^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 135, 193 (2016)	31-May-2016

2004Ma39: E(^{24}Mg)=90 MeV. Measured Eγ, Iγ, $\gamma\gamma$ using GASP array. Charged particles were detected with the ISIS ball of Si detectors, while neutrons were detected using the neutron detectors n-ring.

1990Ch07, 1982Li08: E(^{24}Mg)=65-110 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, nγ(t), n$\gamma\gamma$ coincidence. Also ^{24}Mg(^{58}Ni,2pnγ), E=190 MeV. See separate dataset for this inverse reaction.

1990He04: E(^{24}Mg)=80, 85 MeV. Measured level $T_{1/2}$ by RDDS and DSA methods.

1993SuZZ: ^{58}Ni(^{28}Si,n2p$\alpha\gamma$),E=128 MeV. Measured Eγ, $\gamma\gamma$, particle-γ coincidences with different detector arrays. A rotational band with probable assignment of 1/2[431] is proposed. All levels in this report are covered in 2004Ma39 study.

1973BoXS: Ca(^{40}Ca,X); measured Eγ, nγ-coin, γ(t).

^{79}Sr Levels

E(level)[†]	J$^\pi$	$T_{1/2}$[‡]	Comments
0.0[&]	3/2$^-$		
159.23[a] 5	5/2$^-$	49 ps 6	
177.30[@] 6	5/2$^+$	20 ns 1	$T_{1/2}$: nγ(t) (1990Ch07). Other: 23 ns 4 (γ(t),1973BoXS).
329.86[#] 8	7/2$^+$	107 ps 6	
375.3[c] 3	1/2$^+$		
381.09[&] 5	7/2$^-$	12.5 ps 21	
443.2[b] 3	3/2$^+$		
499.12[@] 8	9/2$^+$	30.5 ps 35	
597.2[c] 3	5/2$^+$		
649.13[a] 7	9/2$^-$	3.0 ps 5	
751.0[b] 4	7/2$^+$		
914.43[#] 9	11/2$^+$	1.80 ps 21	
982.42[&] 8	11/2$^-$	1.04 ps 14	
1032.4[c] 5	9/2$^+$		
1179.39[@] 10	13/2$^+$	1.18 ps 21	
1265.8[b] 5	11/2$^+$		
1339.17[a] 9	13/2$^-$	0.87 ps 14	$T_{1/2}$: from 0.91 ps 21 (RDDS) and 0.83 ps 21 (DSAM) (1990He04).
1676.1[c] 6	13/2$^+$		
1729.8[#] 4	15/2$^+$	<0.7 ps	
1774.26[&] 12	15/2$^-$	0.97 ps 7	$T_{1/2}$: from 0.97 ps 14 (RDDS) and 0.97 ps 7 (DSAM) (1990He04).
1981.8[b] 6	15/2$^+$		
2064.9[@] 4	17/2$^+$	0.48 ps +5−7	
2203.26[a] 15	17/2$^-$	0.62 ps 10	
2506.8[c] 7	17/2$^+$		
2728.9[#] 5	19/2$^+$		
2729.3[&] 3	19/2$^-$		
2889.5[b] 8	19/2$^+$		
3129.4[@] 5	21/2$^+$	0.36 ps 7	
3215.8[a] 4	21/2$^-$	<0.42 ps	$T_{1/2}$: not corrected for side feeding.
3508.5[c] 9	21/2$^+$		
3832.5[&] 5	23/2$^-$		
3873.6[#] 6	23/2$^+$		
3978.3[b] 10	23/2$^+$		
4304.6[@] 7	25/2$^+$	<0.21 ps	$T_{1/2}$: not corrected for side feeding.

Continued on next page (footnotes at end of table)

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04 (continued)

^{79}Sr Levels (continued)

E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ	E(level)†	Jπ
4368.4[a] 6	25/2−	5977.0[c] 11	29/2+	7994.1[#] 11	35/2+	9813.4[@] 13	41/2+
4668.8[c] 10	25/2+	6467.6[#] 9	31/2+	8087.4[&] 10	35/2−	10052.4[b] 17	39/2+
5086.2[&] 7	27/2−	6500.2[&] 9	31/2−	8176.7[@] 12	37/2+	10339.8[a] 17	41/2−
5119.4[#] 8	27/2+	6676.5[b] 12	31/2+	8257.4[b] 13	35/2+	10699.7[c] 17	41/2+
5242.5[b] 11	27/2+	6734.7[@] 10	33/2+	8738.7[a] 14	37/2−	11542.2[#] 13	43/2+
5479.8[@] 9	29/2+	7139.7[a] 9	33/2−	9028.7[c] 13	37/2+	11680.8[@] 14	45/2+
5671.5[a] 8	29/2−	7435.9[c] 12	33/2+	9689.1[#] 12	39/2+	12106.8[a] 20	45/2−

† From least-squares fit to Eγ data; assuming Δ(Eγ)=0.5 keV for Eγ values given to nearest tenth of a keV, and 1 keV when given to nearest keV.
‡ From RDDS or DSA method (1990He04), unless otherwise stated.
[#] Band(A): ν5/2[422],α=−1/2.
[@] Band(a): ν5/2[422],α=+1/2.
[&] Band(B): ν3/2[301],α=−1/2.
[a] Band(b): ν3/2[301],α=+1/2.
[b] Band(C): ν1/2[431],α=−1/2.
[c] Band(c): ν1/2[431],α=+1/2.

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04 (continued)

$\gamma(^{79}Sr)$

A_2 and A_4 coefficients are from ^{58}Ni(^{24}Mg,2pnγ),E=75 MeV (1990Ch07). No angular distribution or correlation data were reported in 2004Ma39.

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	Comments
159.23	5/2$^-$	159.23 *6*	100	0.0	3/2$^-$	(M1+E2)	−0.09 *6*	0.0471 *21*	A_2=−0.28 *3*; A_4=−0.05 *4* α(K)=0.0415 *18*; α(L)=0.00471 *25*; α(M)=0.00079 *5* α(N)=9.9×10^{-5} *5*; α(O)=6.29×10^{-6} *23* Additional information 1.
177.30	5/2$^+$	177.30 *6*	100	0.0	3/2$^-$	(E1(+M2))	−0.01 *3*	0.0346	A_2=−0.20 *3*; A_4=−0.02 *3* α(K)=0.0305 *5*; α(L)=0.00343 *5*; α(M)=0.000577 *9* α(N)=7.23×10^{-5} *11*; α(O)=4.64×10^{-6} *7* Additional information 2.
329.86	7/2$^+$	152.50 *5*	100	177.30	5/2$^+$	M1+E2	−0.22 *8*	0.059 *6*	A_2=−0.44 *3*; A_4=−0.02 *3* α(K)=0.052 *6*; α(L)=0.0061 *8*; α(M)=0.00102 *13* α(N)=0.000127 *15*; α(O)=7.8×10^{-6} *7* Additional information 3.
375.3	1/2$^+$	216.1		159.23	5/2$^-$				
		375.3		0.0	3/2$^-$				
381.09	7/2$^-$	221.80 *6*	81 *1*	159.23	5/2$^-$	M1+E2	−0.17 *7*	0.0203 *10*	A_2=−0.39 *3*; A_4=−0.03 *3* α(K)=0.0179 *9*; α(L)=0.00202 *12*; α(M)=0.000340 *19* α(N)=4.25×10^{-5} *23*; α(O)=2.71×10^{-6} *12* Additional information 4.
		381.09 *6*	19 *1*	0.0	3/2$^-$	E2		0.00864	A_2=+0.25 *6*; A_4=−0.22 *7* α(K)=0.00759 *11*; α(L)=0.000882 *13*; α(M)=0.0001481 *21* α(N)=1.82×10^{-5} *3*; α(O)=1.090×10^{-6} *16* Branching ratio: Iγ(381)/Iγ(222)=15.1 *9*/84.9 *9* (1990He04). Additional information 5.
443.2	3/2$^+$	265.9		177.30	5/2$^+$				
		283.9		159.23	5/2$^-$				
499.12	9/2$^+$	169.15 *6*	82 *1*	329.86	7/2$^+$	M1+E2	−0.26 *6*	0.046 *4*	A_2=−0.45 *3*; A_4=−0.01 *3* α(K)=0.040 *3*; α(L)=0.0047 *4*; α(M)=0.00079 *7* α(N)=9.8×10^{-5} *8*; α(O)=6.0×10^{-6} *4* Additional information 6.
		321.94 *7*	18 *1*	177.30	5/2$^+$	E2		0.01515	A_2=+0.16 *6*; A_4=−0.11 *8* α(K)=0.01328 *19*; α(L)=0.001573 *22*; α(M)=0.000264 *4* α(N)=3.24×10^{-5} *5*; α(O)=1.89×10^{-6} *3* Branching ratio: Iγ(322)/Iγ(169)=18.9 *12*/81.1 *12* (1990He04). Additional information 7.
597.2	5/2$^+$	154.1		443.2	3/2$^+$				
		221.9		375.3	1/2$^+$				
		419.9		177.30	5/2$^+$				
		438.0		159.23	5/2$^-$				

$^{79}_{38}Sr_{41}$-3

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04 (continued)

γ(^{79}Sr) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	Comments
649.13	9/2⁻	268.01 *6*	60 *2*	381.09	7/2⁻	M1+E2	−0.13 *6*	0.0122 *4*	A_2=−0.42 *3*; A_4=+0.01 *4* α(K)=0.0108 *3*; α(L)=0.00120 *4*; α(M)=0.000202 *7* α(N)=2.53×10^{-5} *8*; α(O)=1.63×10^{-6} *5* Additional information 8.
		490.00 *8*	40 *2*	159.23	5/2⁻	E2		0.00391	A_2=+0.23 *5*; A_4=−0.11 *5* α(K)=0.00344 *5*; α(L)=0.000391 *6*; α(M)=6.57×10^{-5} *10* α(N)=8.14×10^{-6} *12*; α(O)=5.00×10^{-7} *7* Branching ratio: Iγ(490)/Iγ(268)=39.8 *24*/60.2 *24* (1990He04). Additional information 9.
751.0	7/2⁺	153.8		597.2	5/2⁺				
		307.8		443.2	3/2⁺				
914.43	11/2⁺	415.27 *8*	60 *1*	499.12	9/2⁺	M1+E2	−0.37 *16*	0.0044 *3*	A_2=−0.72 *8*; A_4=+0.09 *8* α(K)=0.00386 *22*; α(L)=0.00043 *3*; α(M)=7.2×10^{-5} *5* α(N)=9.0×10^{-6} *6*; α(O)=5.8×10^{-7} *3* Additional information 10.
		584.63 *9*	40 *1*	329.86	7/2⁺	E2		0.00232	A_2=+0.34 *7*; A_4=−0.08 *8* α(K)=0.00205 *3*; α(L)=0.000230 *4*; α(M)=3.85×10^{-5} *6* α(N)=4.79×10^{-6} *7*; α(O)=2.99×10^{-7} *5* Additional information 11.
982.42	11/2⁻	333.29 *7*	50 *2*	649.13	9/2⁻	M1+E2	−0.24 *5*	0.00729 *19*	A_2=−0.56 *3*; A_4=+0.01 *5* α(K)=0.00644 *16*; α(L)=0.000716 *20*; α(M)=0.000120 *4* α(N)=1.51×10^{-5} *4*; α(O)=9.69×10^{-7} *23* Additional information 12.
		601.27 *9*	50 *2*	381.09	7/2⁻	E2		0.00214	A_2=+0.34 *5*; A_4=−0.08 *7* α(K)=0.00189 *3*; α(L)=0.000212 *3*; α(M)=3.55×10^{-5} *5* α(N)=4.42×10^{-6} *7*; α(O)=2.77×10^{-7} *4* Branching ratio: Iγ(601)/Iγ(333)=52.0 *54*/48.0 *54* (1990He04). Additional information 13.
1032.4	9/2⁺	281.4		751.0	7/2⁺				
		435.1		597.2	5/2⁺				
1179.39	13/2⁺	264.97 *7*	26 *1*	914.43	11/2⁺	M1+E2	−0.18 *9*	0.0128 *7*	A_2=−0.51 *8*; A_4=+0.17 *9* α(K)=0.0113 *6*; α(L)=0.00127 *8*; α(M)=0.000213 *13* α(N)=2.67×10^{-5} *15*; α(O)=1.71×10^{-6} *8* Additional information 14.
		680.25 *9*	74 *1*	499.12	9/2⁺	(E2)		1.52×10^{-3}	A_2=+0.27 *3*; A_4=−0.03 *4* α(K)=0.001343 *19*; α(L)=0.0001493 *21*; α(M)=2.51×10^{-5} *4* α(N)=3.12×10^{-6} *5*; α(O)=1.97×10^{-7} *3* Branching ratio: Iγ(680)/Iγ(265)=78.9 *20*/21.1 *20* (1990He04). Additional information 15.
1265.8	11/2⁺	233.4		1032.4	9/2⁺				
		514.8		751.0	7/2⁺				
1339.17	13/2⁻	356.69 *7*	45 *2*	982.42	11/2⁻	M1+E2	−0.07 *3*	0.00590	A_2=−0.31 *5*; A_4=−0.04 *5*

$^{79}_{38}Sr_{41}$-4

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04 (continued)

$\gamma(^{79}Sr)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	Comments
									α(K)=0.00521 *8*; α(L)=0.000575 *9*; α(M)=9.67×10^{-5} *15* α(N)=1.214×10^{-5} *18*; α(O)=7.88×10^{-7} *12* Additional information 16.
1339.17	13/2$^-$	690.12 *10*	55 *2*	649.13	9/2$^-$	(E2)		1.46×10^{-3}	A$_2$=+0.45 *11*; A$_4$=−0.14 *16* α(K)=0.001292 *18*; α(L)=0.0001435 *20*; α(M)=2.41×10^{-5} *4* α(N)=3.00×10^{-6} *5*; α(O)=1.90×10^{-7} *3* Branching ratio: Iγ(690)/Iγ(357)=68.0 *28*/32.0 *28* (1990He04). Additional information 17.
1676.1	13/2$^+$	410.3		1265.8	11/2$^+$				
		643.7		1032.4	9/2$^+$				
1729.8	15/2$^+$	550.3	31[#] *6*	1179.39	13/2$^+$				Additional information 18.
		815.5	68[#] *6*	914.43	11/2$^+$				Additional information 19.
1774.26	15/2$^-$	435.05 *10*	47 *5*	1339.17	13/2$^-$	M1+E2	−0.15 *5*	0.00369 *7*	A$_2$=−0.31 *5*; A$_4$=+0.02 *2* α(K)=0.00326 *6*; α(L)=0.000358 *7*; α(M)=6.02×10^{-5} *11* α(N)=7.56×10^{-6} *13*; α(O)=4.92×10^{-7} *8* Additional information 20.
		792.0 *2*	53 *5*	982.42	11/2$^-$				Branching ratio: Iγ(792)/Iγ(435)=77.6 *34*/22.4 *34* (1990He04). Additional information 21.
1981.8	15/2$^+$	305.7		1676.1	13/2$^+$				
		716.1		1265.8	11/2$^+$				
2064.9	17/2$^+$	335.1	12.3[#] *21*	1729.8	15/2$^+$				Additional information 22. δ(E2/M1)≤1 (1990He04).
		885.4	87.7[#] *21*	1179.39	13/2$^+$				Additional information 23.
2203.26	17/2$^-$	429.00 *10*	42 *10*	1774.26	15/2$^-$				δ(E2/M1)≤0.5 (1990He04). Additional information 24.
		864.00 *40*	58 *10*	1339.17	13/2$^-$				Branching ratio: Iγ(864)/Iγ(429)=76.6 *43*/23.4 *43* (1990He04). Additional information 25.
2506.8	17/2$^+$	524.9		1981.8	15/2$^+$				
		830.7		1676.1	13/2$^+$				
2728.9	19/2$^+$	664.0		2064.9	17/2$^+$				Additional information 26.
		999.1		1729.8	15/2$^+$				
2729.3	19/2$^-$	525.9 *3*	33 *10*	2203.26	17/2$^-$				Additional information 27.
		955 *1*	66 *10*	1774.26	15/2$^-$				Additional information 28.
2889.5	19/2$^+$	907.7		1981.8	15/2$^+$				
3129.4	21/2$^+$	400.5	18[#] *3*	2728.9	19/2$^+$				Additional information 29.
		1064.5	82[#] *3*	2064.9	17/2$^+$				Additional information 30.
3215.8	21/2$^-$	486.4		2729.3	19/2$^-$				
		1012.8		2203.26	17/2$^-$				
3508.5	21/2$^+$	1001.7		2506.8	17/2$^+$				

$^{79}_{38}Sr_{41}$-5

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04 (continued)

$\gamma(^{79}Sr)$ (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π
3832.5	$23/2^-$	616.7	3215.8	$21/2^-$	5479.8	$29/2^+$	1175.2	4304.6	$25/2^+$	8257.4	$35/2^+$	1580.9	6676.5	$31/2^+$
		1103.1	2729.3	$19/2^-$	5671.5	$29/2^-$	1303.1	4368.4	$25/2^-$	8738.7	$37/2^-$	1599	7139.7	$33/2^-$
3873.6	$23/2^+$	744.2	3129.4	$21/2^+$	5977.0	$29/2^+$	1308.2	4668.8	$25/2^+$	9028.7	$37/2^+$	1592.8	7435.9	$33/2^+$
		1144.7	2728.9	$19/2^+$	6467.6	$31/2^+$	1348.2	5119.4	$27/2^+$	9689.1	$39/2^+$	1695.0	7994.1	$35/2^+$
3978.3	$23/2^+$	1088.8	2889.5	$19/2^+$	6500.2	$31/2^-$	1414.0	5086.2	$27/2^-$	9813.4	$41/2^+$	1636.7	8176.7	$37/2^+$
4304.6	$25/2^+$	1175.2	3129.4	$21/2^+$	6676.5	$31/2^+$	1434.0	5242.5	$27/2^+$	10052.4	$39/2^+$	1795	8257.4	$35/2^+$
4368.4	$25/2^-$	535.9	3832.5	$23/2^-$	6734.7	$33/2^+$	1254.9	5479.8	$29/2^+$	10339.8	$41/2^-$	1601	8738.7	$37/2^-$
		1152.6	3215.8	$21/2^-$	7139.7	$33/2^-$	1468.2	5671.5	$29/2^-$	10699.7	$41/2^+$	1671	9028.7	$37/2^+$
4668.8	$25/2^+$	1160.3	3508.5	$21/2^+$	7435.9	$33/2^+$	1458.9	5977.0	$29/2^+$	11542.2	$43/2^+$	1853.0	9689.1	$39/2^+$
5086.2	$27/2^-$	1253.7	3832.5	$23/2^-$	7994.1	$35/2^+$	1526.5	6467.6	$31/2^+$	11680.8	$45/2^+$	1867.3	9813.4	$41/2^+$
5119.4	$27/2^+$	1245.8	3873.6	$23/2^+$	8087.4	$35/2^-$	1587.2	6500.2	$31/2^-$	12106.8	$45/2^-$	1767	10339.8	$41/2^-$
5242.5	$27/2^+$	1264.1	3978.3	$23/2^+$	8176.7	$37/2^+$	1442.0	6734.7	$33/2^+$					

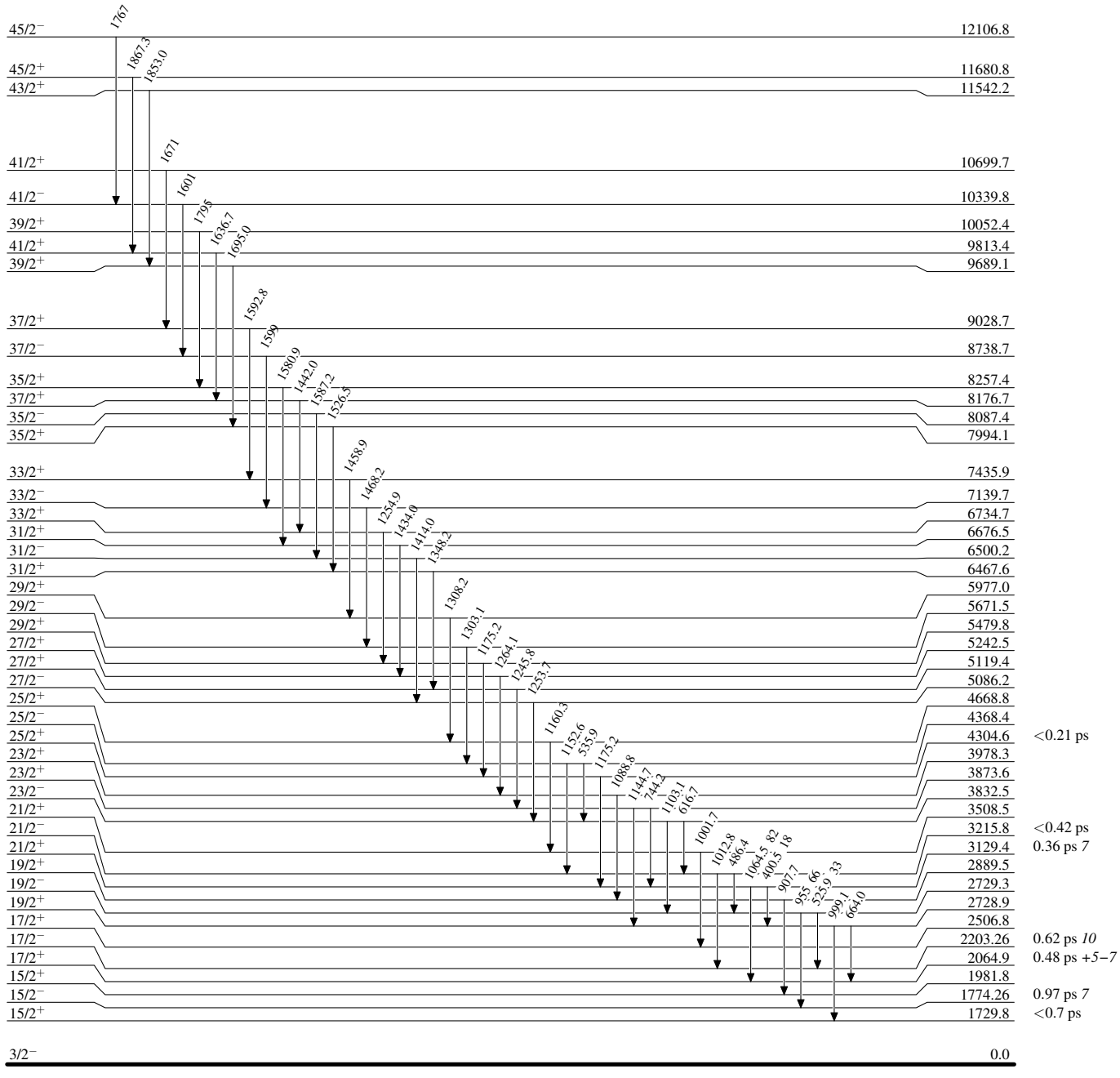
[†] From 1990Ch07 when listed with uncertainties, otherwise from 2004Ma39. Above the 2729 level, all data are from 2004Ma39.
[‡] From 1990Ch07 unless otherwise stated. Values are not available from 2004Ma39.
[#] From 1990He04.
[@] From 1990Ch07.
[&] From BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" appr.

$^{79}_{38}Sr_{41}$-6

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04

Level Scheme

Intensities: % photon branching from each level

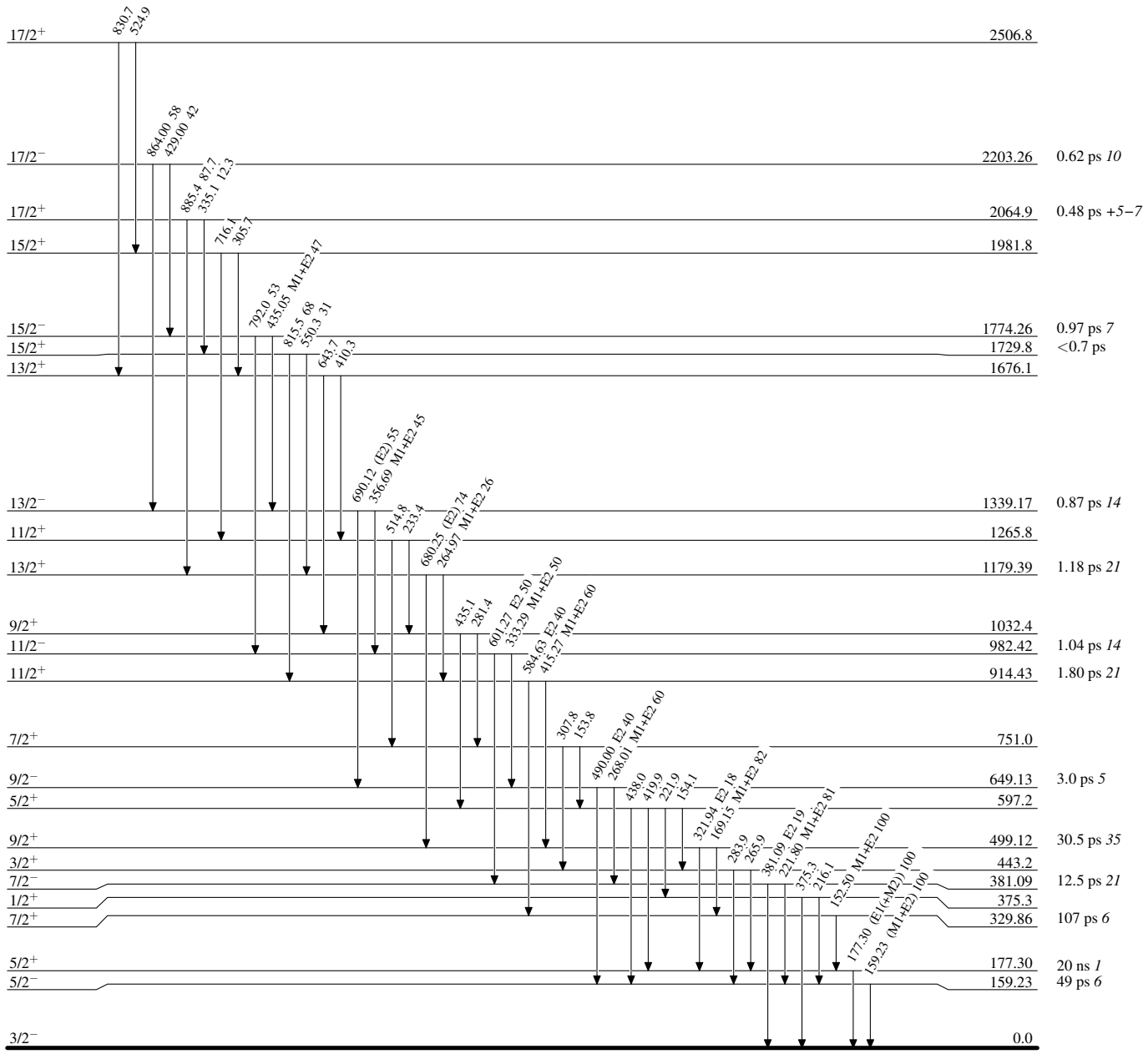


$^{79}_{38}Sr_{41}$

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04

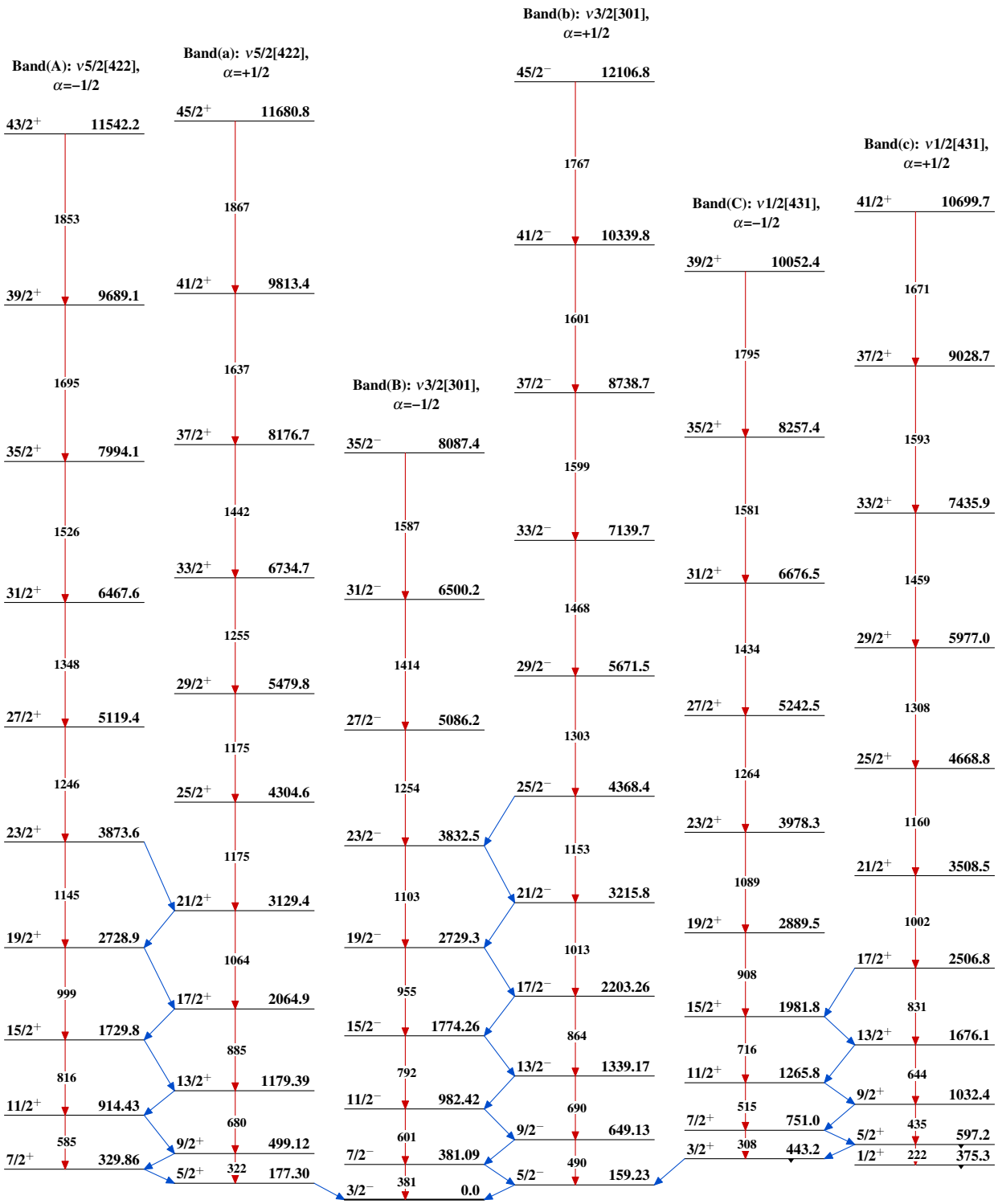
Level Scheme (continued)

Intensities: % photon branching from each level



$^{79}_{38}Sr_{41}$

^{58}Ni(^{24}Mg,2pnγ) 2004Ma39,1990Ch07,1990He04



$^{79}_{38}Sr_{41}$