^{40}Ca(^{36}Ar,αpnγ),(^{32}S,pnγ) 2002Je07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal, E. A. Mccutchan	NDS 136, 1 (2016)	1-Jul-2016

2002Je07: ^{40}Ca (^{36}Ar,αpnγ) with E(^{36}Ar)=145 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$, particle-γ coin using Gammasphere array with 73 Ge detectors and Microball array with 95 CsI detectors. Neutrons were detected with a 30-detector neutron shell. Deduced DCO ratios.

2002Je07: ^{40}Ca(^{32}S,pnγ) (for low-spin studies) with E(^{32}S)=80-100 MeV. Measured Eγ, Iγ, $\gamma\gamma$ and $\gamma\gamma(\theta)$ using Gammasphere array consisting of 69 Compton-suppressed detectors, a 30-element neutron detector, a LEPS detector, BC501 liquid scintillator neutron detectors. Deduced DCO ratios.

2001De46: ^{40}Ca(^{32}S,pnγ) with E(^{32}S)=90 MeV. Measured Eγ, Iγ, $\gamma\gamma$ $\gamma\gamma(\theta)$. Deduced DCO ratios. In one experiment GASP array with 40 Compton-suppressed Ge detectors, inner BGO ball, ISIS Si-ball of 40 ΔE-E Si detectors, and neutron detectors were used. In a second experiment EUROBALL array with 15 'clusters' and 26 'clover' composite detectors were used with a 4π charged-particle device EUCLIDES consisting of 40 Si ΔE-E telescopes. Neutrons were detected with a an array of 50 liquid scintillators.

2002Je07 and 2001De46 disagree about the location of 9$^+$ isomer. 2001De46 assigns E_{lev} and J^π of the 9$^+$ isomer mainly based on the systematics. 2002Je02 assigns E_{lev} and J^π based on measured Eγs and multipolarities deduced from DCO measurements. The ambiguity of the location of the isomer was clarified in β-decay studies (2004Ka38), where an energy of 2.23 MeV *9* was determined, in good agreement with the excitation energy assigned in 2002Je07.

All data presented here are from 2002Je07, unless stated otherwise. Stronger transitions, Iγ>10%, as seen by 2001De46 are in agreement with 2002Je07. Some of the weaker transitions reported by 2001De46 have not been confirmed, these are:

Eγ	Iγ (Iγ(403γ)=100)	E(lev)
274 *1*	3.4 *17*	1931
421.0 *6*	7 *3*	2352
470.4 *6*	19 *3*	3148
595 *1*	5.1 *17*	1931
654 *1*	3.4 *17*	3679
963.4	9 *3*	2965
1025 *1*	5 *3*	3990
1104	5 *2*	2761
1468	5 *2*	2682

^{70}Br Levels

No 1$^+$ (expected T=0) level has been seen below 800 keV.

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0	0$^+$	79.1 ms *8*	$T_{1/2}$: From the Adopted Levels.
933.6 *3*	2$^+$		
1336.4 *4*	3$^+$		
1657.0 *5*	5$^+$		
1760.4 *7*	(3$^+$)		
2002.3 *4*	4$^+$		
2292.3[#] *8*	9$^+$	2.2 s *2*	$T_{1/2}$: From the Adopted Levels. E(level): a tentative (9$^+$) isomer proposed by 2001De46 at 1214 is assigned at 2293 by 2002Je07.
2350.9 *5*	(5$^+$)		
2677.0 *6*	(6$^+$)		
2683.0 *7*	7$^+$		
3027.3 *8*	(8$^+$)		
3098.5[@] *9*	(10$^+$)		

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^{40}Ca(^{36}Ar,αpnγ),(^{32}S,pnγ) 2002Je07 (continued)

^{70}Br Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
3547.2[#] *8*	11^+	6050.9[@] *11*	(14^+)	8430.7 *13*	(16^+)	16157.7[#] *19*	(25^+)
3681.1 *8*	(8^+)	6487.4[#] *10*	(15^+)	9470.4 *13*	(18^+)	18662.8[#] *23*	(27^+)
4446.2 *9*	(10^+)	6787.9 *11*	(14^+)	9507.4[@] *14*	(18^+)	21411.9[#] *25*	(29^+)
4531.2[@] *10*	(12^+)	7659.1 *13*	(16^+)	9782.0[#] *12*	(19^+)		
4884.8[#] *9*	(13^+)	7712.4[@] *12*	(16^+)	11667.1[#] *14*	(21^+)		
5443.3 *10*	(12^+)	8069.8[#] *11*	(17^+)	13786.0[#] *15*	(23^+)		

[†] From a least-squares fit to Eγ, by evaluators.
[‡] From 2002Je07.
[#] Band(A): Configuration=((π $g_{9/2}$)(ν $g_{9/2}$)), α=1.
[@] Band(B): Configuration=((π $g_{9/2}$)(ν $g_{9/2}$)), α=0.

γ(^{70}Br)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
320.7[‡] *3*	97 *12*	1657.0	5^+	1336.4	3^+	E2	DCO=0.93 *15*, 0.90 *12*. I_γ: 52 *6*.
326.1 *3*		2677.0	(6^+)	2350.9	(5^+)	D	DCO=0.31 *9*. I_γ: 30 *6*.
344.4 *5*	46 *5*	3027.3	(8^+)	2683.0	7^+	D	DCO=0.52 *14*. I_γ: 9 *3*.
348.6 *4*		2350.9	(5^+)	2002.3	4^+	D	DCO=0.47 *16*. I_γ: 51 *6*.
390.7 *4*	27 *4*	2683.0	7^+	2292.3	9^+		
402.6[‡] *3*	100	1336.4	3^+	933.6	2^+	D	DCO=0.76 *9*, 0.52 *14*. I_γ: 100.
424.0 *5*		1760.4	(3^+)	1336.4	3^+		I_γ: 10 *3*.
665.7 *3*		2002.3	4^+	1336.4	3^+		I_γ: 13 *3*.
694.0 *4*		2350.9	(5^+)	1657.0	5^+		I_γ: 25 *4*.
734.8 *4*	35 *6*	3027.3	(8^+)	2292.3	9^+		
765.0 *4*	31 *5*	4446.2	(10^+)	3681.1	(8^+)	E2	DCO=1.00 *22*.
806.2 *4*	24 *3*	3098.5	(10^+)	2292.3	9^+	D+Q	DCO=0.76 *8*.
933.6 *3*		933.6	2^+	0	0^+	E2	DCO=0.87 *13*.
997.1 *5*	123 *9*	5443.3	(12^+)	4446.2	(10^+)		I_γ: for 998.0+997.1. DCO=1.18 *15* for 998.0+997.1.
998.0 *5*	123 *9*	3681.1	(8^+)	2683.0	7^+		I_γ: for 998.0+997.1. DCO=1.18 *15* for 998.0+997.1.
1026.0[‡] *5*	57 *7*	2683.0	7^+	1657.0	5^+	E2	DCO=1.09 *25*. I_γ: 34 *6*.
1068.8 *3*		2002.3	4^+	933.6	2^+	E2	DCO=0.85 *10*. I_γ: 78 *9*.
1254.8 *3*	77 *4*	3547.2	11^+	2292.3	9^+	E2	DCO=0.99 *15*.
1337.6 *3*	61 *4*	4884.8	(13^+)	3547.2	11^+		
1344.6 *5*	55 *6*	6787.9	(14^+)	5443.3	(12^+)		
1418.6 *7*	80 *7*	4446.2	(10^+)	3027.3	(8^+)	E2	DCO=0.92 *15*.
1432.6 *5*	27 *4*	4531.2	(12^+)	3098.5	(10^+)		
1519.7 *4*	22 *3*	6050.9	(14^+)	4531.2	(12^+)		
1582.4 *4*	44 *6*	8069.8	(17^+)	6487.4	(15^+)		
1602.6 *4*	47 *6*	6487.4	(15^+)	4884.8	(13^+)		
1608.2 *6*	5 *1*	7659.1	(16^+)	6050.9	(14^+)		

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^{40}Ca(^{36}Ar,αpnγ),(^{32}S,pnγ) 2002Je07 (continued)

γ(^{70}Br) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1642.8 *6*	46 *4*	8430.7	(16^+)	6787.9	(14^+)	
1661.5 *5*	12 *3*	7712.4	(16^+)	6050.9	(14^+)	
1712.2 *6*	30 *5*	9782.0	(19^+)	8069.8	(17^+)	
1758.0 *5*	8 *2*	9470.4	(18^+)	7712.4	(16^+)	
1795.0 *6*	7 *2*	9507.4	(18^+)	7712.4	(16^+)	
1885.0 *6*	12 *3*	11667.1	(21^+)	9782.0	(19^+)	
2118.9 *7*	9 *2*	13786.0	(23^+)	11667.1	(21^+)	
2155.0 *12*	18 *3*	4446.2	(10^+)	2292.3	9^+	
2371.7 *11*	5 *2*	16157.7	(25^+)	13786.0	(23^+)	
2505.0 *13*	3 *1*	18662.8	(27^+)	16157.7	(25^+)	
2749		21411.9	(29^+)	18662.8	(27^+)	E_γ: From Figure 3 of 2002Je07, not listed in Table I.

[†] From 2002Je07. Iγ are from (^{36}Ar,αpnγ). Values for (^{32}S,pnγ) are given as comments.
[‡] Average of values from two experiments (^{36}Ar,αpnγ) and (^{32}S,pnγ) (2002Je07).
[#] From DCO ratios in 2002Je07. A ratio of <0.55 is assigned pure D and ≥0.85 a stretched Q. The latter is assumed to be E2.

^{40}Ca(^{36}Ar,αpnγ),(^{32}S,pnγ) **2002Je07**

Level Scheme

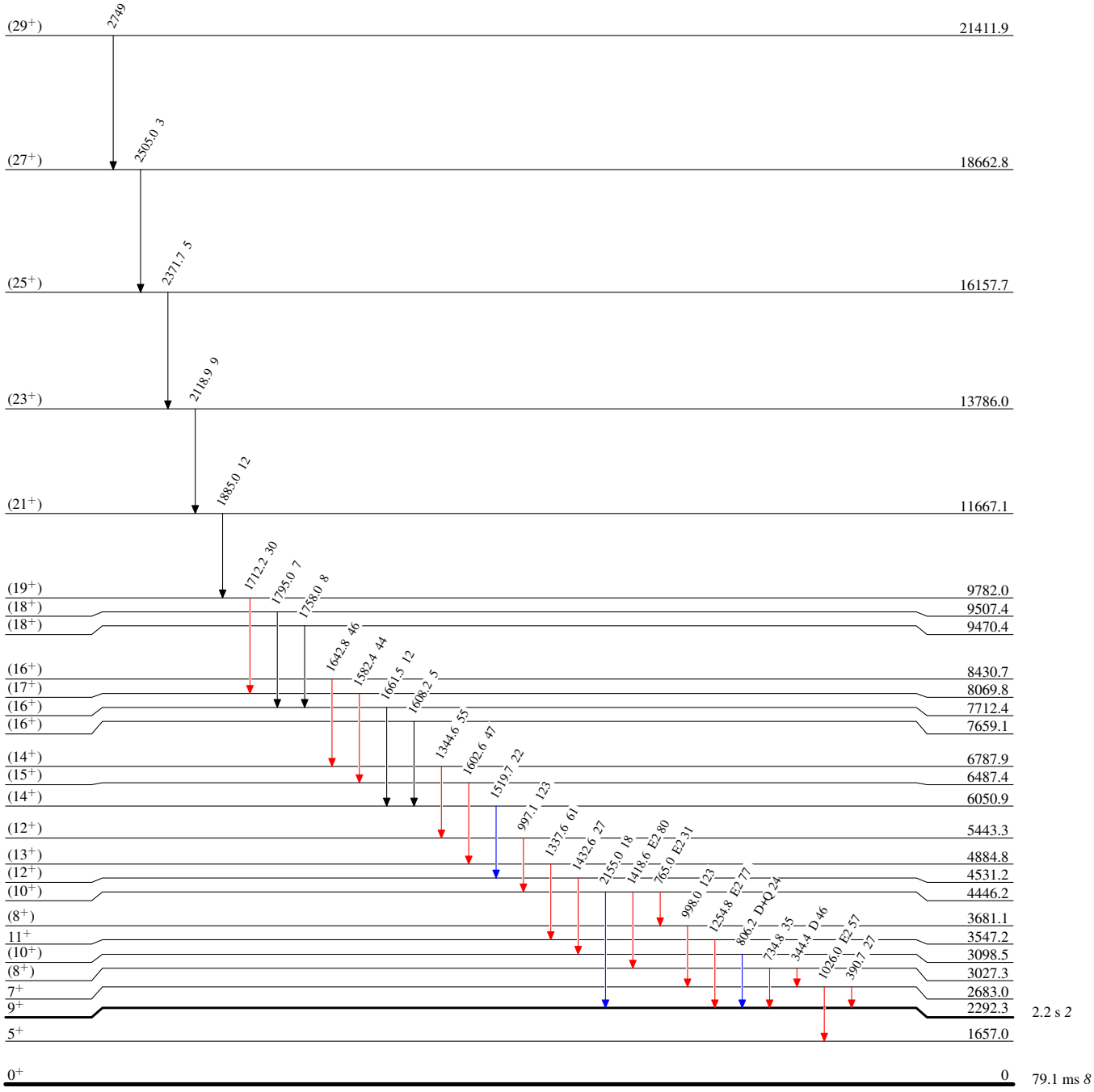
Intensities: Relative I_γ

Legend

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

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

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



$^{70}_{35}Br_{35}$

^{40}Ca(^{36}Ar,αpnγ),(^{32}S,pnγ) 2002Je07

Level Scheme (continued)

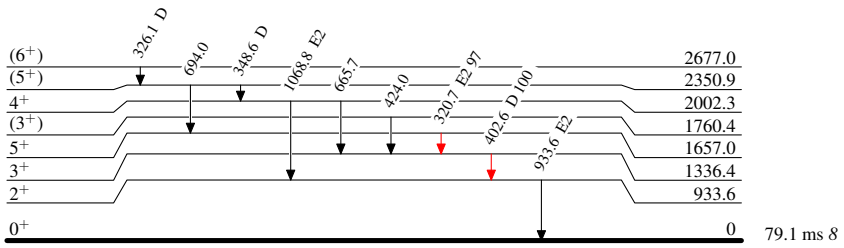
Intensities: Relative I_γ

Legend

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

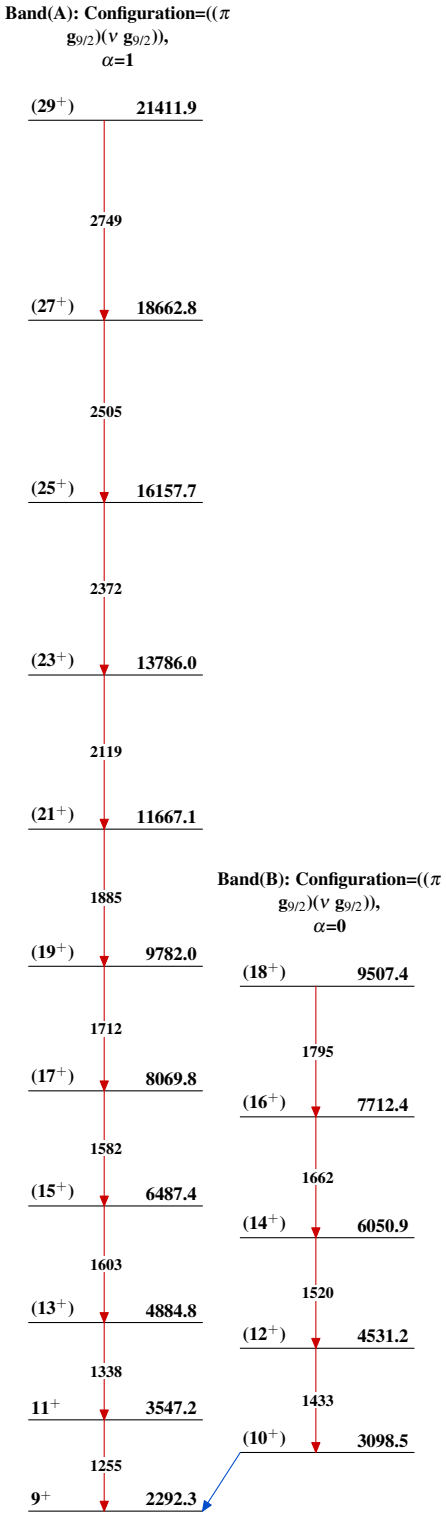
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{70}_{35}Br_{35}$

^{40}Ca(^{36}Ar,αpnγ),(^{32}S,pnγ) 2002Je07



$^{70}_{35}Br_{35}$