^{58}Ni(^{40}Ca,α2pnγ) 1993Ar02

		History	
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 114, 1293 (2013)	1-Sep-2013

1993Ar02: E(^{40}Ca)=187 MeV; 99.7% ^{58}Ni target, NORDBALL array (15 HPGe detectors), 11 liquid-scintillator n detectors, 21-element Si ball for charged particle detection; measured Eγ, Iγ, γ anisotropy ratio [=2Iγ(143°)/(Iγ(79°)+Iγ(101°))], $\gamma\gamma$ coin.

^{91}Ru Levels

E(level)†	J$^\pi$‡	Comments
0.0	(9/2$^+$)	
973.3	(13/2$^+$)	
1871.5	(17/2$^+$)	
1892.7	(13/2$^-$)	
2199.4	(17/2$^-$)	
2253.2	(15/2$^-$)	E(level): for adopted order of 361γ and 155γ; order could not be established by 1993Ar02.
2368.5	(21/2$^+$)	
2408.6	(17/2$^-$)	
2708.3	(19/2$^-$)	E(level): for adopted order of 300γ and 845γ; order could not be established by 1993Ar02.
2984.3	(23/2$^+$)	
3163.4	(21/2$^-$)	
3191.4	(25/2$^+$)	
3553.4	(23/2$^-$)	
3632.3	(25/2$^+$)	
3968.5	(27/2$^+$)	
4034.3	(25/2$^-$)	
4150.2	(29/2$^+$)	
4378.0	(27/2$^-$)	
4990.1	(31/2$^-$)	
5107.5	(33/2$^+$)	
5960.2	(35/2$^+$)	E(level): for adopted order of 853γ and 123γ; order could not be established by 1993Ar02.
5994.4	(35/2$^-$)	
6083.1	(37/2$^+$)	
6311	(37/2$^-$)	
6919	(41/2$^-$)	
7197	(39/2$^-$)	
7513	(41/2$^+$)	
8146	(43/2$^-$,45/2$^-$)	
9627	(45/2$^-$ to 49/2$^-$)	

† From least-squares fit to Eγ, allowing equal weight for each γ.

‡ Authors′ values; based on measured γ anisotropy ratios, and the assumptions that essentially all levels deexcite to levels having equal or lower spin and that crossover transitions usually have mult=E2. Note that J values for π=− levels with E>4500 exceed those in Adopted Levels, because the 608γ and 612γ are interpreted as ΔJ=2 (rather than ΔJ=1) transitions by 1993Ar02.

γ(^{91}Ru)

E$_\gamma$†	I$_\gamma$‡	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.#	Comments
123.4	6.9 *10*	6083.1	(37/2$^+$)	5960.2	(35/2$^+$)		Anisotropy ratio (1993Ar02): 1.1 *3*.
155.4	11.2 *11*	2408.6	(17/2$^-$)	2253.2	(15/2$^-$)	D	Anisotropy ratio (1993Ar02): 0.88 *15*.
181.8	13.3 *12*	4150.2	(29/2$^+$)	3968.5	(27/2$^+$)	D	Anisotropy ratio (1993Ar02): 0.73 *10*.
207.1		3191.4	(25/2$^+$)	2984.3	(23/2$^+$)		I$_\gamma$: 33.8 *21* for 207.1γ+209.1γ doublet (1993Ar02).
209.1		2408.6	(17/2$^-$)	2199.4	(17/2$^-$)		I$_\gamma$: 33.8 *21* for 207.1γ+209.1γ doublet.
299.6	13.6 *11*	2708.3	(19/2$^-$)	2408.6	(17/2$^-$)	D	Anisotropy ratio (1993Ar02): 0.91 *14*.

Continued on next page (footnotes at end of table)

^{58}Ni(^{40}Ca,α2pnγ) 1993Ar02 (continued)

γ(^{91}Ru) (continued)

Eγ[†]	Iγ[‡]	Ei(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
306.7	3.4 *10*	2199.4	(17/2⁻)	1892.7	(13/2⁻)		Anisotropy ratio (1993Ar02): 1.1 *5*.
317.0	18.0 *19*	6311	(37/2⁻)	5994.4	(35/2⁻)	D	Anisotropy ratio (1993Ar02): 0.69 *14*.
327.8	30.4 *17*	2199.4	(17/2⁻)	1871.5	(17/2⁺)		Anisotropy ratio (1993Ar02): 1.26 *10*; interpreted by authors as a ΔJ=0 transition.
336.3	6.3 *18*	3968.5	(27/2⁺)	3632.3	(25/2⁺)		Anisotropy ratio (1993Ar02): 0.94 *27*.
343.6	18.9 *15*	4378.0	(27/2⁻)	4034.3	(25/2⁻)	D	Anisotropy ratio (1993Ar02): 0.79 *11*.
360.5	9.2 *14*	2253.2	(15/2⁻)	1892.7	(13/2⁻)	D	Anisotropy ratio (1993Ar02): 0.53 *15*.
390.2	11.4 *15*	3553.4	(23/2⁻)	3163.4	(21/2⁻)	D	Anisotropy ratio (1993Ar02): 0.87 *18*.
497.0	56 *3*	2368.5	(21/2⁺)	1871.5	(17/2⁺)	Q	Anisotropy ratio (1993Ar02): 1.61 *15*.
608.0	15.7 *15*	6919	(41/2⁻)	6311	(37/2⁻)	Q	Anisotropy ratio (1993Ar02): 1.47 *22*. Note that this transition is assigned as ΔJ=1 in Adopted Gammas.
612.1	36.6 *21*	4990.1	(31/2⁻)	4378.0	(27/2⁻)	Q	Anisotropy ratio (1993Ar02): 1.66 *15*. Note that adopted mult(612γ)=D+Q.
615.7	28.1 *20*	2984.3	(23/2⁺)	2368.5	(21/2⁺)	D	Anisotropy ratio (1993Ar02): 0.81 *8*.
647.8	4.0 *10*	3632.3	(25/2⁺)	2984.3	(23/2⁺)		
777.2	10.0 *15*	3968.5	(27/2⁺)	3191.4	(25/2⁺)	D	Anisotropy ratio (1993Ar02): 0.65 *17*.
822.8	9.5 *20*	3191.4	(25/2⁺)	2368.5	(21/2⁺)		Anisotropy ratio (1993Ar02): 1.2 *5*.
824.7	20.0 *22*	4378.0	(27/2⁻)	3553.4	(23/2⁻)	Q	Anisotropy ratio (1993Ar02): 1.50 *25*.
844.9	10.1 *20*	3553.4	(23/2⁻)	2708.3	(19/2⁻)		Anisotropy ratio (1993Ar02): 1.2 *4*.
852.7	8.4 *15*	5960.2	(35/2⁺)	5107.5	(33/2⁺)	D	Anisotropy ratio (1993Ar02): 0.78 *24*.
870.8	23.9 *21*	4034.3	(25/2⁻)	3163.4	(21/2⁻)	Q	Anisotropy ratio (1993Ar02): 1.9 *3*.
898.2	93 *5*	1871.5	(17/2⁺)	973.3	(13/2⁺)	Q	Anisotropy ratio (1993Ar02): 1.42 *10*.
919.4	11.5 *20*	1892.7	(13/2⁻)	973.3	(13/2⁺)		Anisotropy ratio (1993Ar02): 1.6 *4*; interpreted by authors as a ΔJ=0 transition.
957.3	30 *4*	5107.5	(33/2⁺)	4150.2	(29/2⁺)	Q	Anisotropy ratio (1993Ar02): 1.6 *5*.
958.7	31 *4*	4150.2	(29/2⁺)	3191.4	(25/2⁺)	Q	Anisotropy ratio (1993Ar02): 1.3 *3*.
964.2	25.0 *24*	3163.4	(21/2⁻)	2199.4	(17/2⁻)	Q	Anisotropy ratio (1993Ar02): 1.7 *3*.
973.3	100 *3*	973.3	(13/2⁺)	0.0	(9/2⁺)	Q	Anisotropy ratio (1993Ar02): 1.47 *9*.
975.6	9.2 *15*	6083.1	(37/2⁺)	5107.5	(33/2⁺)		
1004.3	36.0 *25*	5994.4	(35/2⁻)	4990.1	(31/2⁻)	Q	Anisotropy ratio (1993Ar02): 1.46 *16*.
1203.0	15.1 *21*	7197	(39/2⁻)	5994.4	(35/2⁻)	Q	Anisotropy ratio (1993Ar02): 1.4 *3*.
1226.7	17 *3*	8146	(43/2⁻,45/2⁻)	6919	(41/2⁻)		Anisotropy ratio (1993Ar02): 1.0 *3*.
1263.9	6.6 *14*	3632.3	(25/2⁺)	2368.5	(21/2⁺)		
1430.2	9.6 *19*	7513	(41/2⁺)	6083.1	(37/2⁺)	Q	Anisotropy ratio (1993Ar02): 1.5 *5*.
1481.2	7.5 *17*	9627	(45/2⁻ to 49/2⁻)	8146	(43/2⁻,45/2⁻)		Anisotropy ratio (1993Ar02): 1.3 *4*.
[x]1701.0	2.8 *8*						
[x]1731.5	3.8 *10*						
[x]2299.8	2.5 *9*						

[†] ΔE_γ=0.2-1.0 keV, depending on energy and intensity.

[‡] Photon intensity relative to I(974γ)=100 (1993Ar02).

[#] Based on measured γ anisotropy ratio; expected values are≈1.4 for stretched Q (or D ΔJ=0),≈0.8 for stretched D.

[x] γ ray not placed in level scheme.

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Legend

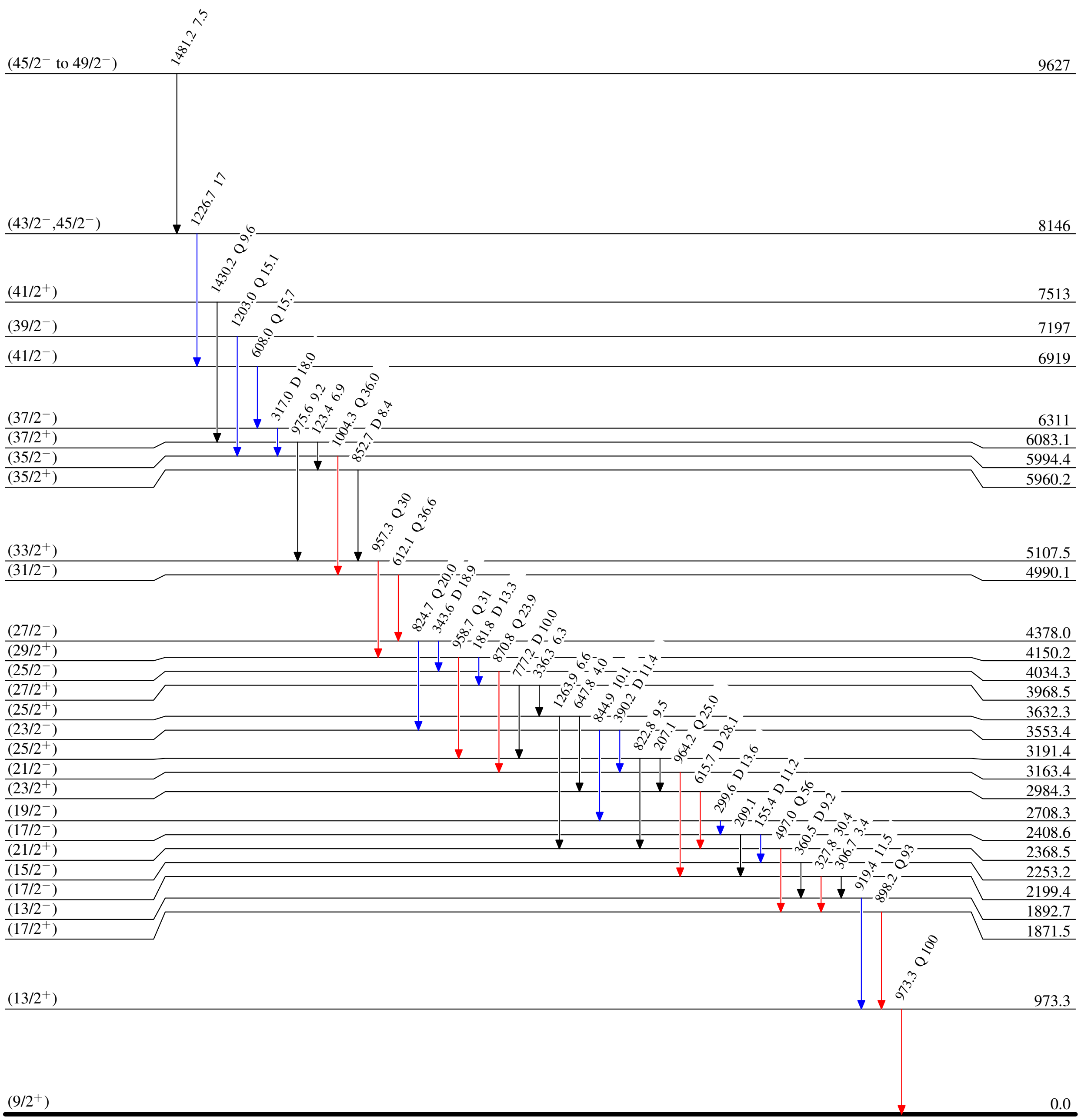
Level Scheme

Intensities: Relative I_γ

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

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

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



$^{91}_{44}Ru_{47}$