^{96}Zr(^{13}C,p3nγ) 2004Ti04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Lalkovski, J. Timar and Z. Elekes	NDS 161, 1 (2019)	1-Apr-2019

Facility: Strasbourg's IReS Vivitron; Beam: E(^{13}C)=51 and 58 MeV; Target: stack of two targets with thickness of 558 μg/cm^2 enriched to 86% in ^{96}Zr; Detectors: EUROBALL IV comprising 15 Cluster, and 24 Clover detectors at backward angles and at≈90 deg., DIAMANT comprising 88 CsI scintillators; Measured: γ-γ coinc., particle-γ coinc., Eγ, Iγ, $\gamma\gamma(\theta)$(DCO); Deduced: ^{105}Rh level scheme, band structure, γ-ray Mult., J^π.

^{105}Rh Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0@	7/2+	1605.4# 11	17/2+	3535.8# 14	25/2+	5763.1& 17	37/2+
149.0# 6	9/2+	1677.0f 10	15/2+	3838.5& 15	29/2+	6019.5c 16	37/2+
499.8 7	5/2+	1937.3d 16	15/2+	4001.8b 14	27/2+	6343.8a 17	39/2+
603.0@ 7	11/2+	2164.0e 11	(17/2+)	4214.2a 15	31/2+	6565.5b 17	39/2+
734.0f 7	11/2+	2244.0@ 12	19/2+	4297.8c 14	29/2+	7037.0& 18	41/2+
795.1# 9	13/2+	2520.8# 13	21/2+	4688.7b 14	31/2+	7155.5c 17	41/2+
1019.3d 7	7/2+	2616.0f 14	(19/2+)	4701.3& 15	33/2+	7711.7a 19	43/2+
1207.0e 9	13/2+	2980.8a 13	23/2+	5079.8c 15	33/2+	8466.4& 19	45/2+
1365.9@ 10	15/2+	3196.8& 14	25/2+	5183.3a 16	35/2+	8523.5c 20	(45/2+)
1400.3d 12	11/2+	3477.0a 14	27/2+	5524.3b 15	35/2+	9211.7a 21	(47/2+)

† From a least-squares fit to Eγ; ΔE_γ=1 keV assumed by the evaluators.
‡ From the Adopted Levels.
# Band(A): $\pi g_{9/2}$, α=+1/2.
@ Band(a): $\pi g_{9/2}$, α=−1/2.
& Band(B): $\pi g_{9/2}\nu(h_{11/2})^2$, α=+1/2. Chiral yrast.
a Band(b): $\pi g_{9/2}\nu(h_{11/2})^2$, α=−1/2. Chiral yrast.
b Band(C): $\pi g_{9/2}\nu(h_{11/2})^2$, α=+1/2. Chiral yrare.
c Band(c): $\pi g_{9/2}\nu(h_{11/2})^2$, α=−1/2. Chiral yrare.
d Band(D): π1/2[431].
e Band(E): γ-vibrational band, α=+1/2.
f Band(e): γ-vibrational band, α=−1/2.

γ(^{105}Rh)

Eγ†	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
149	149.0	9/2+	0.0	7/2+
192	795.1	13/2+	603.0	11/2+
216	3196.8	25/2+	2980.8	23/2+
240	1605.4	17/2+	1365.9	15/2+
277	2520.8	21/2+	2244.0	19/2+
280	3477.0	27/2+	3196.8	25/2+
296	4297.8	29/2+	4001.8	27/2+
351	499.8	5/2+	149.0	9/2+
361	3838.5	29/2+	3477.0	27/2+
376	4214.2	31/2+	3838.5	29/2+
381	1400.3	11/2+	1019.3	7/2+
391	4688.7	31/2+	4297.8	29/2+

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^{96}Zr(^{13}C,p3nγ) 2004Ti04 (continued)

$\gamma(^{105}Rh)$ (continued)

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	Comments
391	5079.8	$33/2^+$	4688.7	$31/2^+$			
444	5524.3	$35/2^+$	5079.8	$33/2^+$			
454	603.0	$11/2^+$	149.0	$9/2^+$			
460	2980.8	$23/2^+$	2520.8	$21/2^+$			
466	4001.8	$27/2^+$	3535.8	$25/2^+$	M1+E2	0.24 *8*	Mult.: ΔJ=1 transition.
470	1677.0	$15/2^+$	1207.0	$13/2^+$			
473	1207.0	$13/2^+$	734.0	$11/2^+$			
482	5183.3	$35/2^+$	4701.3	$33/2^+$			
487	2164.0	$(17/2^+)$	1677.0	$15/2^+$			
487	4701.3	$33/2^+$	4214.2	$31/2^+$			
495	6019.5	$37/2^+$	5524.3	$35/2^+$			
496	3477.0	$27/2^+$	2980.8	$23/2^+$			
500	499.8	$5/2^+$	0.0	$7/2^+$			
520	1019.3	$7/2^+$	499.8	$5/2^+$			
537	1937.3	$15/2^+$	1400.3	$11/2^+$			
546	6565.5	$39/2^+$	6019.5	$37/2^+$			
571	1365.9	$15/2^+$	795.1	$13/2^+$			
580	5763.1	$37/2^+$	5183.3	$35/2^+$			
581	6343.8	$39/2^+$	5763.1	$37/2^+$			
585	734.0	$11/2^+$	149.0	$9/2^+$			
590	7155.5	$41/2^+$	6565.5	$39/2^+$			
603	603.0	$11/2^+$	0.0	$7/2^+$			
604	1207.0	$13/2^+$	603.0	$11/2^+$			
639	2244.0	$19/2^+$	1605.4	$17/2^+$			
642	3838.5	$29/2^+$	3196.8	$25/2^+$			
646	795.1	$13/2^+$	149.0	$9/2^+$			
675	7711.7	$43/2^+$	7037.0	$41/2^+$			
676	3196.8	$25/2^+$	2520.8	$21/2^+$			
687	4688.7	$31/2^+$	4001.8	$27/2^+$			
693	7037.0	$41/2^+$	6343.8	$39/2^+$			
734	734.0	$11/2^+$	0.0	$7/2^+$			
737	2980.8	$23/2^+$	2244.0	$19/2^+$			
737	4214.2	$31/2^+$	3477.0	$27/2^+$			
755	8466.4	$45/2^+$	7711.7	$43/2^+$			
762	4297.8	$29/2^+$	3535.8	$25/2^+$			
763	1365.9	$15/2^+$	603.0	$11/2^+$			
782	5079.8	$33/2^+$	4297.8	$29/2^+$			
805	4001.8	$27/2^+$	3196.8	$25/2^+$			
810	1605.4	$17/2^+$	795.1	$13/2^+$			
821	4297.8	$29/2^+$	3477.0	$27/2^+$	M1+E2	0.37 *8*	Mult.: ΔJ=1 transition.
823	5524.3	$35/2^+$	4701.3	$33/2^+$			
836	5524.3	$35/2^+$	4688.7	$31/2^+$			
850	4688.7	$31/2^+$	3838.5	$29/2^+$			
863	4701.3	$33/2^+$	3838.5	$29/2^+$			
866	5079.8	$33/2^+$	4214.2	$31/2^+$			
870	1019.3	$7/2^+$	149.0	$9/2^+$			
878	2244.0	$19/2^+$	1365.9	$15/2^+$			
915	2520.8	$21/2^+$	1605.4	$17/2^+$			
939	2616.0	$(19/2^+)$	1677.0	$15/2^+$			
940	6019.5	$37/2^+$	5079.8	$33/2^+$			
943	1677.0	$15/2^+$	734.0	$11/2^+$			
957	2164.0	$(17/2^+)$	1207.0	$13/2^+$			
969	5183.3	$35/2^+$	4214.2	$31/2^+$			
1015	3535.8	$25/2^+$	2520.8	$21/2^+$	E2		
1019	1019.3	$7/2^+$	0.0	$7/2^+$			
1021	4001.8	$27/2^+$	2980.8	$23/2^+$			

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^{96}Zr(^{13}C,p3nγ) 2004Ti04 (continued)

γ(^{105}Rh) (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
1041	6565.5	$39/2^+$	5524.3	$35/2^+$	1274	7037.0	$41/2^+$	5763.1	$37/2^+$
1062	5763.1	$37/2^+$	4701.3	$33/2^+$	1310	5524.3	$35/2^+$	4214.2	$31/2^+$
1101	4297.8	$29/2^+$	3196.8	$25/2^+$	1368	7711.7	$43/2^+$	6343.8	$39/2^+$
1136	7155.5	$41/2^+$	6019.5	$37/2^+$	1368	8523.5	$(45/2^+)$	7155.5	$41/2^+$
1160	6343.8	$39/2^+$	5183.3	$35/2^+$	1429	8466.4	$45/2^+$	7037.0	$41/2^+$
1212	4688.7	$31/2^+$	3477.0	$27/2^+$	1500	9211.7	$(47/2^+)$	7711.7	$43/2^+$
1241	5079.8	$33/2^+$	3838.5	$29/2^+$					

† From 2004Ti04.
‡ From 2004Ti04, based on DCO ratios and linear polarization measurements. No details provided by the authors.

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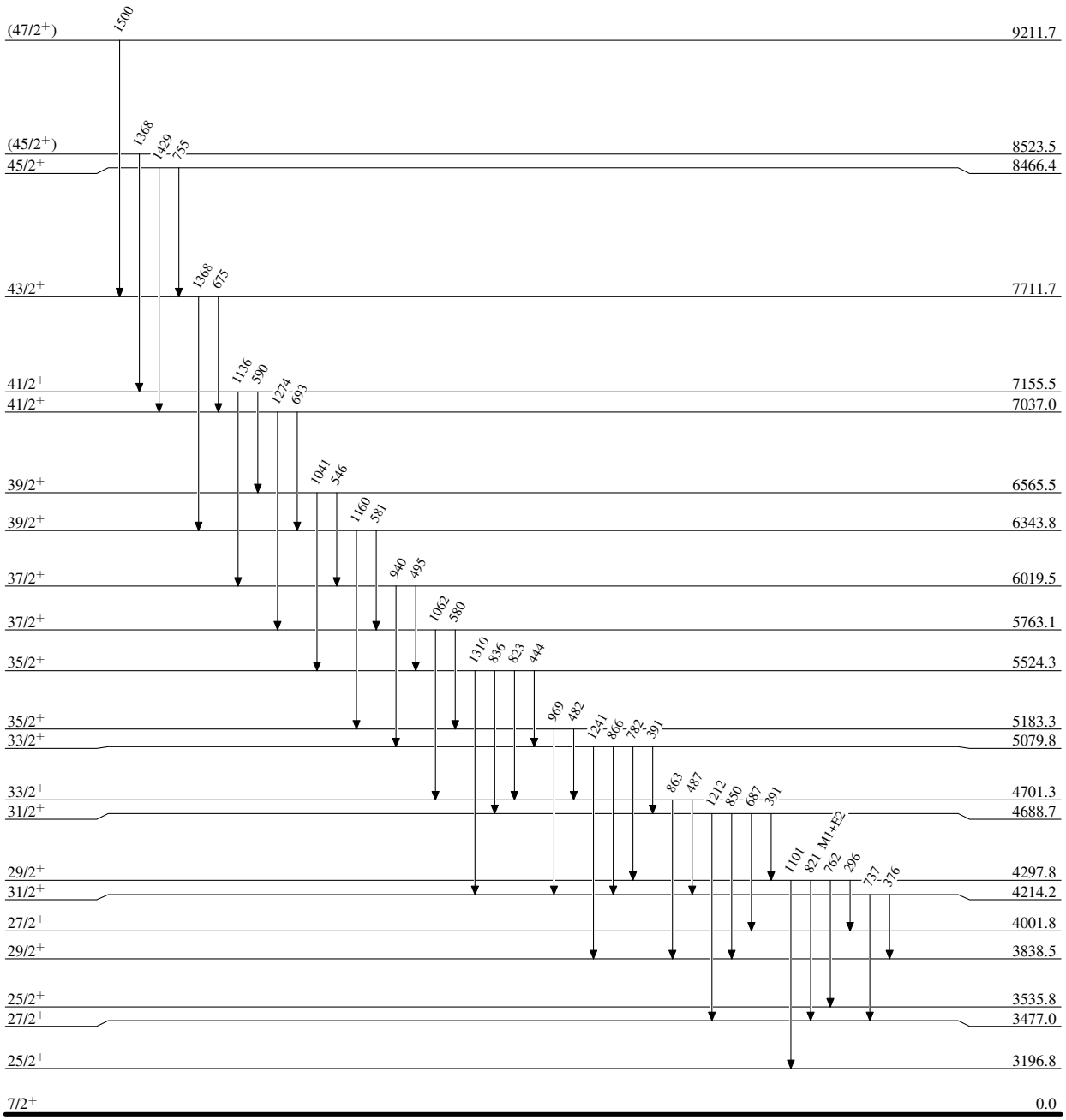
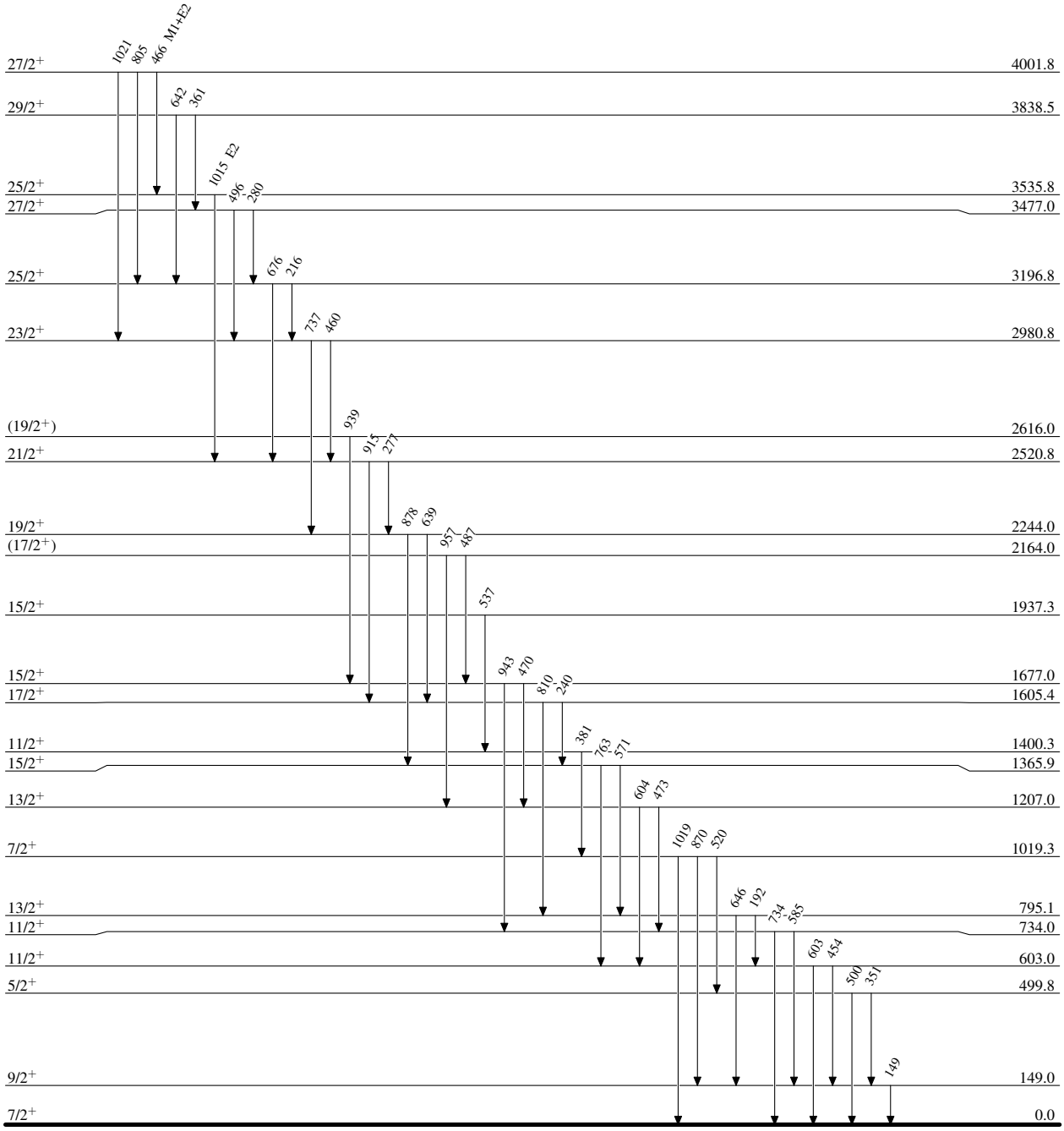
Level Scheme



$^{105}_{45}Rh_{60}$

^{96}Zr(^{13}C,p3nγ) 2004Ti04

Level Scheme (continued)



$^{105}_{45}Rh_{60}$

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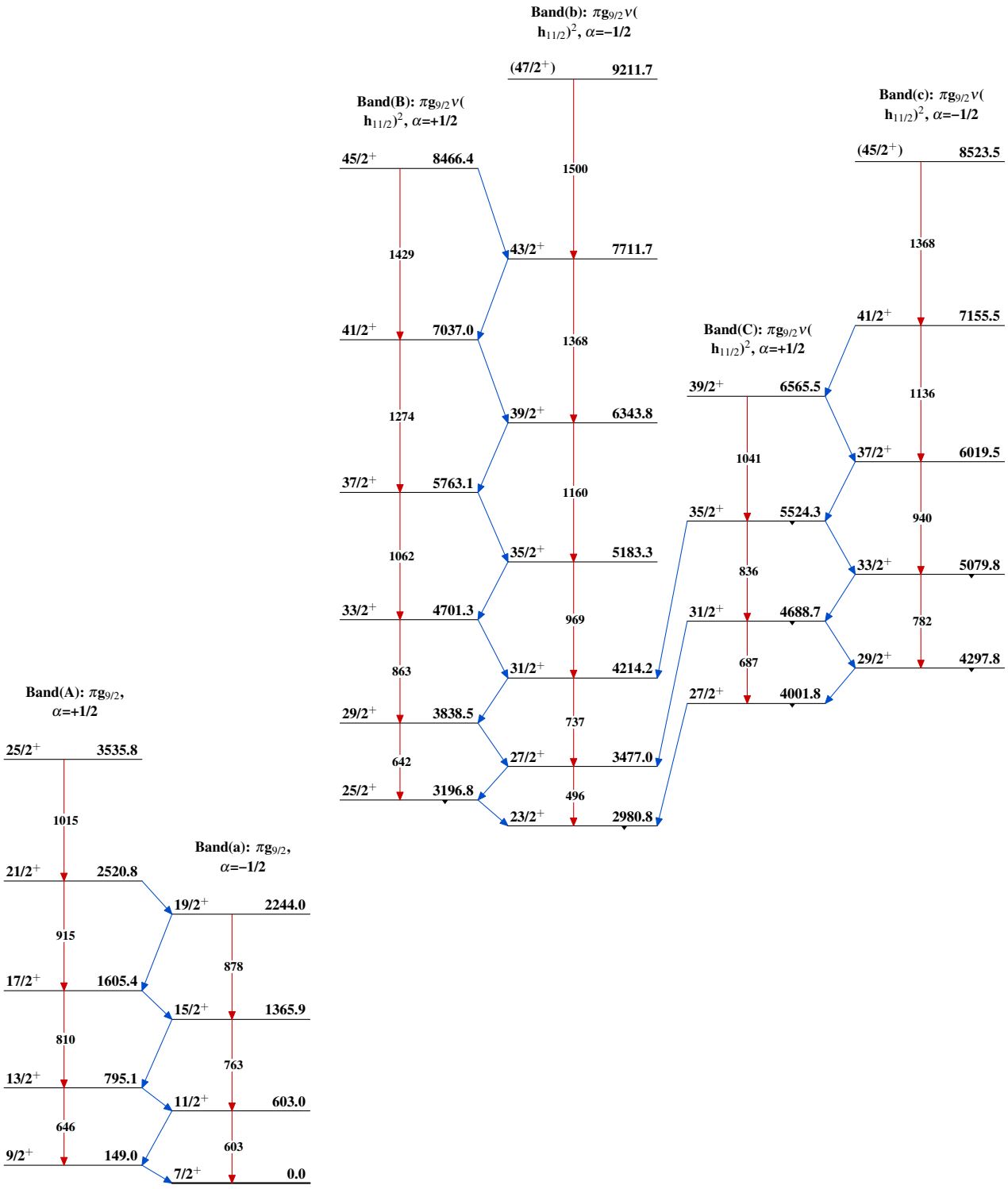
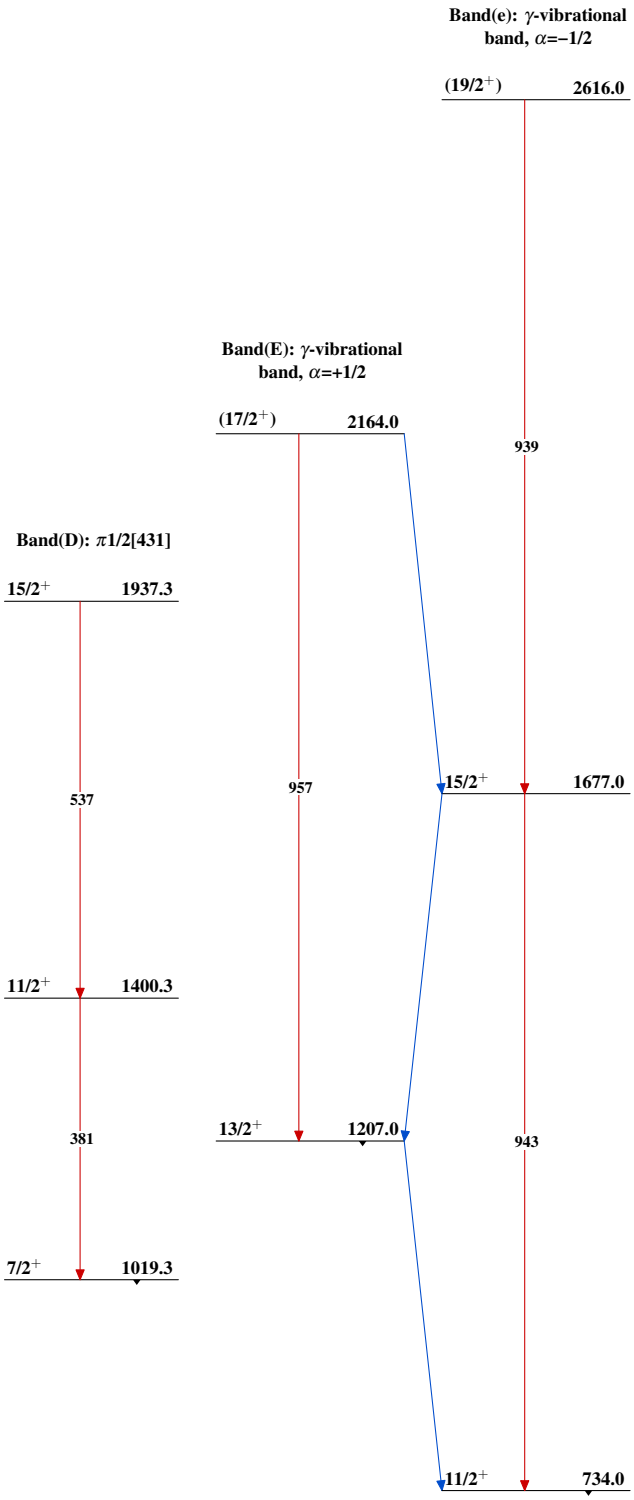


$^{105}_{45}Rh_{60}$

^{96}Zr(^{13}C,p3nγ) 2004Ti04 (continued)



$^{105}_{45}Rh_{60}$