^{42}Ca(n,γ) E=thermal 1969Gr08,1978Ve06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

1969Gr08: Thermal neutron beam was produced from the Dutch High Flux Reactor, with intensity of 10^7 cm^{-2}s^{-1} on enriched ^{42}Ca target. γ-rays were detected by a 6.5 cm^3 planar Ge(Li) detector. Measured Eγ, Iγ, $\gamma\gamma$. Deduced levels, J, γ-branching ratios.

1978Ve06: Polarized thermal neutron beam was produced from the HFR at Petten, with intensity of 2×10^7 cm^{-2}s^{-1} on enriched ^{42}Ca target. γ-rays were detected with Ge(Li) detectors. Measured γ(circ pol). Deduced levels, J.

Others:

1971BiZH: E=thermal. Measured Eγ, Iγ, $\gamma\gamma$.

1971Cr02: E=thermal. Measured Eγ, Iγ. Data for three secondary γ-rays.

1989Ra06: E=thermal.

^{43}Ca Levels

E(level)[‡]	J$^\pi$[†]	T$_{1/2}$	Comments
0.0	7/2$^-$		
372.72 *17*	5/2$^-$		
593.31 *23*	3/2$^-$[&]		
990.4 *3*	3/2$^+$		
1394.5 *5*	5/2$^+$		
1957.3 *8*	1/2$^+$		
2046.33 *21*	3/2$^-$[&]		
2102.8 *5*	3/2$^-$		
2272.8 *12*			
2610.9 *4*	1/2$^-$[&]		
2878.2 *5*	1/2$^-$[&]		
2943.5 *4*	3/2$^-$[&]		
3286.1 *6*	3/2$^-$[&]		
3315.4 *6*	1/2$^-$,3/2$^-$		
3572.6 *4*	3/2$^-$[&]		
4207.3 *4*	1/2$^-$[&]		
4602.6 *11*	(1/2,3/2,5/2$^+$)		
4641.5 *11*	3/2$^+$,5/2$^+$		
4901.2 *6*	1/2$^-$,3/2$^-$[&]		
5037.8 *6*	1/2$^-$,3/2$^-$[&]		
(7932.7[#] *3*)	1/2$^+$[@]	1.1 eV *2*	Γ from 2006MuZX.

[†] From Adopted Levels, unless otherwise stated.

[‡] Least-squares fit to Eγ data.

[#] Observed de-excitation intensity is 88% *8* of g.s. feeding.

[@] s-wave capture in ^{42}Ca g.s.

[&] From (pol n,γ) measurements (1978Ve06).

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$\gamma(^{43}Ca)$

Iγ normalization: normalized assuming Iγ(g.s.)=100. Capture σ_0=0.68 b *7* (2006MuZX).
Asymmetry ratios from (pol n,γ) are given under comments as R values.

E_γ †‡	I_γ †@	E_i(level)	J_i^π	E_f	J_f^π	Comments
220.6 *3*	11 *1*	593.31	3/2$^-$	372.72	5/2$^-$	
372.70 *20*	38 *4*	372.72	5/2$^-$	0.0	7/2$^-$	
396.9 *4*	0.9 *2*	990.4	3/2$^+$	593.31	3/2$^-$	
404.0 *8*	0.5 *2*	1394.5	5/2$^+$	990.4	3/2$^+$	
564.4 *6*	1.5 *5*	2610.9	1/2$^-$	2046.33	3/2$^-$	
593.4 *6*	23 *2*	593.31	3/2$^-$	0.0	7/2$^-$	
617.7 *3*	6.6 *7*	990.4	3/2$^+$	372.72	5/2$^-$	
651.6 *6*	0.9 *5*	2046.33	3/2$^-$	1394.5	5/2$^+$	
831.4 *10*	0.4 *2*	2878.2	1/2$^-$	2046.33	3/2$^-$	
840.9 *10*	0.3 *2*	2943.5	3/2$^-$	2102.8	3/2$^-$	
[x]878.2 *6*	0.9 *2*					
967.5 *15*	≈0.2	1957.3	1/2$^+$	990.4	3/2$^+$	
1021.5 *10*	1.4 *4*	1394.5	5/2$^+$	372.72	5/2$^-$	
1055.9 *6*	4.2 *6*	2046.33	3/2$^-$	990.4	3/2$^+$	
1239.1 *12*	1.0 *2*	3286.1	3/2$^-$	2046.33	3/2$^-$	
1268.9 *6*	0.7 *2*	3315.4	1/2$^-$,3/2$^-$	2046.33	3/2$^-$	
1363.9 *10*	1.5 *10*	1957.3	1/2$^+$	593.31	3/2$^-$	
[x]1370.5 *10*	1.1 *2*					
1453.0 *3*	4.9 *5*	2046.33	3/2$^-$	593.31	3/2$^-$	
1525.4 *10*	0.7 *2*	3572.6	3/2$^-$	2046.33	3/2$^-$	
1673.5 *4*	11.9 *12*	2046.33	3/2$^-$	372.72	5/2$^-$	
1729.9 *10*	1.2 *4*	2102.8	3/2$^-$	372.72	5/2$^-$	
2017.8 *8*	2.8 *3*	2610.9	1/2$^-$	593.31	3/2$^-$	
2046.3 *3*	38 *4*	2046.33	3/2$^-$	0.0	7/2$^-$	
2102.7 *6*	1.2 *5*	2102.8	3/2$^-$	0.0	7/2$^-$	
2161.1 *6*	2.1 *3*	4207.3	1/2$^-$	2046.33	3/2$^-$	
2285.4 *10*	1.4 *3*	2878.2	1/2$^-$	593.31	3/2$^-$	
2350.3 *4*	2.5 *3*	2943.5	3/2$^-$	593.31	3/2$^-$	
2595.3[&]		4641.5	3/2$^+$,5/2$^+$	2046.33	3/2$^-$	Additional information 3.
2628.4		4901.2	1/2$^-$,3/2$^-$	2272.8		Additional information 4. Iγ(2628)/Iγ(2855)=0.67 *47* (quoted by 1990En08).
2798.4		4901.2	1/2$^-$,3/2$^-$	2102.8	3/2$^-$	Additional information 5. Iγ(2798)/Iγ(2855)=1.00 *85* (quoted by 1990En08).
2854.8		4901.2	1/2$^-$,3/2$^-$	2046.33	3/2$^-$	Additional information 6.
2895.1 *5*	2.0 *3*	(7932.7)	1/2$^+$	5037.8	1/2$^-$,3/2$^-$	R=+2.1 *9* (1978Ve06).
2978.9 *7*	1.2 *3*	3572.6	3/2$^-$	593.31	3/2$^-$	
2992.4 *10*	0.6 *3*	5037.8	1/2$^-$,3/2$^-$	2046.33	3/2$^-$	
3031.3 *10*	1.1 *3*	(7932.7)	1/2$^+$	4901.2	1/2$^-$,3/2$^-$	R=+0.9 *5* (1978Ve06).
3199.4	0.3 *2*	3572.6	3/2$^-$	372.72	5/2$^-$	Additional information 1.
3291.1		(7932.7)	1/2$^+$	4641.5	3/2$^+$,5/2$^+$	Additional information 8.
3330.0		(7932.7)	1/2$^+$	4602.6	(1/2,3/2,5/2$^+$)	Additional information 9.
3613.4 *8*	4.7 *12*	4207.3	1/2$^-$	593.31	3/2$^-$	
[x]3654.7 *6*	0.9 *3*					
3725.3 *3*	8.3 *12*	(7932.7)	1/2$^+$	4207.3	1/2$^-$	R=+0.98 *15* (1978Ve06).
4009.8[&]		4602.6	(1/2,3/2,5/2$^+$)	593.31	3/2$^-$	Additional information 2.
4307.6		4901.2	1/2$^-$,3/2$^-$	593.31	3/2$^-$	Additional information 7. Iγ(4308)/Iγ(2855)=0.67 *60* (quoted by 1990En08).
4359.5 *5*	2.9 *4*	(7932.7)	1/2$^+$	3572.6	3/2$^-$	R=−0.4 *2* (1978Ve06).
4616.6 *9*	0.6 *3*	(7932.7)	1/2$^+$	3315.4	1/2$^-$,3/2$^-$	
4646.2 *6*	2.4 *5*	(7932.7)	1/2$^+$	3286.1	3/2$^-$	R=−0.3 *2* (1978Ve06).

Continued on next page (footnotes at end of table)

^{42}Ca(n,γ) E=thermal 1969Gr08,1978Ve06 (continued)

$\gamma(^{43}Ca)$ (continued)

E_γ[†][‡]	I_γ[†][@]	E_i(level)	J_i^π	E_f	J_f^π	Comments
[x]4836.8 *9*	≈0.1					
4989.2 *5*	3.6 *5*	(7932.7)	$1/2^+$	2943.5	$3/2^-$	R=−0.55 *18* (1978Ve06).
5054.2 *5*	2.4 *4*	(7932.7)	$1/2^+$	2878.2	$1/2^-$	R=+0.6 *3* (1978Ve06).
5321.4 *5*	4.1 *6*	(7932.7)	$1/2^+$	2610.9	$1/2^-$	R=+0.79 *19* (1978Ve06).
[x]5420.7 *12*	≈0.2					
5828.6 *15*	0.9 *3*	(7932.7)	$1/2^+$	2102.8	$3/2^-$	
5886.0 *4*	53[#] *8*	(7932.7)	$1/2^+$	2046.33	$3/2^-$	R=−0.50 *3* (1978Ve06).
5975.2 *15*	0.6 *3*	(7932.7)	$1/2^+$	1957.3	$1/2^+$	
7339.0 *7*	5.7 *9*	(7932.7)	$1/2^+$	593.31	$3/2^-$	R=−0.50 *11* (1978Ve06).

[†] From 1969Gr08. Recoil correction, applied by 1969Gr08, has been removed by the evaluators.
[‡] Gamma energies in 1969Gr08 have been compared with those in the PGAA-LBL Budapest database (2007ChZX).
[#] From measured elemental σ_γ=0.024 b *4* (2007ChZX, PGAA database), abundance of ^{42}Ca=0.647%, and σ_0=0.68 b *7* (2006MuZX), σ_γ=0.37 b *6* and Iγ=54 *10*/100 n-captures, which agrees with 53 *8* from 1969Gr08.
[@] Intensity per 100 neutron captures.
[&] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

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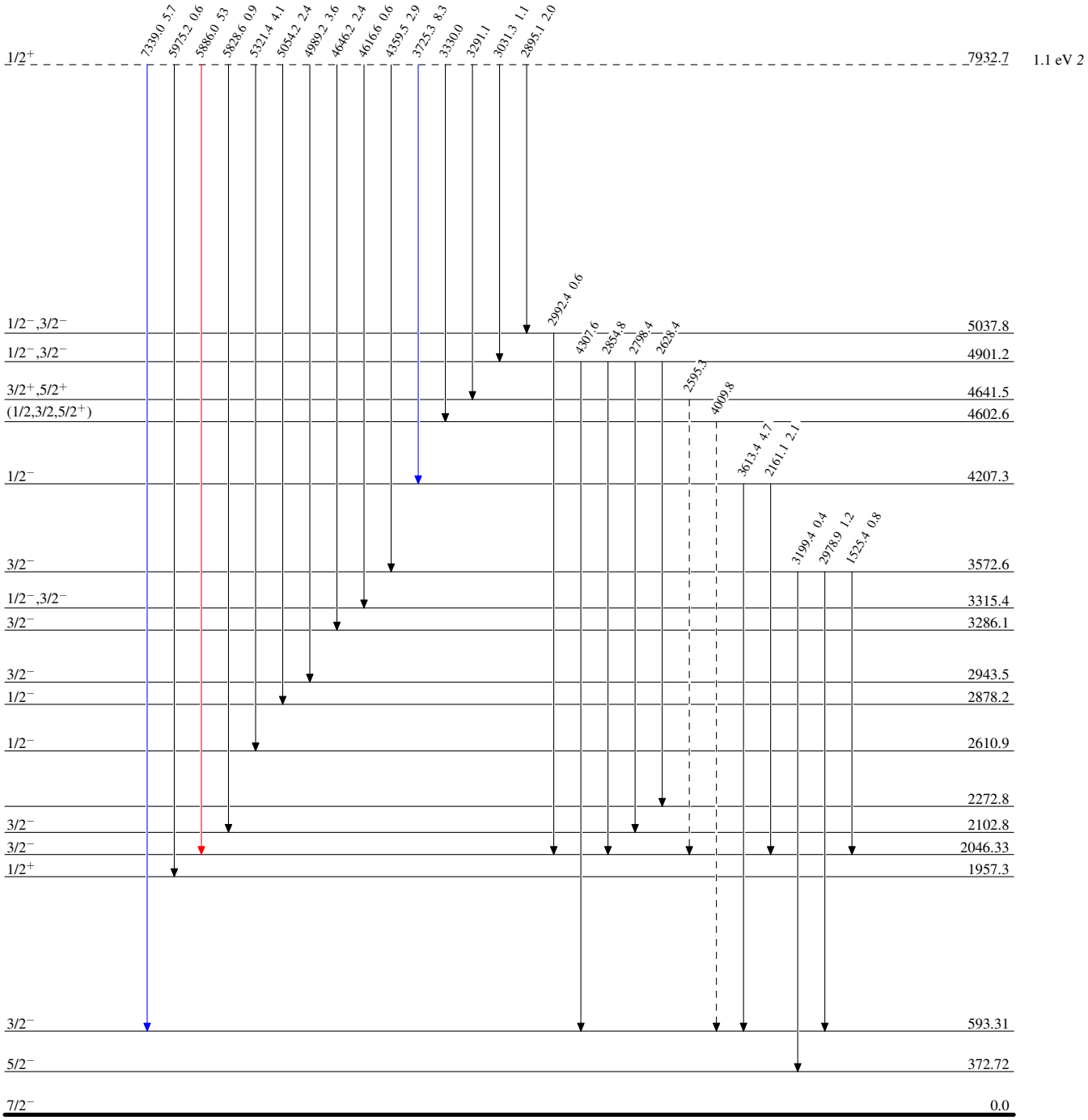
Level Scheme

Intensities: Per about 100 N-captures

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)



$^{43}_{20}Ca_{23}$

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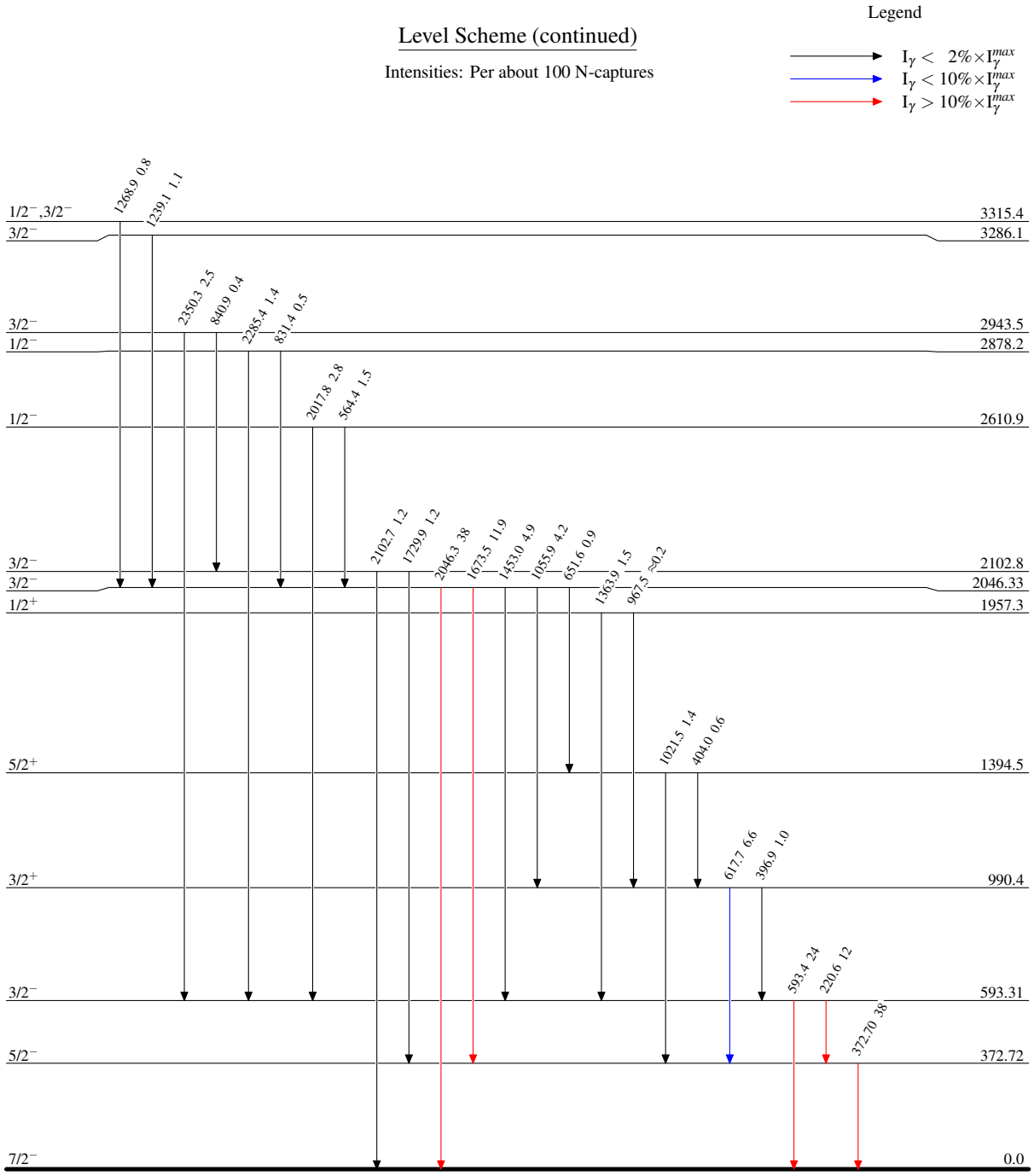
Level Scheme (continued)

Intensities: Per about 100 N-captures



$^{43}_{20}Ca_{23}$