^{58}Ni(^{40}Ca,3pγ),^{64}Zn(^{36}Ar,p$\alpha\gamma$) 1994Ro08,1983Gr33

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, G. Mukherjee, A. A. Sonzogni	NDS 111, 2555 (2010)	30-Jun-2009

1994Ro08: E(^{40}Ca) = 180 MeV, measured Eγ, Iγ,$\gamma(\theta)$ $\gamma\gamma$-coin using NORDBALL array with 15 HPGe (BGO shielded) at 79°, 101° and 143°; particle identification using neutron wall with 11 liquid sc. and Si ball with 21 detectors.
1998Ju05: E(^{40}Ca) = 145 MeV. Measured Eγ, Iγ,$\gamma\gamma$-coin, lifetimes from RDDS using six EUROBALL cluster detectors at 41° and 139°.
1999Ju04: E(^{40}Ca, pulsed) = 145 MeV. Measured Eγ, I$\gamma(\theta$,H,t), deduced g factors. IMPAD technique. using an array of six HPGe detectors.
1983Gr33: ^{64}Zn(^{36}Ar,p$\alpha\gamma$); E=127 MeV. Measured $T_{1/2}$ and $\gamma(\theta$,H); Ge(Li) at ±135°. PAD.
All data are from 1994Ro08. Unless mentioned otherwise. Others: 1980No06, 1998Ju05,1999Ju04.
γ-ray anisotropy R = 2Iγ(143°)/[Iγ(79°) + Iγ(101°)] from thick target experiment, except for a few high energy transitions; (1994Ro08).

^{95}Rh Levels

E(level)	J^π	$T_{1/2}$ †	Comments
0.0‡	9/2$^+$	5.02 min *10*	%ε+%β^+=100 $T_{1/2}$: From Adopted Levels.
1350.71‡ *20*	(13/2$^+$)		
2067.0‡ *3*	(17/2$^+$)		
2236.1# *3*	(17/2$^-$)	18.8 ns *10*	g=1.29 *4* (1983Gr33) $T_{1/2}$: Weighted av of 15 ns *5* (RDDS 1980No06) and 19 ns *1* (using pulsed beam 1983Gr33).
2263.5‡ *3*	(17/2$^+$)		
2448.6‡ *3*	(21/2$^+$)	2.54 ns *22*	$T_{1/2}$: Weighted av of 2.1 ns *3* (1980No06) and 2.65 ns *15* (1998Ju05).
3240.9# *4*	(21/2$^-$)	4.6 ps *2*	$T_{1/2}$: Other 26 ps *4* (RDDS 1980No06). Probably not corrected for side feeding.
3723.2‡ *3*	(25/2$^+$)	<1.4 ps	
3908.3# *4*	(25/2$^-$)	24.9 ps *12*	g=0.90 *28* g: weighted average of two measurements, done with Fe- (1.28 *19*) and Ni-hosts (0.69 *14*) (1999Ju04).
4241.4@ *3*	(21/2$^+$)		
5457.8@ *3*	(25/2$^+$)	<1.4 ps	
6119.1‡ *3*	(27/2$^+$)		
6211.7@ *3*	(29/2$^+$)	6.6 ps *6*	g=0.64 *31* g: Weighted average of two measurements, done with Fe- (0.80 *30*) and Ni-hosts (0.04 *59*) (1999Ju04).
6404.8 *4*	(27/2$^-$)	<0.7 ps	
6584.9& *4*	(27/2$^-$)	<0.7 ps	
6698.7 *4*	(29/2$^-$)	0.85 ps *5*	
6794.6@ *4*	(31/2$^+$)	<0.7 ps	
7064.5?& *4*	(29/2$^-$)		
7139.0@ *4*	(33/2$^+$)		
7512.1& *4*	(31/2$^-$)		
7624.6@ *4*	(35/2$^+$)	14.8 ps *26*	g=0.41 *14* g: Weighted average of two measurements, done with Fe- (0.33 *15*) and Ni-hosts (0.67 *27*) (1999Ju04).
7845.7& *4*	(33/2$^-$)	1.77 ps *15*	
8394.5& *4*	(35/2$^-$)	1.86 ps *9*	
8655.5& *4*	(37/2$^-$)	1.16 ps *22*	

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^{58}Ni(^{40}Ca,3pγ),^{64}Zn(^{36}Ar,p$\alpha\gamma$) 1994Ro08,1983Gr33 (continued)

^{95}Rh Levels (continued)

E(level)	J$^\pi$	T$_{1/2}$[†]	E(level)	J$^\pi$
8874.8[@] *4*	(39/2$^+$)	<2.0 ps	12113.4 *5*	(41/2$^+$)
9346.1[&] *4*	(39/2$^-$)	<1.0 ps	12194.3 *5*	
10652.8[&] *4*	(41/2$^-$)		12434.1 *5*	(43/2$^+$)
11367.5 *5*			12868.6 *5*	(41/2$^-$,43/2$^-$)
11966.6?[@] *5*	(41/2$^+$)		13875.9 *5*	(45/2$^+$,47/2$^+$)

[†] From RDDS measured by 1998Ju05 except as noted.
[‡] Band(A): +ve parity yrast band.
[#] Band(B): -ve parity yrast band.
[@] Band(C): +ve parity side band.
[&] Band(D): -ve parity side band.

γ(^{95}Rh)

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
92.8 *2*	26 *5*	6211.7	(29/2$^+$)	6119.1	(27/2$^+$)	(M1)	R=0.56 *20*.
114.1 *2*	12 *4*	6698.7	(29/2$^-$)	6584.9	(27/2$^-$)	(M1)	
169.0 *2*	372 *11*	2236.1	(17/2$^-$)	2067.0	(17/2$^+$)	(E1)[#]	R>1.15 *5*.
185.2 *2*	47 *6*	2448.6	(21/2$^+$)	2263.5	(17/2$^+$)	(E2)	R=1.23 *39*.
261.0 *2*	252 *10*	8655.5	(37/2$^-$)	8394.5	(35/2$^-$)	(M1)	R=0.89 *6*.
293.8 *2*	47 *9*	6698.7	(29/2$^-$)	6404.8	(27/2$^-$)	(M1)	
333.3 *2*	78 *9*	7845.7	(33/2$^-$)	7512.1	(31/2$^-$)	(M1)	R=0.66 *16*.
344.4 *2*	96 *11*	7139.0	(33/2$^+$)	6794.6	(31/2$^+$)		R=0.85 *25*.
381.5 *2*	407 *13*	2448.6	(21/2$^+$)	2067.0	(17/2$^+$)	(E2)	R=1.36 *7*.
447.5 *2*	35 *15*	7512.1	(31/2$^-$)	7064.5?	(29/2$^-$)		
467.6 *2*	37 *12*	12434.1	(43/2$^+$)	11966.6?	(41/2$^+$)		
479.4 *2*	50 *11*	7064.5?	(29/2$^-$)	6584.9	(27/2$^-$)		R=0.69 *40*.
485.6 *2*	112 *18*	7624.6	(35/2$^+$)	7139.0	(33/2$^+$)	(M1)	R=0.63 *20*.
548.9 *2*	259 *18*	8394.5	(35/2$^-$)	7845.7	(33/2$^-$)	(M1)	R=1.12 *16*.
582.9[†] *2*	362 *20*	6794.6	(31/2$^+$)	6211.7	(29/2$^+$)	(M1)	R=0.69 *7*.
661.3 *2*	57 *10*	6119.1	(27/2$^+$)	5457.8	(25/2$^+$)		R=0.68 *22*.
667.4 *2*	504 *18*	3908.3	(25/2$^-$)	3240.9	(21/2$^-$)	(E2)	R=1.48 *9*.
690.5 *2*	193 *12*	9346.1	(39/2$^-$)	8655.5	(37/2$^-$)	(M1)	R=0.87 *10*.
716.2 *2*	901 *21*	2067.0	(17/2$^+$)	1350.71	(13/2$^+$)	(E2)	Mult.: Q from $\gamma(\theta)$; assumed E2 by 1980No06. R>1.14 *4*.
753.7 *2*	196 *15*	6211.7	(29/2$^+$)	5457.8	(25/2$^+$)	(E2)	R=2.10 *31*.
769.9 *2*	26 *10*	8394.5	(35/2$^-$)	7624.6	(35/2$^+$)	(E1)	
809.7 *2*	30 *11*	8655.5	(37/2$^-$)	7845.7	(33/2$^-$)	(E2)	R=1.60 *94*.
813.3 *2*	29 *10*	7512.1	(31/2$^-$)	6698.7	(29/2$^-$)		
830.1 *2*	253 *12*	7624.6	(35/2$^+$)	6794.6	(31/2$^+$)	(E2)	R=1.71 *15*.
912.9 *2*	76 *16*	2263.5	(17/2$^+$)	1350.71	(13/2$^+$)	(E2)	R=1.99 *89*.
951.7 *2*	36 *13*	9346.1	(39/2$^-$)	8394.5	(35/2$^-$)	(E2)	
1004.8 *2*	500 *12*	3240.9	(21/2$^-$)	2236.1	(17/2$^-$)	(E2)	R=1.66 *8*.
1147.2 *2*	195 *9*	7845.7	(33/2$^-$)	6698.7	(29/2$^-$)	(E2)	R=1.54 *14*.
1216.4 *2*	36 *10*	5457.8	(25/2$^+$)	4241.4	(21/2$^+$)	(E2)	
1250.1 *2*	183 *13*	8874.8	(39/2$^+$)	7624.6	(35/2$^+$)	(E2)	R=1.53 *16*.
1274.7[†] *2*	429 *16*	3723.2	(25/2$^+$)	2448.6	(21/2$^+$)	(E2)	R=1.80 *12*.
1306.7 *2*	35 *11*	10652.8	(41/2$^-$)	9346.1	(39/2$^-$)		
1350.7 *2*	1000 *17*	1350.71	(13/2$^+$)	0.0	9/2$^+$	(E2)	R=1.20 *4*. Mult.: Q from $\gamma(\theta)$; assumed E2 by 1980No06.

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^{58}Ni(^{40}Ca,3pγ),^{64}Zn(^{36}Ar,p$\alpha\gamma$) 1994Ro08,1983Gr33 (continued)

γ(^{95}Rh) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
1441.8 *2*	29 *10*	13875.9	(45/2$^+$,47/2$^+$)	12434.1	(43/2$^+$)		
1734.4† *2*	254 *12*	5457.8	(25/2$^+$)	3723.2	(25/2$^+$)	(M1)	R=1.58 *14*.
1792.7 *2*	33 *10*	4241.4	(21/2$^+$)	2448.6	(21/2$^+$)		R=1.45 *73*.
1997.3 *2*	15 *9*	10652.8	(41/2$^-$)	8655.5	(37/2$^-$)		
2021.4 *2*	49 *13*	11367.5		9346.1	(39/2$^-$)		
2396.1 *2*	22 *7*	6119.1	(27/2$^+$)	3723.2	(25/2$^+$)		
2488.5 *2*	142 *12*	6211.7	(29/2$^+$)	3723.2	(25/2$^+$)	(E2)	R=1.72 *29*.
2496.4 *2*	73 *8*	6404.8	(27/2$^-$)	3908.3	(25/2$^-$)	(M1)	R=1.94 *44*.
2676.6 *2*	37 *6*	6584.9	(27/2$^-$)	3908.3	(25/2$^-$)	(M1)	
2790.3 *2*	206 *9*	6698.7	(29/2$^-$)	3908.3	(25/2$^-$)	(E2)	R=1.73 *9*.
2848.1 *2*	16 *8*	12194.3		9346.1	(39/2$^-$)		
3091.9 *2*	24 *7*	11966.6?	(41/2$^+$)	8874.8	(39/2$^+$)		
3238.6 *2*	19 *8*	12113.4	(41/2$^+$)	8874.8	(39/2$^+$)		R=0.56 *30*.
3522.4 *2*	10 *4*	12868.6	(41/2$^-$,43/2$^-$)	9346.1	(39/2$^-$)		
3559.2 *2*	17 *4*	12434.1	(43/2$^+$)	8874.8	(39/2$^+$)		R=1.37 *66*.

† A common $T_{1/2}$=23 ps *6* has been reported for these γ's in 1980No06 from RDDS measurement.

‡ From γ-ray anisotropy R and cascading pattern of γ-decay.

From the Iγ(1004.8) and Iγ(169.0) one can obtain α=0.344. However, α(E1)=0.032 which indicates a problem with the E1 assignment. On the other hand α(E2)=0.21 but would have a large B(E2) (=8.5 *5* W.U) which may not commensurate with this magic nucleus as quoted in 1980No06. Also, the value of Iγ(169.0) may be low because of the half life of this state.

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Level Scheme

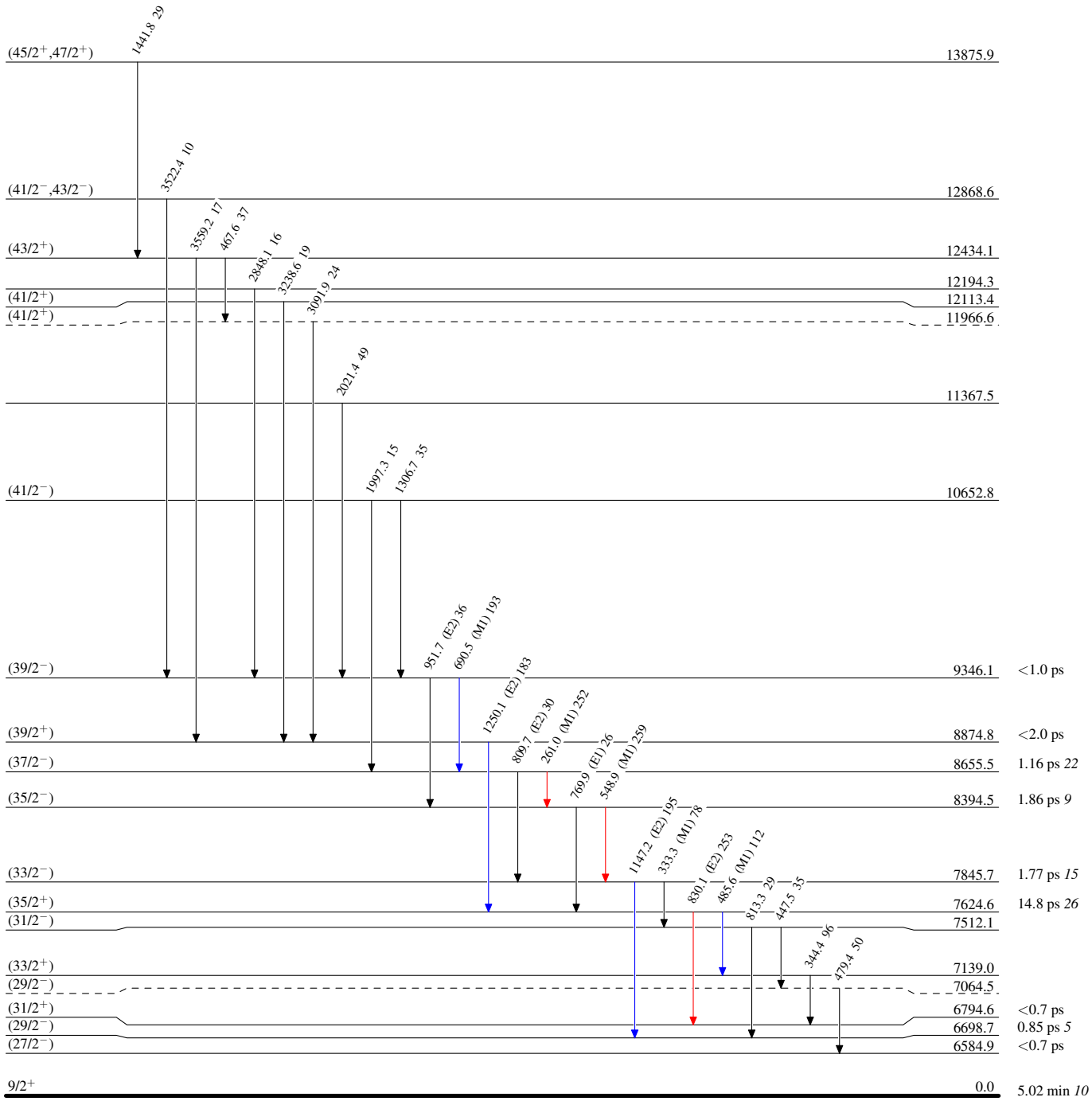
Intensities: Relative I_γ

Legend

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

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

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



$^{95}_{45}Rh_{50}$

^{58}Ni(^{40}Ca,3pγ),^{64}Zn(^{36}Ar,p$\alpha\gamma$) 1994Ro08,1983Gr33

Level Scheme (continued)

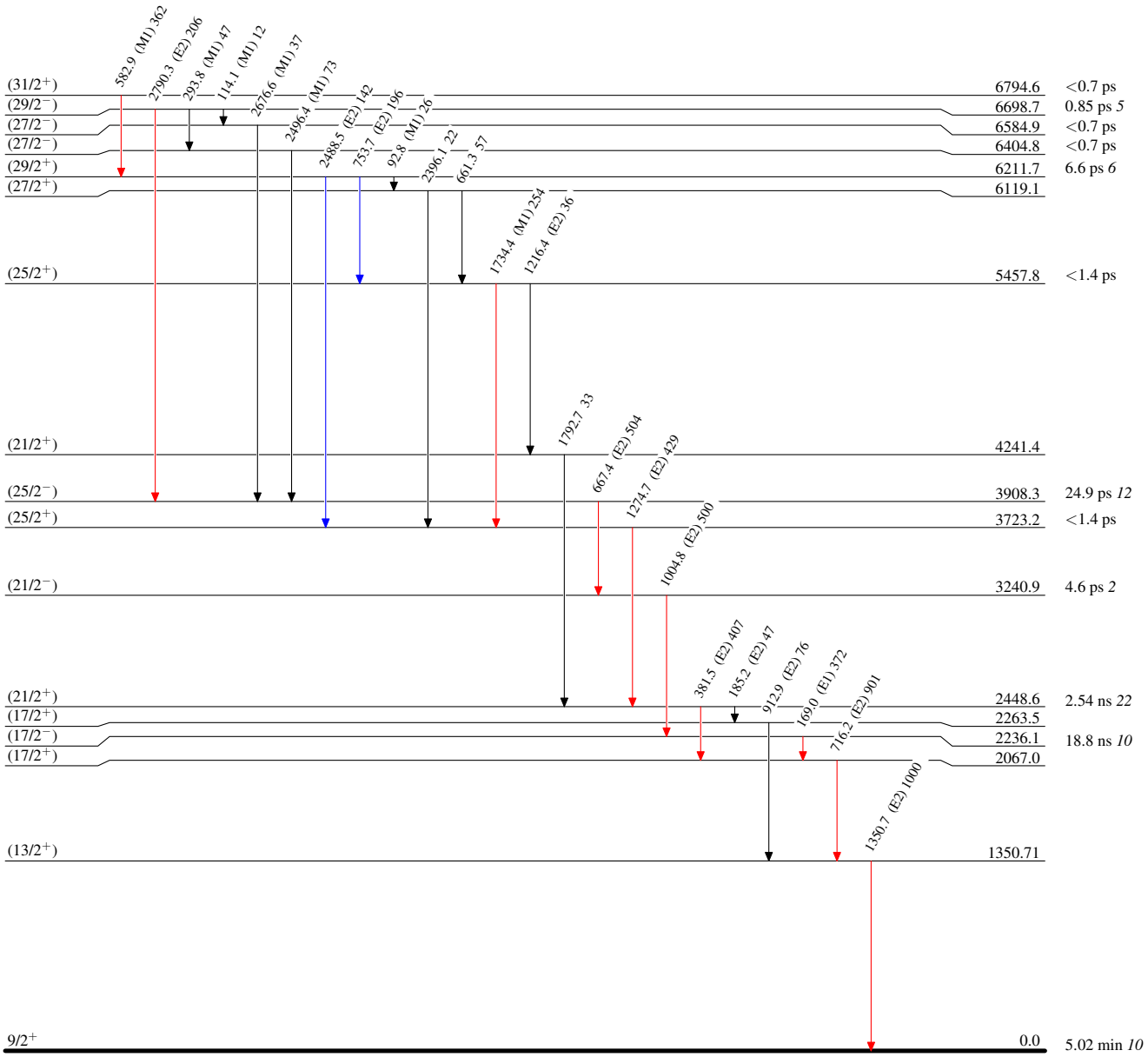
Intensities: Relative I_γ

Legend

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

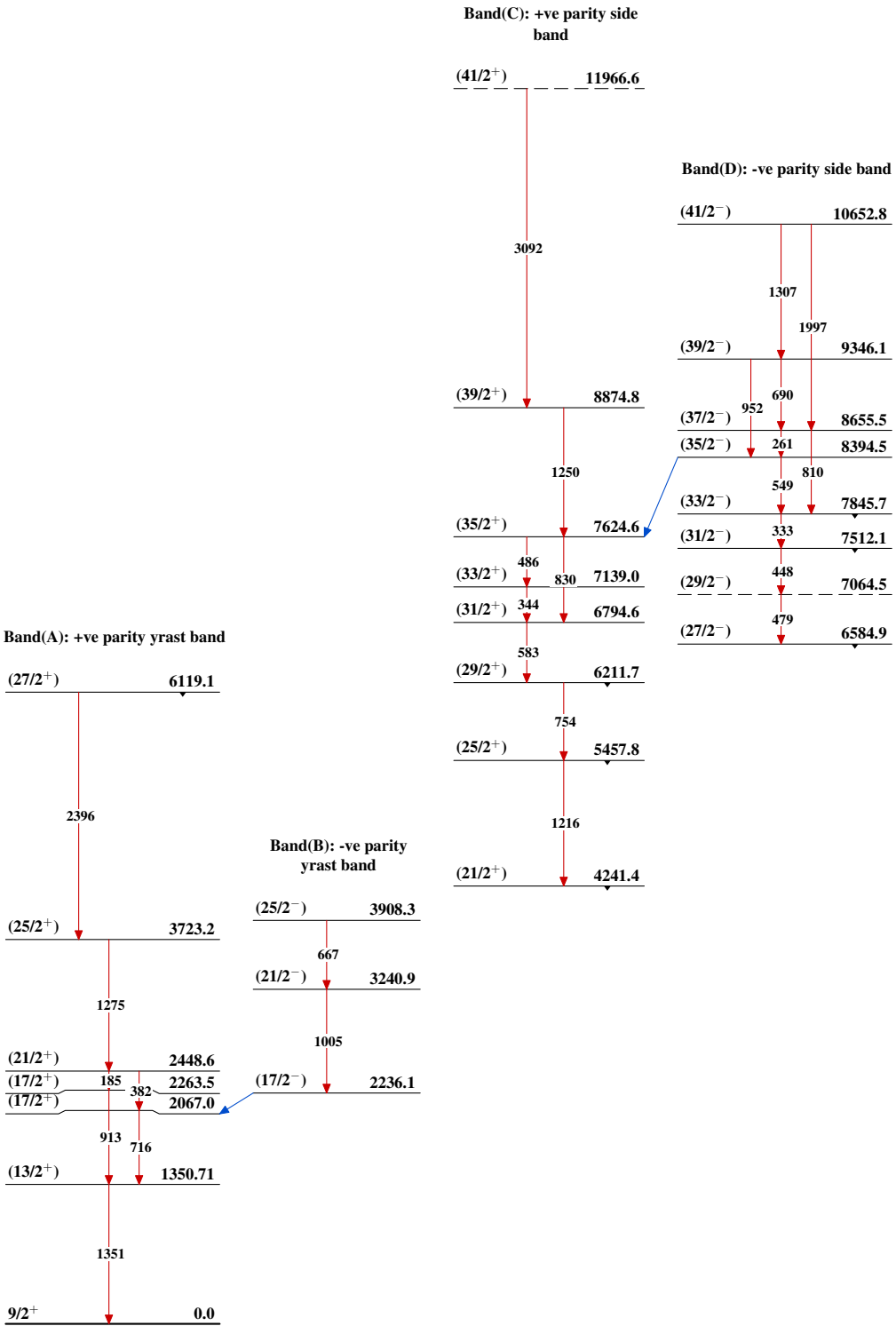
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{95}_{45}Rh_{50}$

^{58}Ni(^{40}Ca,3pγ),^{64}Zn(^{36}Ar,p$\alpha\gamma$) 1994Ro08,1983Gr33



$^{95}_{45}Rh_{50}$