^{58}Ni(^{36}Ar,2pnγ): E=111 MeV 2013Zh10

History

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

Compiled by E. McNeice and B. Singh (McMaster), May 30, 2013.

E(^{36}Ar)=111 MeV; 6.0 mg/cm^2 thick, 99.83% enriched ^{58}Ni target; beam from CIME cyclotron at GANIL; measured Eγ, Iγ, $\gamma\gamma$-coin, DCO ratios (90°, 135°) ratios, $\gamma(\theta)$, γ(lin pol), (particle)-γ coin. γ-rays detected by the EXOGAM Ge clover detector array containing eleven clover-type Ge detectors. Neutrons detected using the Neutron Wall array composed of 50 organic liquid-scintillator elements. Light charged particles detected with the DIAMANT detector system consisting of 80 CsI scintillators.

2013Zh10 state that the level structure below the (13/2$^-$) state will be discussed in a forthcoming paper.

^{91}Ru Levels

E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0.0#	(9/2$^+$)	2200.3 *6*	(17/2$^-$)	3164.6 *6*	(21/2$^-$)	4847.4 *8*	(27/2$^-$)
46.0# *7*	(7/2$^+$)	2254.3 *5*	(15/2$^-$)	3192.3# *9*	(25/2$^+$)	4992.0 *9*	(29/2$^-$)
435.8 *4*	(11/2$^+$)	2363.6 *8*	(17/2$^+$)	3259.0 *7*	(21/2$^-$)	5096.8# *10*	(31/2$^+$)
890.2# *7*	(11/2$^+$)	2369.4# *8*	(21/2$^+$)	3555.0 *7*	(23/2$^-$)	5100.3 *8*	(29/2$^-$)
973.7# *4*	(13/2$^+$)	2409.8 *6*	(17/2$^-$)	3633.4 *9*	(25/2$^+$)	5109.0# *11*	(33/2$^+$)
1659.8 *6*	(11/2$^+$)	2709.7 *7*	(19/2$^-$)	3969.9# *9*	(27/2$^+$)	5996.7 *11*	(33/2$^-$)
1872.2# *6*	(17/2$^+$)	2799.5 *9*	(21/2$^+$)	4035.8 *7*	(25/2$^-$)		
1893.5 *5*	(13/2$^-$)	2927.8 *7*	(19/2$^-$)	4151.6# *9*	(29/2$^+$)		
2178.8# *12*	(15/2$^+$)	2985.3# *9*	(23/2$^+$)	4379.7 *8*	(27/2$^-$)		

† From least-squares fit to Eγ, allowing 1 keV uncertainty In Eγ for which the authors did state an uncertainty.

‡ Authors′ recommended values, supported by deduced band structure and measured transition multipolarities.

\# Band(A): yrast π=+ sequence.

γ(^{91}Ru)

Eγ‡	Iγ	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.†	Comments
46#		46.0	(7/2$^+$)	0.0	(9/2$^+$)		
155.4 *5*	3.0 *2*	2409.8	(17/2$^-$)	2254.3	(15/2$^-$)	D	Mult.: DCO=0.65 *7*.
181.6 *5*	2.7 *1*	4151.6	(29/2$^+$)	3969.9	(27/2$^+$)	D	Mult.: DCO=0.68 *5*.
206.9 *5*	16.0 *4*	3192.3	(25/2$^+$)	2985.3	(23/2$^+$)	D	Mult.: DCO=0.68 *2*.
209.4 *5*	4.5 *2*	2409.8	(17/2$^-$)	2200.3	(17/2$^-$)		
234#		1893.5	(13/2$^-$)	1659.8	(11/2$^+$)		
236.8 *5*	2.9 *3*	3164.6	(21/2$^-$)	2927.8	(19/2$^-$)		
252.9 *5*	<0.6	5100.3	(29/2$^-$)	4847.4	(27/2$^-$)		
296.0 *5*	1.6 *2*	3555.0	(23/2$^-$)	3259.0	(21/2$^-$)		
299.9 *5*	5.6 *2*	2709.7	(19/2$^-$)	2409.8	(17/2$^-$)	M1	Mult.: DCO=0.67 *3*; POL=−0.16 *8*.
306.8 *5*	1.9 *2*	2200.3	(17/2$^-$)	1893.5	(13/2$^-$)	Q	Mult.: DCO=1.04 *10*.
328.0 *5*	25.1 *1*	2200.3	(17/2$^-$)	1872.2	(17/2$^+$)	E1	Mult.: DCO=1.06 *5*; POL=−0.25 *4*. Interpreted As D, ΔJ=0.
336.5 *5*	3.2 *2*	3969.9	(27/2$^+$)	3633.4	(25/2$^+$)		
343.8 *5*	5.2 *1*	4379.7	(27/2$^-$)	4035.8	(25/2$^-$)	M1	Mult.: DCO=0.55 *5*; POL=−0.07 *3*.
360.6 *5*	5.9 *2*	2254.3	(15/2$^-$)	1893.5	(13/2$^-$)	M1	Mult.: DCO=0.68 *4*; POL=−0.15 *5*.
390.5 *5*	2.7 *2*	3555.0	(23/2$^-$)	3164.6	(21/2$^-$)	M1	Mult.: DCO=0.62 *7*; POL=−0.21 *5*.
435.9 *5*	2.4 *2*	2799.5	(21/2$^+$)	2363.6	(17/2$^+$)	E2	Mult.: DCO=1.02 *8*; POL=+0.17 *7*.
436.0 *5*	<0.4	435.8	(11/2$^+$)	0.0	(9/2$^+$)		
455.0 *5*	1.0 *1*	3164.6	(21/2$^-$)	2709.7	(19/2$^-$)	D	Mult.: DCO=0.6 *1*.
491.4 *5*	4.2 *2*	2363.6	(17/2$^+$)	1872.2	(17/2$^+$)	M1	Mult.: DCO=0.7 *2*; POL=+0.07 *2*. interpreted by authors As D ΔJ=0 transition.

Continued on next page (footnotes at end of table)

^{58}Ni(^{36}Ar,2pnγ): E=111 MeV 2013Zh10 (continued)

γ(^{91}Ru) (continued)

E_γ[‡]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
497.2 *5*	38.3 *1*	2369.4	(21/2+)	1872.2	(17/2+)	E2	Mult.: DCO=1.07 *2*; A_2=+0.39 *7*; A_4=−0.16 *8*; POL=+0.17 *3*.
516.4 *5*	1.1 *1*	2409.8	(17/2−)	1893.5	(13/2−)	E2	Mult.: DCO=1.1 *1*; POL=+0.27 *5*.
519[#]		2178.8	(15/2+)	1659.8	(11/2+)		
538.0 *5*	<0.4	973.7	(13/2+)	435.8	(11/2+)	M1	Mult.: DCO=1.1 *6* for gate on ΔJ=1, D 361γ; POL=−0.19 *8*.
549.3 *5*	2.4 *2*	3259.0	(21/2−)	2709.7	(19/2−)	M1	Mult.: DCO=0.54 *5*; POL=−0.09 *1*.
612.3 *5*	5.4 *2*	4992.0	(29/2−)	4379.7	(27/2−)	M1	Mult.: DCO=0.68 *4*; POL=−0.14 *3*.
615.8 *5*	30.0 *5*	2985.3	(23/2+)	2369.4	(21/2+)	M1	Mult.: DCO=0.50 *2*; POL=−0.07 *1*.
648.0 *5*	2.8 *2*	3633.4	(25/2+)	2985.3	(23/2+)		
686[#]		1659.8	(11/2+)	973.7	(13/2+)		
720.7 *5*	0.7 *1*	5100.3	(29/2−)	4379.7	(27/2−)	M1	Mult.: DCO=0.57 *10*; POL=−0.11 *3*.
727.5 *5*	5.8 *3*	2927.8	(19/2−)	2200.3	(17/2−)	M1	Mult.: DCO=0.55 *4*; POL=−0.11 *2*.
754.5 *5*	1.7 *2*	3164.6	(21/2−)	2409.8	(17/2−)		
777.5 *5*	4.8 *1*	3969.9	(27/2+)	3192.3	(25/2+)	M1	Mult.: DCO=0.6 *1*; POL=−0.08 *1*.
811.6 *5*	0.8 *1*	4847.4	(27/2−)	4035.8	(25/2−)	M1	Mult.: DCO=0.55 *9*; POL=−0.16 *5*.
823.0 *5*	6.8 *2*	3192.3	(25/2+)	2369.4	(21/2+)	E2	Mult.: DCO=0.96 *4*; A_2=+0.205 *5*, A_4=−0.02 *1*; POL=+0.073 *6*.
824.7 *5*	3.6 *2*	4379.7	(27/2−)	3555.0	(23/2−)		
844[#]		890.2	(11/2+)	46.0	(7/2+)		
845.3 *5*	2.0 *1*	3555.0	(23/2−)	2709.7	(19/2−)	E2	Mult.: DCO=0.96 *9*; POL=+0.14 *2*.
871.2 *5*	10.5 *1*	4035.8	(25/2−)	3164.6	(21/2−)	E2	Mult.: DCO=0.91 *3*; A_2=+0.23 *3*, A_4=−0.01 *1*; POL=+0.081 *9*.
890[#]		890.2	(11/2+)	0.0	(9/2+)		
898.5 *5*	73 *1*	1872.2	(17/2+)	973.7	(13/2+)	E2	Mult.: DCO=1.01 *1*; A_2=+0.33 *1*; A_4=−0.01 *2*; POL=+0.131 *6*.
919.8 *5*	11.3 *1*	1893.5	(13/2−)	973.7	(13/2+)	E1	Mult.: DCO=0.99 *4*; POL=−0.07 *1*. Interpreted As D, ΔJ=0.
957.4 *5*	8.1 *3*	5109.0	(33/2+)	4151.6	(29/2+)	E2	Mult.: DCO=1.1 *2*; POL=+0.13 *4*.
959.4 *5*	9.6 *3*	4151.6	(29/2+)	3192.3	(25/2+)	E2	Mult.: DCO=1.03 *5*; POL=+0.07 *2*.
964.5 *5*	17.3 *3*	3164.6	(21/2−)	2200.3	(17/2−)	E2	Mult.: DCO=1.01 *3*; POL=+0.17 *1*.
973.5 *5*	100	973.7	(13/2+)	0.0	(9/2+)	E2	Mult.: DCO=0.95 *2*; A_2=+0.39 *3*, A_4=−0.02 *5*; POL=+0.139 *4*.
1003[#]		1893.5	(13/2−)	890.2	(11/2+)		
1004.7 *5*	1.7 *1*	5996.7	(33/2−)	4992.0	(29/2−)	E2	Mult.: DCO=0.9 *1*; POL=+0.13 *3*.
1126.9 *5*	0.8 *1*	5096.8	(31/2+)	3969.9	(27/2+)	Q	Mult.: DCO=0.96 *9*.
1263.9 *5*	4.9 *2*	3633.4	(25/2+)	2369.4	(21/2+)	E2	Mult.: DCO=0.99 *6*; A_2=+0.41 *4*, A_4=−0.01 *1*; POL=+0.12 *2*.
1280.7 *5*	2.1 *8*	2254.3	(15/2−)	973.7	(13/2+)	E1	Mult.: DCO=0.6 *1*; POL=+0.14 *4*.
1614[#]		1659.8	(11/2+)	46.0	(7/2+)		
1660[#]		1659.8	(11/2+)	0.0	(9/2+)		

† From measured DCO ratios and polarization, POL. Expected DCO values are ≈1 for stretched Q and ≈0.6 for pure stretched D if gated on stretched Q transitions, but ≈1.6 for stretched Q and ≈1 for for pure stretched D when gated by pure stretched D. For D+Q transitions, DCO values lie between 0.6 and 1.0, depending on δ. Stretched Q gating transitions were used, unless otherwise stated. POL values are negative for pure stretched M1 and nonstretched E1 transitions, and positive for pure stretched E1 and E2 transitions.

‡ Uncertainties are stated to be within 0.5 keV (2013Zh10). The evaluators has, therefore, assigned 0.5 keV to all data.

2013Zh10 report that details of this transition will be discussed in a forthcoming publication.

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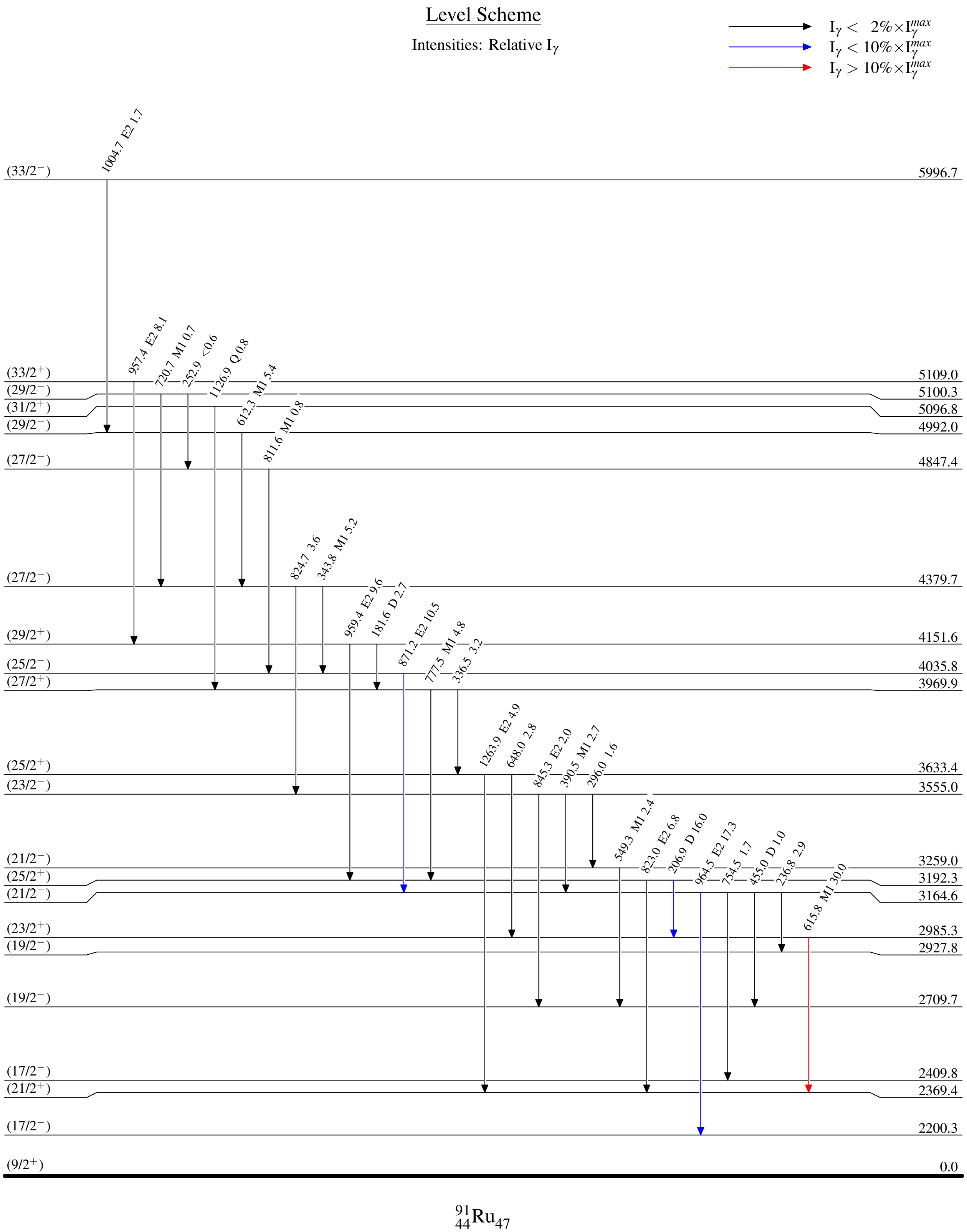
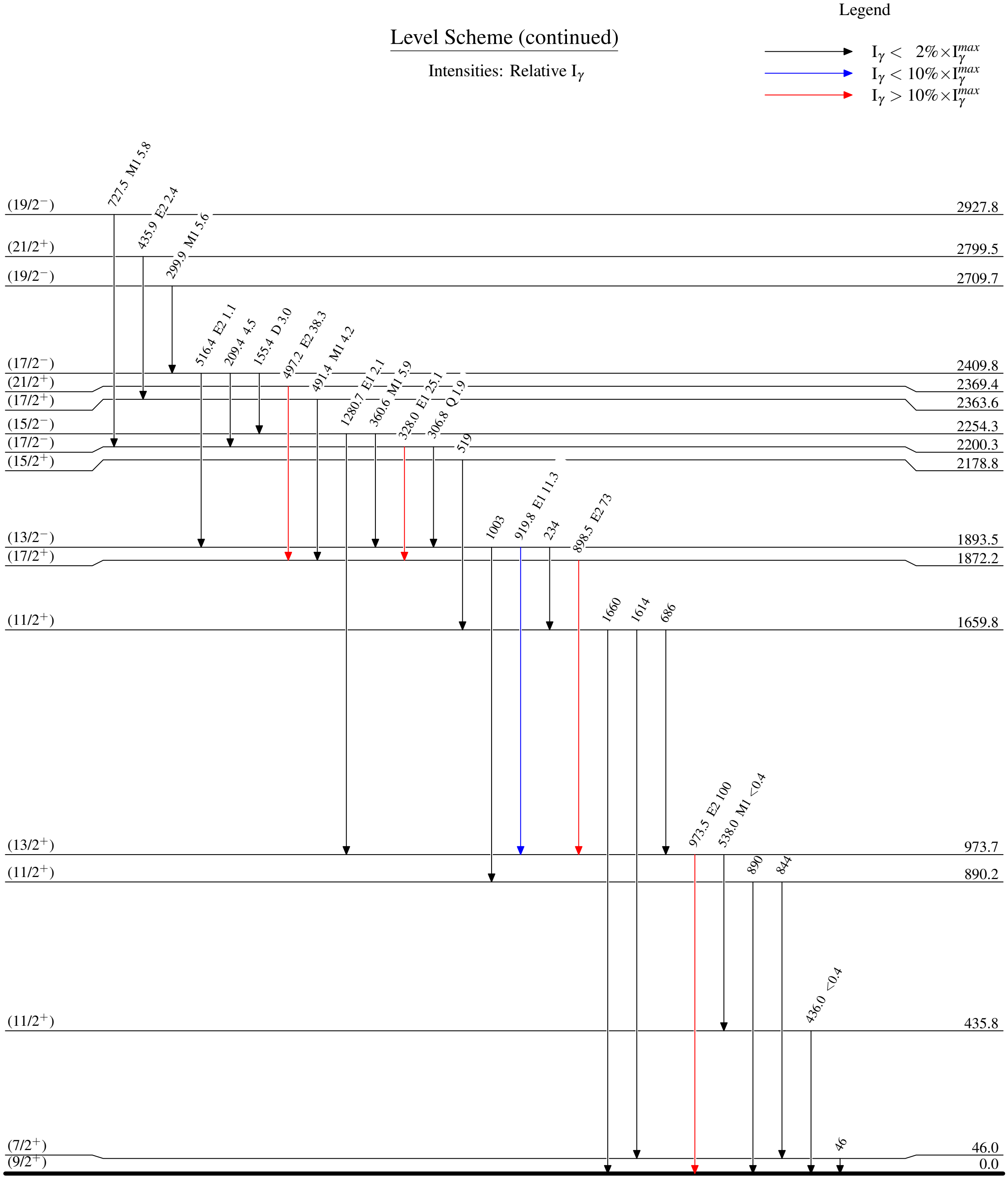


$^{58}Ni(^{36}Ar,2pn\gamma)$: E=111 MeV 2013Zh10

Level Scheme (continued)

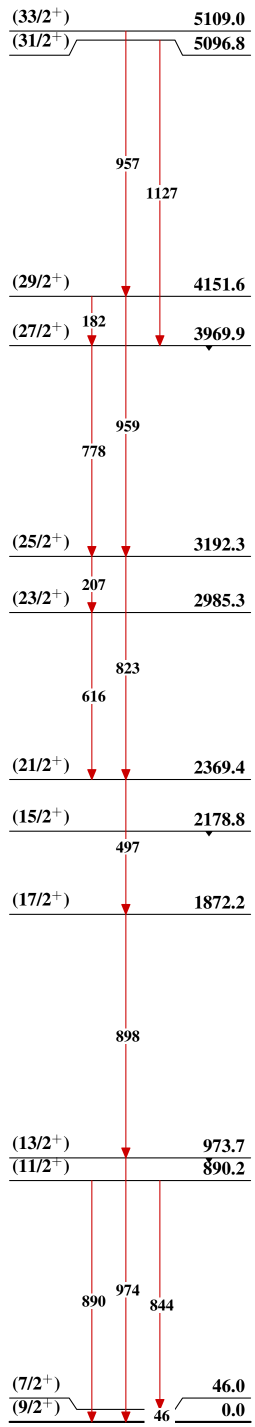
Intensities: Relative I_γ



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

$^{58}Ni(^{36}Ar,2pn\gamma)$: E=111 MeV 2013Zh10

Band(A): Yrast π=+ sequence



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