^{58}Ni(^{40}Ca,2$\alpha\gamma$) 2004Bu13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, E. A. Mccutchan	NDS 165, 1 (2020)	1-Mar-2020

2004Bu13: E(^{40}Ca)=135 MeV from Legnaro XTU tandem accelerator. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, $\gamma\gamma(\theta)$ with the GASP array consisting of 40 Compton-suppressed HPGe detectors and an 80 BGO element inner ball. The ISIS Si ball of 40 ΔE-E telescopes was used for the detection of charged particles.

^{90}Ru Levels

E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ
0.0‡	0^+	3983.5‡ *6*	10^+	5827.9# *7*	$13^{(-)}$	7655.7# *8*	(17^-)
738.4‡ *3*	2^+	4198.3# *6*	$9^{(-)}$	6099.4 *8*	15^+	7675.3 *8*	
1639.0‡ *5*	4^+	4959.2‡ *7*	12^+	6144.2 *8*		8023.9 *9*	
2524.9‡ *5*	6^+	4980.5# *6*	$11^{(-)}$	6261.6 *8*		8106.7? *9*	
2602.8# *5*	$5^{(-)}$	5311.5? *7*		6389.9 *8*	16^+	8377.2 *9*	
3037.2‡ *6*	8^+	5732.2‡ *8*	14^+	6749.7# *8*	$15^{(-)}$	8623.2 *9*	(20^+)
3300.8# *6*	$7^{(-)}$	5816.8 *8*	13^+	7418.0 *9*	(18^+)	9477.6 *9*	

† From least-squares fit to Eγ′s, by evaluators.
‡ Band(A): Yrast Sequence.
# Band(B): Band based on $5^{(-)}$.

γ(^{90}Ru)

R(DCO)=I(γ_1 at 72°,90° or 108°; γ_2 at 35° or 145°)/ I(γ_1 at 35° or 145°; γ_2 at 72°,90° or 108°). All gating transition were ΔJ=2 in character yielding expected values of 0.5 for stretched dipole transitions and 1.0 for stretched quadrupole transitions.

E_γ†	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
282.6 *3*	3.8 *6*	6099.4	15^+	5816.8	13^+	Q	A_2=+0.4 *3*; A_4=+0.1 *3*
290.5 *3*	15.0 *14*	6389.9	16^+	6099.4	15^+	D	DCO=0.46 *10*; A_2=−0.37 *14*; A_4=−0.03 *18*
331.0‡ *3*		5311.5?		4980.5	$11^{(-)}$		
348.6 *3*	2.6 *8*	8023.9		7675.3			
367.2 *3*	17.9 *19*	6099.4	15^+	5732.2	14^+	D	DCO=0.62 *9*; A_2=−0.31 *14*; A_4=+0.1 *3*
412.0 *3*	2.0 *5*	6144.2		5732.2	14^+		
444.8 *3*	2.7 *8*	6261.6		5816.8	13^+		
451.0‡ *3*		8106.7?		7655.7	(17^-)		
512.2 *3*	57 *4*	3037.2	8^+	2524.9	6^+	Q	DCO=0.93 *5*; A_2=+0.35 *12*; A_4=+0.16 *18*
697.9 *3*	32 *4*	3300.8	$7^{(-)}$	2602.8	$5^{(-)}$	Q	DCO=1.04 *7*; A_2=+0.23 *23*; A_4=−0.1 *3*
721.5 *3*	6.9 *12*	8377.2		7655.7	(17^-)	(Q)	DCO=0.95 *18*; A_2=+0.04 *22*; A_4=−0.3 *3*
738.4 *3*	100	738.4	2^+	0.0	0^+	Q	DCO=1.04 *6*; A_2=+0.27 *14*; A_4=−0.01 *18*
773.0 *3*	25 *3*	5732.2	14^+	4959.2	12^+	Q	DCO=1.16 *20*; A_2=+0.30 *10*; A_4=+0.04 *16*
776.0 *3*	2.2 *14*	3300.8	$7^{(-)}$	2524.9	6^+		
782.5 *3*	27 *4*	4980.5	$11^{(-)}$	4198.3	$9^{(-)}$	Q	DCO=1.06 *11*; A_2=+0.27 *9*; A_4=−0.09 *14*
847.4 *3*	21 *4*	5827.9	$13^{(-)}$	4980.5	$11^{(-)}$	Q	DCO=0.86 *12*; A_2=+0.44 *15*; A_4=+0.02 *24*
857.6 *3*	7.1 *12*	5816.8	13^+	4959.2	12^+	D	DCO=0.46 *12*; A_2=−0.11 *23*; A_4=+0.8 *5*
886.0 *3*	61 *5*	2524.9	6^+	1639.0	4^+	Q	DCO=1.00 *11*; A_2=+0.26 *10*; A_4=−0.03 *16*
897.5 *3*	32 *5*	4198.3	$9^{(-)}$	3300.8	$7^{(-)}$	Q	DCO=1.07 *17*; A_2=+0.14 *8*; A_4=−0.21 *12*
900.6 *3*	97 *4*	1639.0	4^+	738.4	2^+	Q	DCO=1.00 *9*; A_2=+0.20 *5*; A_4=−0.10 *8*
906.0 *3*	10.8 *16*	7655.7	(17^-)	6749.7	$15^{(-)}$	Q	DCO=0.98 *4*; A_2=+0.54 *21*; A_4=+0.27 *20*

Continued on next page (footnotes at end of table)

^{58}Ni(^{40}Ca,2$\alpha\gamma$) 2004Bu13 (continued)

$\gamma(^{90}Ru)$ (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
921.8 *3*	14.9 *24*	6749.7	$15^{(-)}$	5827.9	$13^{(-)}$	Q	DCO=0.9 *3*; A_2=+0.28 *24*; A_4=+0.03 *33*
925.6 *3*	3.3 *9*	7675.3		6749.7	$15^{(-)}$		
946.1 *3*	45 *4*	3983.5	10^+	3037.2	8^+	Q	DCO=0.97 *8*; A_2=+0.19 *16*; A_4=−0.08 *21*
963.7 *3*	37 *4*	2602.8	$5^{(-)}$	1639.0	4^+	D	DCO=0.61 *5*; A_2=−0.15 *14*; A_4=+0.6 *3*
975.7 *3*	40 *4*	4959.2	12^+	3983.5	10^+	Q	DCO=0.92 *8*; A_2=+0.28 *9*; A_4=−0.10 *18*
996.8[‡] *3*	1.4 *8*	4980.5	$11^{(-)}$	3983.5	10^+		
1028.1 *3*	12.2 *18*	7418.0	(18^+)	6389.9	16^+	Q	DCO=0.9 *3*; A_2=+0.2 *3*; A_4=−0.05 *43*
1100.3 *3*	3.9 *10*	9477.6		8377.2		(Q)	DCO=0.9 *3*; A_2=−0.2 *3*; A_4=+0.3 *4* Mult.: negative value of A_2 is inconsistent with Q assignment.
1161.3[‡] *3*		4198.3	$9^{(-)}$	3037.2	8^+		E_γ: from figure 1 of 2004Bu13; not listed in authors′ table I.
1205.2 *3*	8.3 *17*	8623.2	(20^+)	7418.0	(18^+)	Q	DCO=1.09 *22*; A_2=+0.15 *18*; A_4=+0.3 *4*

[†] 0.3 keV uncertainty assigned by evaluators based on a general statement by 2004Bu13 that errors are below 0.3 keV.
[‡] Placement of transition in the level scheme is uncertain.

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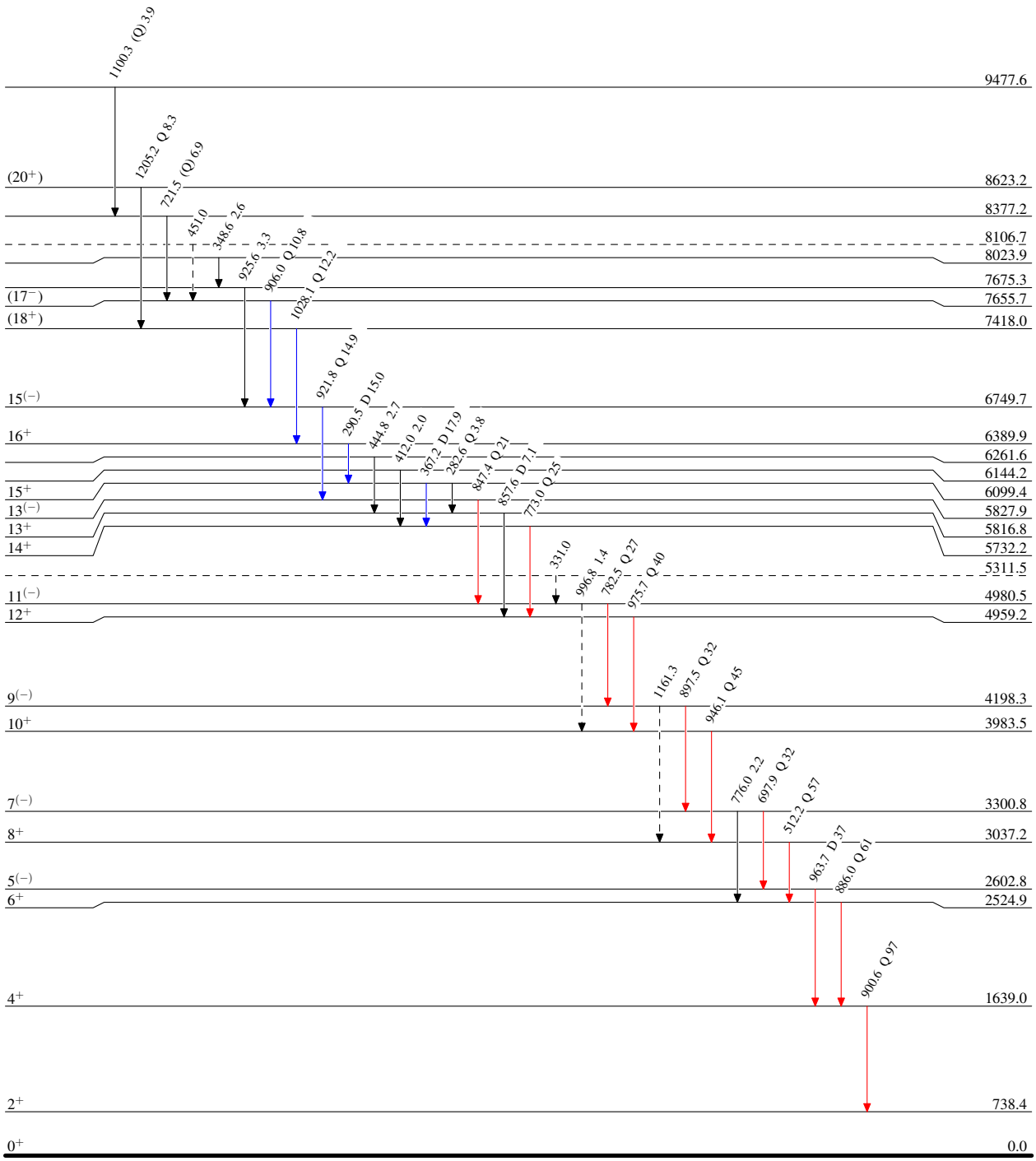
Level Scheme

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



$^{90}_{44}Ru_{46}$

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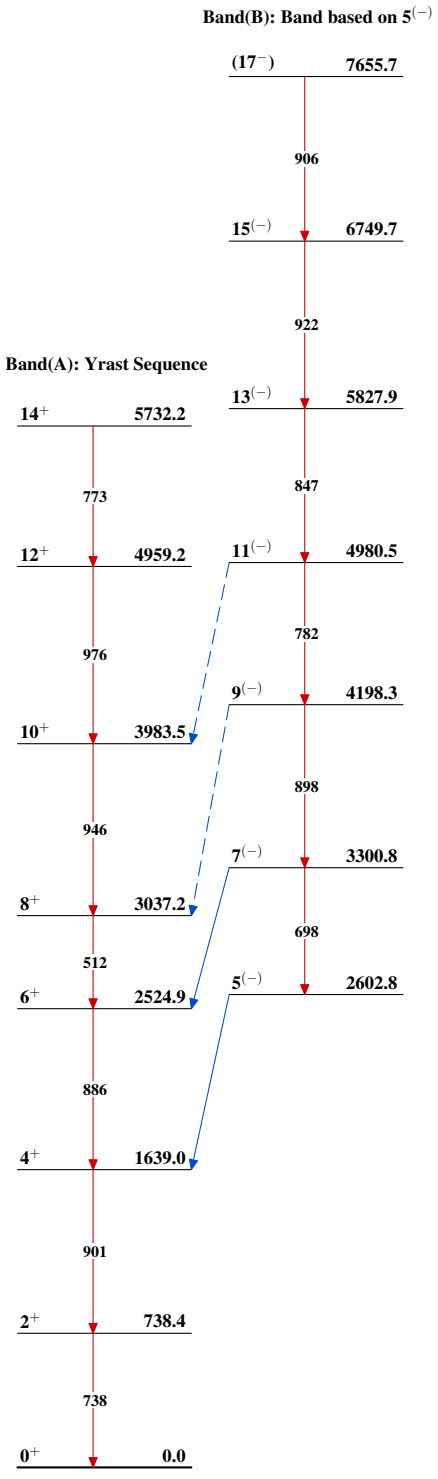

$^{90}_{44}Ru_{46}$