *2*	1.6 *6*	3913.1+x	(18⁻)	3555.5+x	(17⁻)				
363.0 *2*	0.4 *2*	4818.1+x	(23⁺)	4454.9+x	(22⁺)	D+Q@			
374.7 *2*	0.9 *4*	4287.8+x	(19⁻)	3913.1+x	(18⁻)				
375.7 *2*	18 *3*	725.0+z	(12⁻)	349.3+z	(10⁻)	Q			
382.6 *3*	29 *3*	860.1+y	(7⁻)	477.5+y	(5⁻)	Q			
384.5 *3*	13.7 *22*	651.0+y	(6⁻)	266.6+y	(5⁻)				
386.9 *1*	20.2 *21*	734.6+x	(10⁺)	347.8+x	(8⁺)	Q			
389.1 *2*	0.9 *6*	4677.1+x	(20⁻)	4287.8+x	(19⁻)				
403.4 *2*	14 *3*	670.0+y	(7⁻)	266.6+y	(5⁻)				
407.3 *2*	24 *4*	902.1+z	(13⁻)	494.9+z	(11⁻)				
410.9 *3*	9.9 *15*	860.1+y	(7⁻)	449.2+y	(6⁻)				
416.7 *3*	4.7 *12*	1086.7+y	(8⁻)	670.0+y	(7⁻)				
416.8 *1*	34 *3*	1496.0+x	(11⁻)	1079.3+x	(10⁻)	M1		0.1018	α(K)exp=0.090 *20*. Mult.: from α(K)exp.
435.7 *3*	23 *4*	1086.7+y	(8⁻)	651.0+y	(6⁻)	Q			
437.3 *1*	10.3 *21*	571.9+x	(8⁻)	134.6+x	(6⁻)	Q			
447.6 *1*	24 *3*	972.2+x	(11⁺)	524.6+x	(9⁺)	E2			α(K)exp=0.018 *4*. Mult.: Q from γ(θ); E2 from α(K)exp.
454.3 *2*	18 *3*	903.5+y	(8⁻)	449.2+y	(6⁻)	Q			
ˣ457.2‡ *2*									
460.4 *2*	2.4 *4*	2090.6+x	(12⁺)	1630.4+x	(10⁺)				
473.7 *3*	17.0 *23*	1333.8+y	(9⁻)	860.1+y	(7⁻)	(Q)			
474.4 *2*	21.5 *23*	817.8+x	(9⁻)	343.4+x	(7⁻)	E2		0.0251	α(K)exp=0.019 *4*. Mult.: Q from γ(θ); E2 from α(K)exp.

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^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07 (continued)

γ(^{180}Re) (continued)

E_γ †	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Mult.#	α&	Comments
484.3 2	15.0 21	1209.4+z	(14⁻)	725.0+z	(12⁻)	Q		
489.4 2	10.6 21	1159.2+y	(9⁻)	670.0+y	(7⁻)			
491.0 2	3.1 6	2350.5+x	(13⁺)	1859.4+x	(11⁺)			
499.0 1	24.4 24	1233.7+x	(12⁺)	734.6+x	(10⁺)			
506.4 2	18 3	1408.4+z	(15⁻)	902.1+z	(13⁻)	Q		
507.4 1	18.8 20	1079.3+x	(10⁻)	571.9+x	(8⁻)			
511.2 3	19 3	1597.9+y	(10⁻)	1086.7+y	(8⁻)			
524.0 2	12.4 21	1496.0+x	(11⁻)	972.2+x	(11⁺)			
533.6 4	9.4 24	1436.9+y	(10⁻)	903.5+y	(8⁻)	Q		
536.9 1	9.3 14	1354.7+x	(11⁻)	817.8+x	(9⁻)	Q		
540.1 1	5.8 5	2290.9+x	(13⁻)	1750.8+x	(11⁻)	Q		
544.5 1	17.2 17	1516.7+x	(13⁺)	972.2+x	(11⁺)	Q		
547.3 3	12.0 16	1881.1+y	(11⁻)	1333.8+y	(9⁻)			
549.0 2	2.7 5	2639.7+x	(14⁺)	2090.6+x	(12⁺)	Q		
562.0 2	4.4 6	1641.4+x	(12⁻)	1079.3+x	(10⁻)	Q	0.0166	
563.4 2	6.8 14	1722.7+y	(11⁻)	1159.2+y	(9⁻)			
567.7 2	6.6 9	2582.3+x	(14⁻)	2014.6+x	(12⁻)	Q		
579.5 3	10.4 19	2177.4+y	(12⁻)	1597.9+y	(10⁻)	Q		
581.3 2	4.7 8	2077.9+x	(13⁻)	1496.0+x	(11⁻)			
582.5 2	7.2 17	1791.9+z	(16⁻)	1209.4+z	(14⁻)			
583.0 2	5.0 11	1937.6+x	(13⁻)	1354.7+x	(11⁻)	Q		
584.4 2	16.9 19	1818.0+x	(14⁺)	1233.7+x	(12⁺)	E2	0.0152	α(K)exp=0.009 3. Mult.: Q from γ(θ); E1 from α(K)exp.
592.7 5	5.4 18	2029.9+y	(12⁻)	1436.9+y	(10⁻)			
598.1 2	2.4 6	2239.5+x	(14⁻)	1641.4+x	(12⁻)	(Q)		
599.0 2	5.0 10	2889.8+x	(15⁻)	2290.9+x	(13⁻)	(Q)		
600.4 3	10.5 18	2008.8+z	(17⁻)	1408.4+z	(15⁻)			
601.2 2	5.2 6	2231.7+x	(12⁺)	1630.4+x	(10⁺)			
607.2 5	4.3 10	2330.2+y	(13⁻)	1722.7+y	(11⁻)	Q		
608.5 2	2.4 6	2546.6+x	(15⁻)	1937.6+x	(13⁻)			
610.9 3	7.2 9	2492.0+y	(13⁻)	1881.1+y	(11⁻)			
612.5 3	1.4 4	2851.9+x	(16⁻)	2239.5+x	(14⁻)			
618.3 2	14.7 23	2135.0+x	(15⁺)	1516.7+x	(13⁺)	E2	0.0133	α(K)exp=0.016 6. Mult.: (Q) from γ(θ); E2 from α(K)exp.
618.4 2	1.1 5	3164.8+x	(17⁻)	2546.6+x	(15⁻)	(Q)		
627.5 2	2.3 6	2403.7+x	(14⁻)	1776.4+x	(12⁻)			
632.0 2	4.8 10	3214.3+x	(16⁻)	2582.3+x	(14⁻)	Q		
638.1 2	3.5 7	2558.8+x	(13⁺)	1920.9+x	(11⁺)	(Q)		
638.1 3	6.4 14	2815.5+y	(14⁻)	2177.4+y	(12⁻)	(Q)		
644.2 2	1.3 6	3203.0+x	(15⁺)	2558.8+x	(13⁺)	(Q)		
644.4 1	11.6 23	2462.4+x	(16⁺)	1818.0+x	(14⁺)	E2	0.0121	α(K)exp=0.011 4. Mult.: (Q) from γ(θ); E2 from α(K)exp.
646.5 2	2.3 9	2878.3+x	(14⁺)	2231.7+x	(12⁺)			
651.8 2	2.2 11	3791.0+x	(20⁺)	3139.1+x	(18⁺)			
654.4 2	2.8 12	4135.0+x	(21⁺)	3480.8+x	(19⁺)			
663.4 3	0.9 4	4454.9+x	(22⁺)	3791.0+x	(20⁺)			
665.5 3	1.2 6	3543.8+x	(16⁺)	2878.3+x	(14⁺)	(Q)		
665.6 2	3.5 11	3555.5+x	(17⁻)	2889.8+x	(15⁻)	(Q)		
666.1 3	3.8 8	3158.1+y	(15⁻)	2492.0+y	(13⁻)	(Q)		
667.0 2	10.7 20	2801.9+x	(17⁺)	2135.0+x	(15⁺)			
676.6 2	6.5 20	3139.1+x	(18⁺)	2462.4+x	(16⁺)			
678.5 1	28 4	1496.0+x	(11⁻)	817.8+x	(9⁻)	E2	0.0108	α(K)exp=0.012 4. Mult.: Q from γ(θ), E2 from α(K)exp.
679.0 2	5.9 15	3480.8+x	(19⁺)	2801.9+x	(17⁺)	(Q)		
680.8 3	6.6 14	2689.6+z	(19⁻)	2008.8+z	(17⁻)			
683.3 2	0.6 3	4818.1+x	(23⁺)	4135.0+x	(21⁺)			

Continued on next page (footnotes at end of table)

^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07 (continued)

γ(^{180}Re) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]
689.6 *5*	2.3 *10*	3505.1+y	(16⁻)	2815.5+y	(14⁻)	
698.9 *2*	2.3 *8*	3913.1+x	(18⁻)	3214.3+x	(16⁻)	
707.9 *4*	1.1 *4*	3866.0+y	(17⁻)	3158.1+y	(15⁻)	
731.6 *2*	1.8 *9*	4287.8+x	(19⁻)	3555.5+x	(17⁻)	
748.8 *3*	3.3 *12*	3438.4+z	(21⁻)	2689.6+z	(19⁻)	
761.7 *2*	9.7 *19*	1496.0+x	(11⁻)	734.6+x	(10⁺)	
764.2 *2*	0.9 *4*	4677.1+x	(20⁻)	3913.1+x	(18⁻)	
807.8 *2*	4.1 *8*	1332.3+x	(10⁺)	524.6+x	(9⁺)	
984.8 *2*	11.3 *24*	1332.3+x	(10⁺)	347.8+x	(8⁺)	Q[@]

[†] From ^{170}Er(^{14}N,4nγ), E=71 MeV.

[‡] Delayed transition which feeds the K^π=(11⁻) rotational band.

[#] From $\gamma(\theta)$ measured in ^{181}Ta(α,5nγ), except where noted.

[@] From R(DCO) measurement, no details given by authors.

[&] 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.

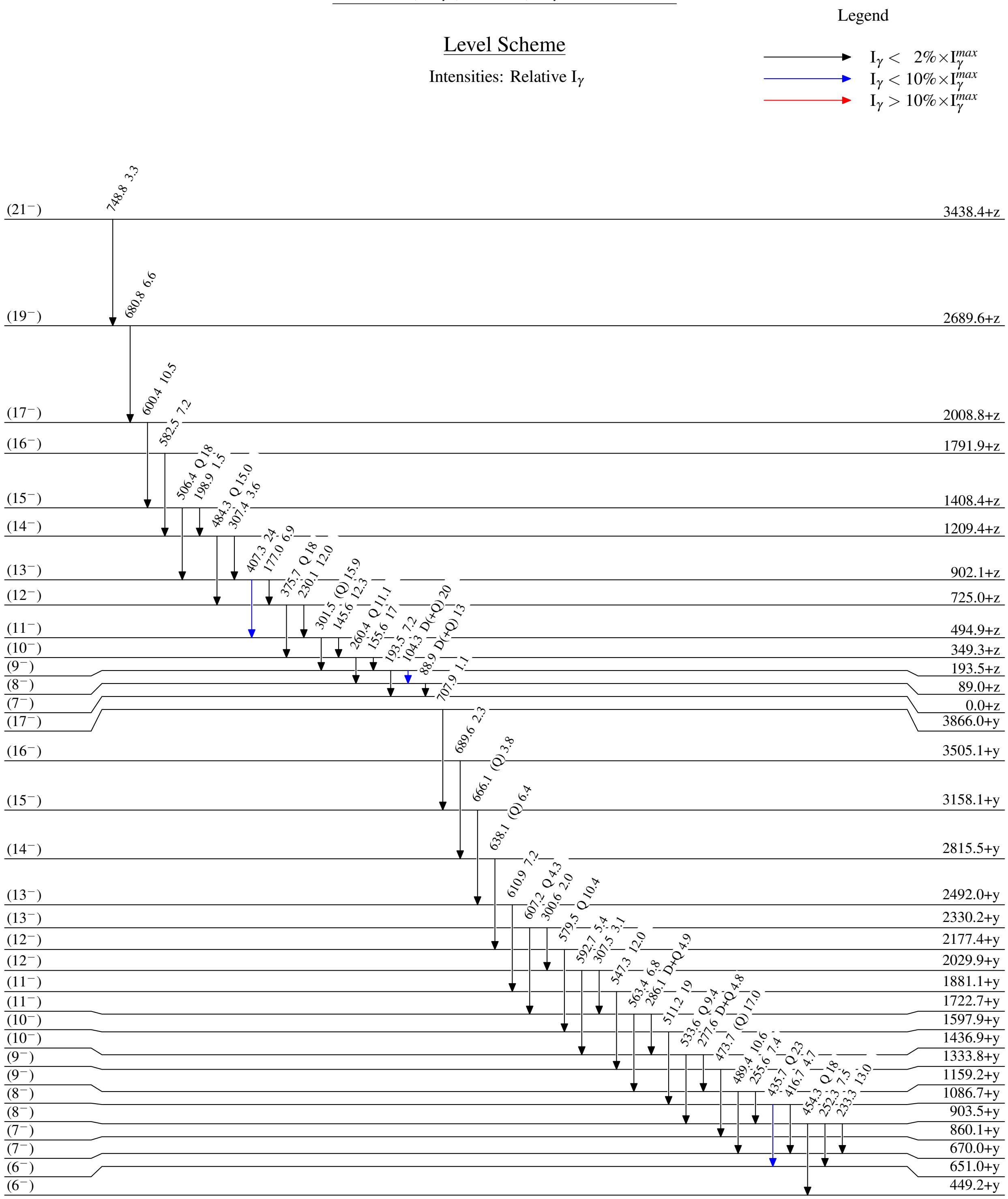
[a] Multiply placed with undivided intensity.

[x] γ ray not placed in level scheme.

^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07

Level Scheme

Intensities: Relative I_γ

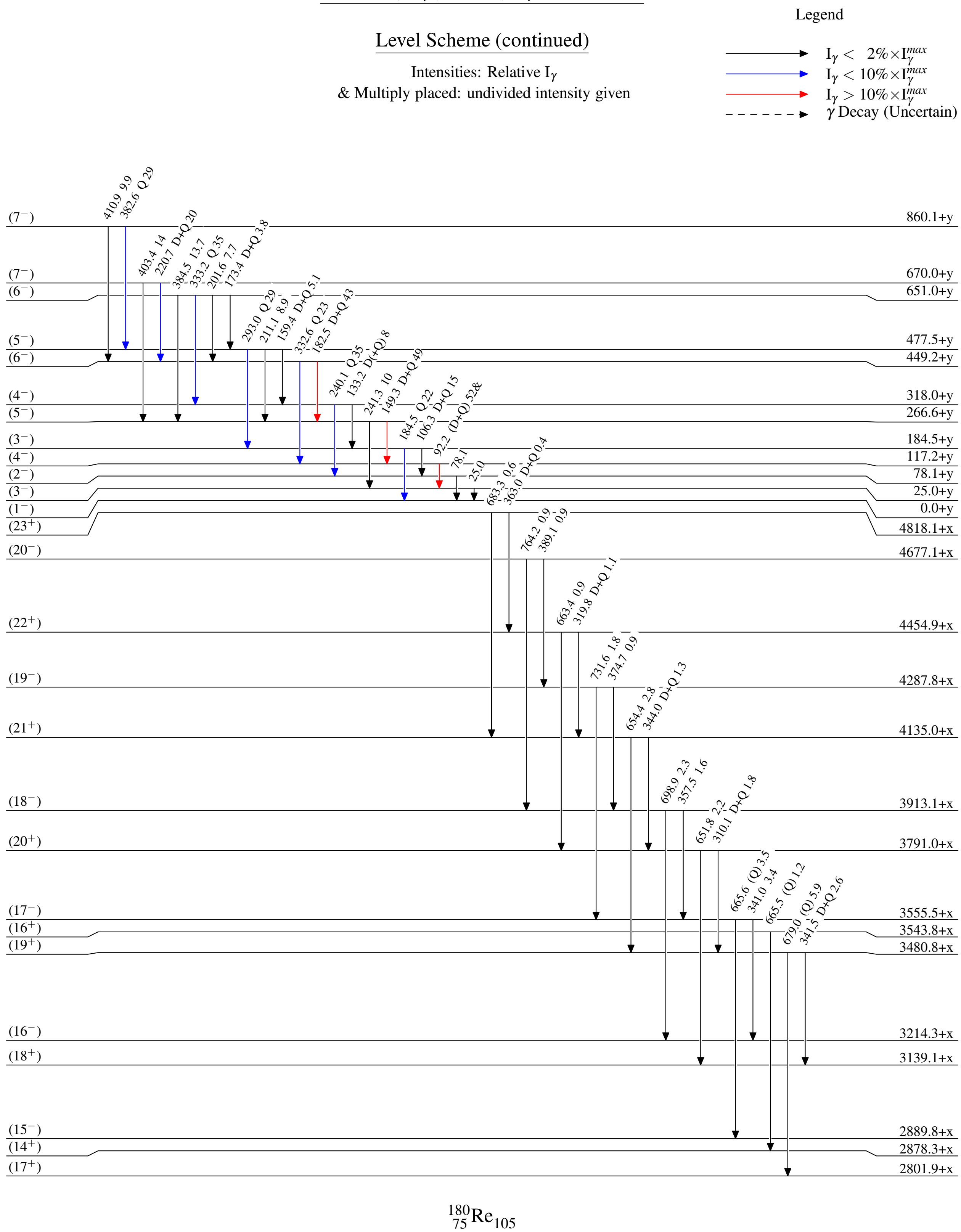


$^{180}_{75}Re_{105}$

^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



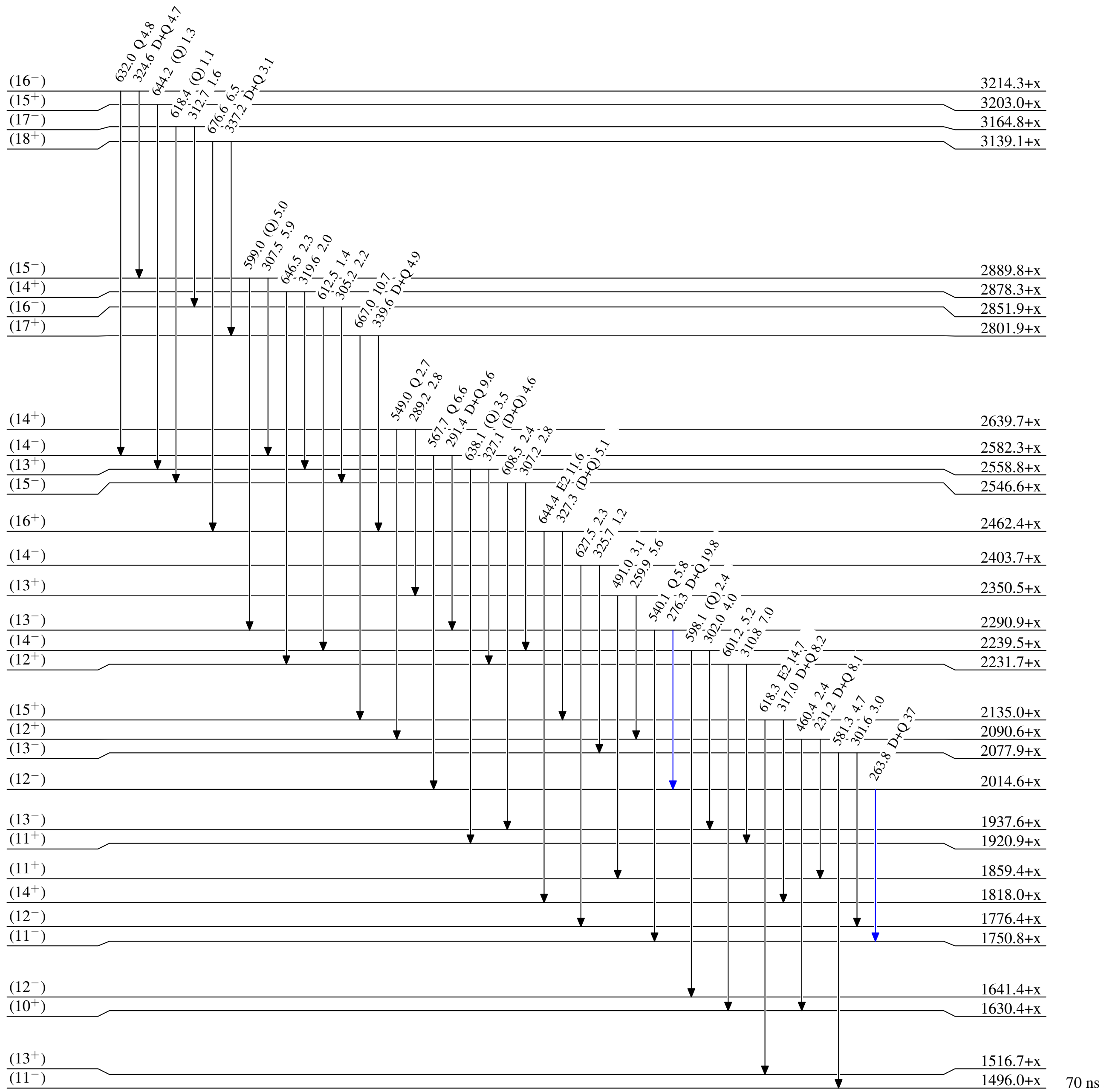
^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{180}_{75}Re_{105}$

^{170}Er(^{14}N,4nγ),^{181}Ta(α,5nγ) 1990Ve07

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given