^{52}Cr(^{16}O,αpnγ) 2001Mu14

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alan L. Nichols, Balraj Singh, Jagdish K. Tuli	NDS 113, 973 (2012)	15-Apr-2012

2001Mu14: natural Cr target, ^{52}Cr(^{16}O,αpnγ), E=65 MeV. Measured Eγ, Iγ, $\gamma\gamma$ and $\gamma\gamma(\theta)$(DCO), Gamma Detector Array (GDA) comprised of 12 Compton-suppressed HPGe detectors and 4π Charged-Particle Detector Array (CPDA) of 14 ΔE-E phoswich plastic scintillating detectors.

^{62}Cu Levels

E(level)†	J$^\pi$	E(level)†	J$^\pi$	E(level)†	J$^\pi$	E(level)†	J$^\pi$
0	1$^+$	1920.0 *11*	(5$^+$)	4104.0 *11*		6008.3‡ *11*	11$^+$
40.84‡ *3*	2$^+$	2147.7 *9*	6$^+$	4165.0‡ *9*	9$^-$	6175.1 *13*	10$^{(+)}$
243.0 *6*	2$^+$	2295.2‡ *8*	6$^-$	4446.9 *10*	9$^-$	6215.0 *14*	(11$^-$)
390.1‡ *7*	4$^+$	2517.6 *10*	(6$^-$)	4596.5 *12*		6528.1# *16*	(13$^-$)
426.5# *7*	3$^+$	2833.6 *10*	(7$^+$)	4628.2# *10*	(9$^-$)	7101.2‡ *13*	12$^{(+)}$
674.8 *8*	3$^+$	2891.8‡ *9*	7$^-$	4746.5 *11*	9$^+$	7133.2 *13*	(13$^-$)
698.3 *11*	3$^+$	3028.9 *9*	7$^-$	5000.0‡ *10*	10$^{(-)}$	7240.1# *19*	(14$^-$)
1249.2 *7*	4$^+$	3190.9# *9*	6$^-$	5047.0# *10*	(10$^-$)	7285.6 *13*	(12$^+$)
1370.1‡ *8*	5$^+$	3434.5 *9*	8$^-$	5106.5 *12*	(10$^-$)	7620.5 *13*	12$^{(+)}$
1485.7 *10*	4$^+$	3627.5 *9*	8$^-$	5257.9 *14*	(10$^-$)	8601.0 *14*	(13$^+$)
1676.8# *7*	5$^+$	3674.9 *11*		5618.2# *11*	(11$^-$)	8959.1‡ *15*	(14$^+$)
1916.9 *10*	(5$^+$)	3978.6 *10*	9$^{(-)}$	5840.1# *12*	(12$^-$)	10883.9?‡ *19*	

† From least-squares fit to Eγ data, assuming Δ(Eγ)=1 keV.
‡ Band(A): γ-sequence based on 2$^+$.
# Band(B): γ-sequence based on 3$^+$.

γ(^{62}Cu)

DCO ratios correspond to E2 gates, unless otherwise stated. Expected DCO ratios are: 1.25 for stretched quadrupole, 0.62 for stretched dipole and 1.0 for ΔJ=0, dipole transitions.

Eγ	Iγ	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
40.84 *3*		40.84	2$^+$	0	1$^+$	Eγ: from Adopted Gammas.
137	1.5 *8*	3028.9	7$^-$	2891.8	7$^-$	DCO=0.8 *4*.
147	3.4 *9*	390.1	4$^+$	243.0	2$^+$	DCO=0.76 *20*.
190	1.0 *6*	1676.8	5$^+$	1485.7	4$^+$	
202	2.1 *6*	243.0	2$^+$	40.84	2$^+$	
222	1.0 *4*	2517.6	(6$^-$)	2295.2	6$^-$	
222	2.2 *3*	5840.1	(12$^-$)	5618.2	(11$^-$)	DCO=0.6 *3*.
243	12.3 *10*	243.0	2$^+$	0	1$^+$	
243	1.0 *8*	1920.0	(5$^+$)	1676.8	5$^+$	
243	2.3 *11*	3434.5	8$^-$	3190.9	6$^-$	
253	1.3 *10*	5000.0	10$^{(-)}$	4746.5	9$^+$	
272	2.8 *3*	698.3	3$^+$	426.5	3$^+$	DCO=0.90 *20* (M1 gated).
285	1.3 *9*	674.8	3$^+$	390.1	4$^+$	DCO=1.4 *3*.
335	1.0 *8*	7620.5	12$^{(+)}$	7285.6	(12$^+$)	
350	100.0 *3*	390.1	4$^+$	40.84	2$^+$	DCO=1.17 *10*.
351	2.0 *12*	3978.6	9$^{(-)}$	3627.5	8$^-$	
358	0.5 *5*	8959.1	(14$^+$)	8601.0	(13$^+$)	

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^{52}Cr(^{16}O,αpnγ) 2001Mu14 (continued)

γ(^{62}Cu) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
378	2.7 *3*	2295.2	6^-	1916.9	(5^+)	DCO=0.5 *3*.
385	35.2 *4*	426.5	3^+	40.84	2^+	DCO=0.51 *10*.
404	1.0 *3*	5000.0	$10^{(-)}$	4596.5		
419	3.0 *7*	5047.0	(10^-)	4628.2	(9^-)	DCO=0.6 *3*.
427	3.3 *12*	1676.8	5^+	1249.2	4^+	DCO=0.7 *4* (M1 gated).
432	3.7 *12*	674.8	3^+	243.0	2^+	DCO=1.67 *10* (M1 gated).
437	3.5 *8*	3627.5	8^-	3190.9	6^-	DCO=1.32 *20*.
468	1.2 *10*	4446.9	9^-	3978.6	$9^{(-)}$	DCO=0.62 *20*.
477	4.2 *7*	4104.0		3627.5	8^-	
490	1.1 *5*	4165.0	9^-	3674.9		
493	2.2 *8*	4596.5		4104.0		
512	3.3 *8*	5618.2	(11^-)	5106.5	(10^-)	DCO=0.7 *3*.
519	1.5 *5*	7620.5	$12^{(+)}$	7101.2	$12^{(+)}$	DCO=0.5 *3*.
538	3.2 *6*	2833.6	(7^+)	2295.2	6^-	
538	3.1 *12*	4165.0	9^-	3627.5	8^-	
544	2.3 *7*	3434.5	8^-	2891.8	7^-	
544	10.3 *12*	3978.6	$9^{(-)}$	3434.5	8^-	DCO=2.40 *20*.
571	4.2 *6*	5618.2	(11^-)	5047.0	(10^-)	DCO=0.68 *20*.
575	4.4 *7*	1249.2	4^+	674.8	3^+	
597	24.2 *4*	2891.8	7^-	2295.2	6^-	DCO=2.46 *10*.
600	1.5 *6*	3627.5	8^-	3028.9	7^-	
600	1.5 *7*	5047.0	(10^-)	4446.9	9^-	
618	1.4 *5*	2295.2	6^-	1676.8	5^+	
660	3.1 *10*	5106.5	(10^-)	4446.9	9^-	DCO=0.5 *3*.
686	3.3 *7*	2833.6	(7^+)	2147.7	6^+	DCO=0.6 *3*.
688	1.3 *4*	6528.1	(13^-)	5840.1	(12^-)	DCO=0.5 *3*.
712	0.5 *3*	7240.1	(14^-)	6528.1	(13^-)	
731	1.1 *5*	4165.0	9^-	3434.5	8^-	
734	7.6 *4*	3028.9	7^-	2295.2	6^-	
735	7.2 *3*	3627.5	8^-	2891.8	7^-	
744	4.5 *3*	2891.8	7^-	2147.7	6^+	
777	3.4 *8*	2147.7	6^+	1370.1	5^+	DCO=0.6 *3*.
783	2.3 *10*	3674.9		2891.8	7^-	
788	1.5 *5*	3978.6	$9^{(-)}$	3190.9	6^-	
793	1.3 *7*	5840.1	(12^-)	5047.0	(10^-)	
811	1.0 *3*	5257.9	(10^-)	4446.9	9^-	DCO=0.51 *20*.
822	9.2 *10*	1249.2	4^+	426.5	3^+	DCO=1.18 *20* (M1 gated).
835	9.4 *4*	5000.0	$10^{(-)}$	4165.0	9^-	DCO=1.61 *20*.
859	1.2 *7*	1249.2	4^+	390.1	4^+	
881	0.9 *5*	5047.0	(10^-)	4165.0	9^-	
896	0.3 *3*	5000.0	$10^{(-)}$	4104.0		
925	53.6 *3*	2295.2	6^-	1370.1	5^+	DCO=1.52 *10*.
944	12.7 *4*	1370.1	5^+	426.5	3^+	DCO=0.36 *10* (M1 gated).
980	61.8 *3*	1370.1	5^+	390.1	4^+	DCO=3.80 *10*.
980	1.0 *8*	8601.0	(13^+)	7620.5	$12^{(+)}$	
990	1.0 *4*	5618.2	(11^-)	4628.2	(9^-)	
1002	2.0 *3*	1676.8	5^+	674.8	3^+	
1006	3.0 *7*	1249.2	4^+	243.0	2^+	
1008	3.2 *10*	6008.3	11^+	5000.0	$10^{(-)}$	DCO=0.88 *20*.
1013	2.0 *4*	4446.9	9^-	3434.5	8^-	DCO=0.5 *3*.
1058	1.2 *5*	1485.7	4^+	426.5	3^+	
1069	0.8 *7*	5047.0	(10^-)	3978.6	$9^{(-)}$	
1093	1.6 *7*	7101.2	$12^{(+)}$	6008.3	11^+	DCO=2.0 *3*.
1111	0.9 *3*	7285.6	(12^+)	6175.1	$10^{(+)}$	
1119	9.5 *5*	4746.5	9^+	3627.5	8^-	DCO=2.42 *10*.

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^{52}Cr(^{16}O,αpnγ) 2001Mu14 (continued)

$\gamma(^{62}Cu)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
1135	2.4 *10*	4165.0	9^-	3028.9	7^-	DCO=0.96 *20*.
1140	10.2 *10*	3434.5	8^-	2295.2	6^-	DCO=1.78 *10*.
1148	1.3 *3*	2517.6	(6^-)	1370.1	5^+	DCO=1.2 *5*.
1168	1.0 *3*	6215.0	(11^-)	5047.0	(10^-)	DCO=0.5 *3*.
1194	4.1 *8*	4628.2	(9^-)	3434.5	8^-	DCO=1.9 *3*.
1222	2.1 *3*	1920.0	(5^+)	698.3	3^+	DCO=0.40 *20* (M1 gated).
1251	4.5 *14*	1676.8	5^+	426.5	3^+	DCO=1.4 *5* (M1 gated).
1262	6.0 *6*	6008.3	11^+	4746.5	9^+	DCO=1.23 *10*.
1273	15.2 *4*	4165.0	9^-	2891.8	7^-	DCO=1.18 *10*.
1277	2.1 *4*	7285.6	(12^+)	6008.3	11^+	DCO=0.6 *3*.
1287	2.6 *3*	1676.8	5^+	390.1	4^+	DCO=1.5 *4*.
1293	1.0 *6*	7133.2	(13^-)	5840.1	(12^-)	
1332	16.4 *4*	3627.5	8^-	2295.2	6^-	DCO=1.33 *10*.
1372	3.1 *5*	5000.0	$10^{(-)}$	3627.5	8^-	DCO=1.35 *20*.
1418	1.0 *7*	4446.9	9^-	3028.9	7^-	
1429	1.7 *3*	6175.1	$10^{(+)}$	4746.5	9^+	DCO=0.6 *3*.
1437	1.2 *8*	4628.2	(9^-)	3190.9	6^-	
1464	1.3 *4*	2833.6	(7^+)	1370.1	5^+	DCO=1.1 *4*.
1490	5.3 *3*	1916.9	(5^+)	426.5	3^+	DCO=0.9 *3*.
1500	1.0 *7*	8601.0	(13^+)	7101.2	$12^{(+)}$	
1514	1.2 *7*	3190.9	6^-	1676.8	5^+	
1515	1.1 *7*	7133.2	(13^-)	5618.2	(11^-)	DCO=1.1 *5*.
1555	2.3 *8*	4446.9	9^-	2891.8	7^-	DCO=1.0 *3*.
1612	1.5 *7*	7620.5	$12^{(+)}$	6008.3	11^+	DCO=0.6 *3*.
1758	4.5 *8*	2147.7	6^+	390.1	4^+	DCO=1.1 *4*.
1821	2.3 *10*	3190.9	6^-	1370.1	5^+	DCO=2.9 *5*.
1843	0.3 *3*	6008.3	11^+	4165.0	9^-	
1858	1.0 *7*	8959.1	(14^+)	7101.2	$12^{(+)}$	DCO=1.9 *6*.
1869	1.1 *7*	4165.0	9^-	2295.2	6^-	
1905	1.0 *7*	2295.2	6^-	390.1	4^+	
1925[†]	0.5 *5*	10883.9?		8959.1	(14^+)	

[†] Placement of transition in the level scheme is uncertain.

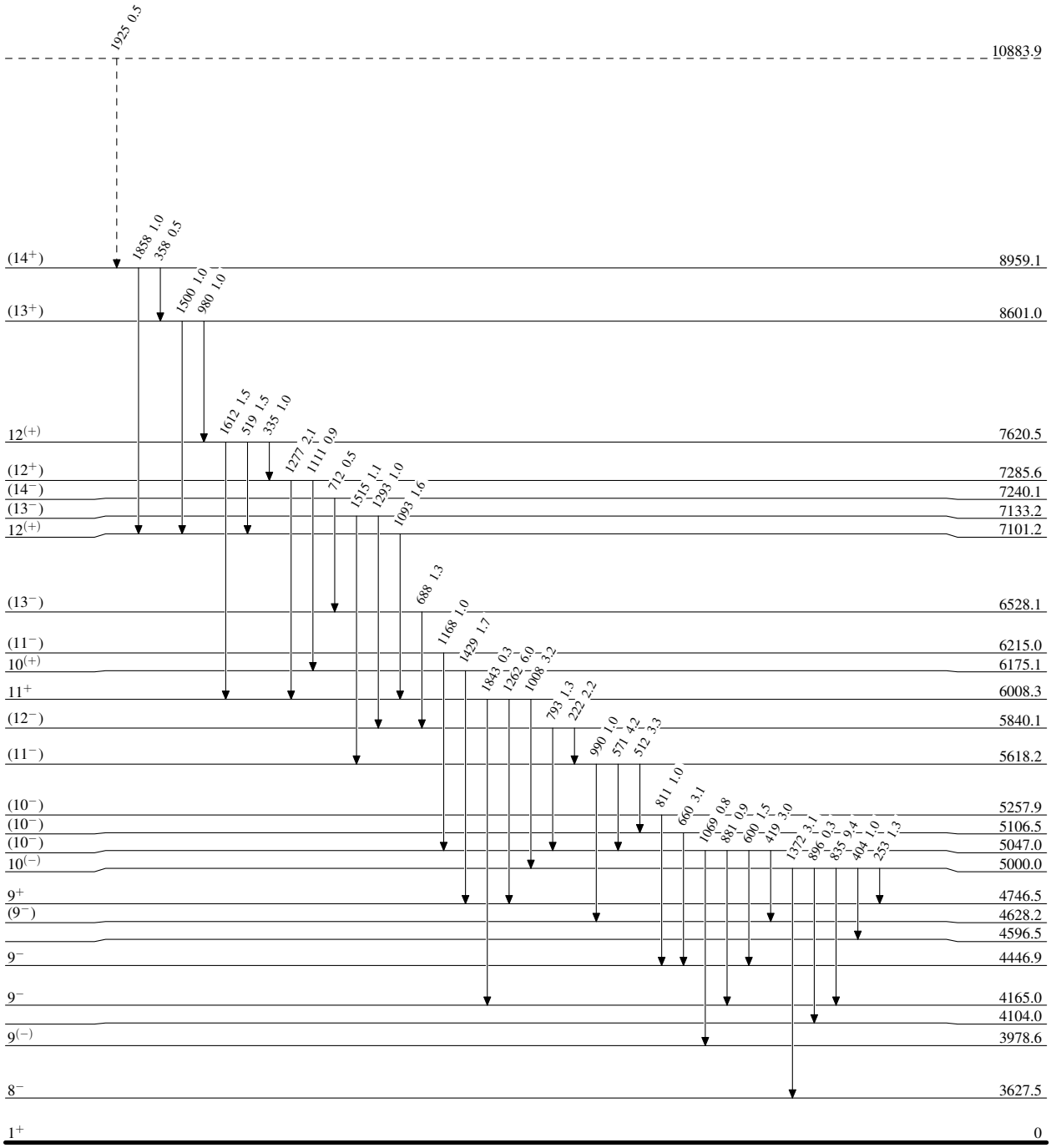
^{52}Cr(^{16}O,αpnγ) 2001Mu14

Level Scheme

Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



$^{62}_{29}Cu_{33}$

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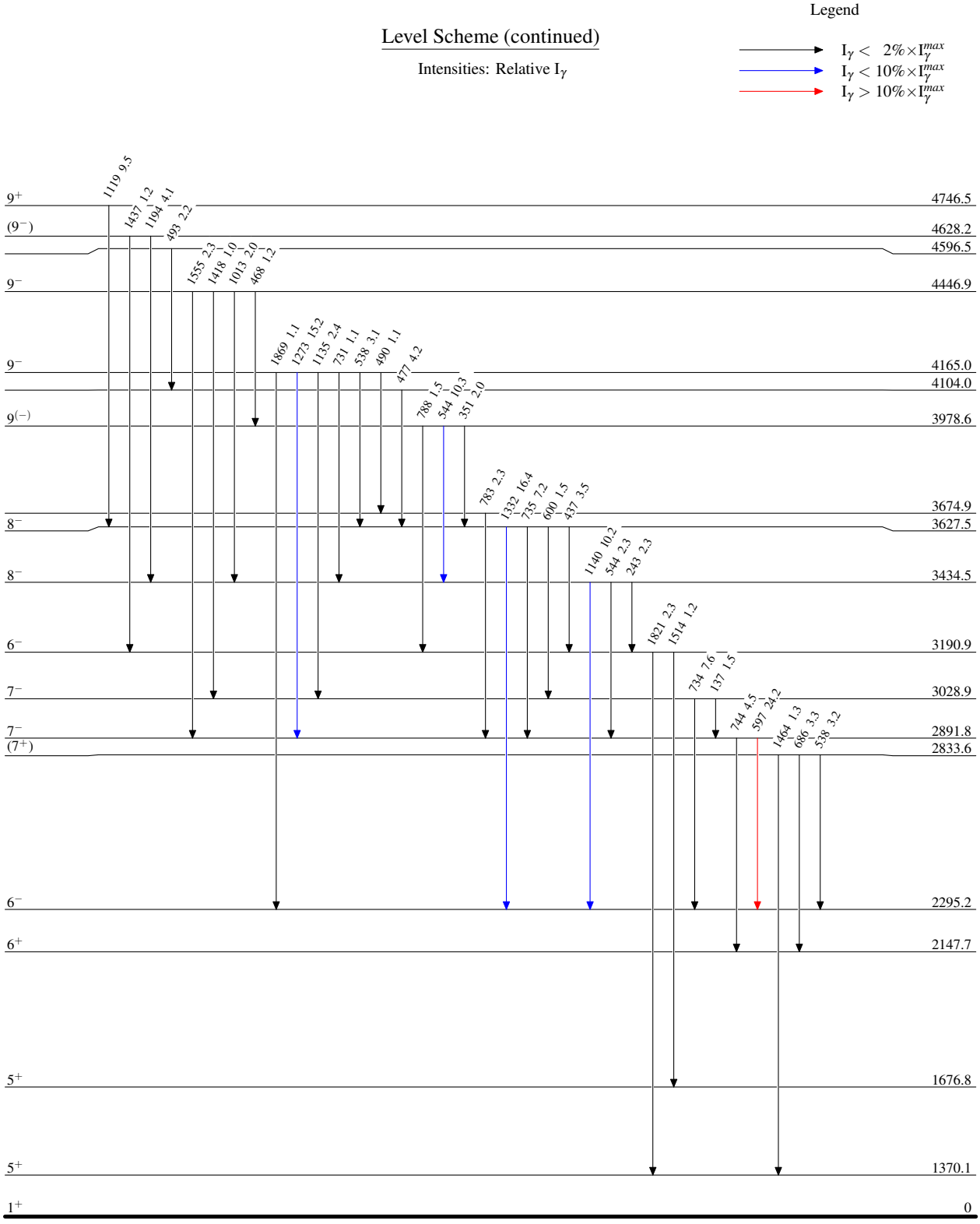
Level Scheme (continued)

Intensities: Relative I_γ

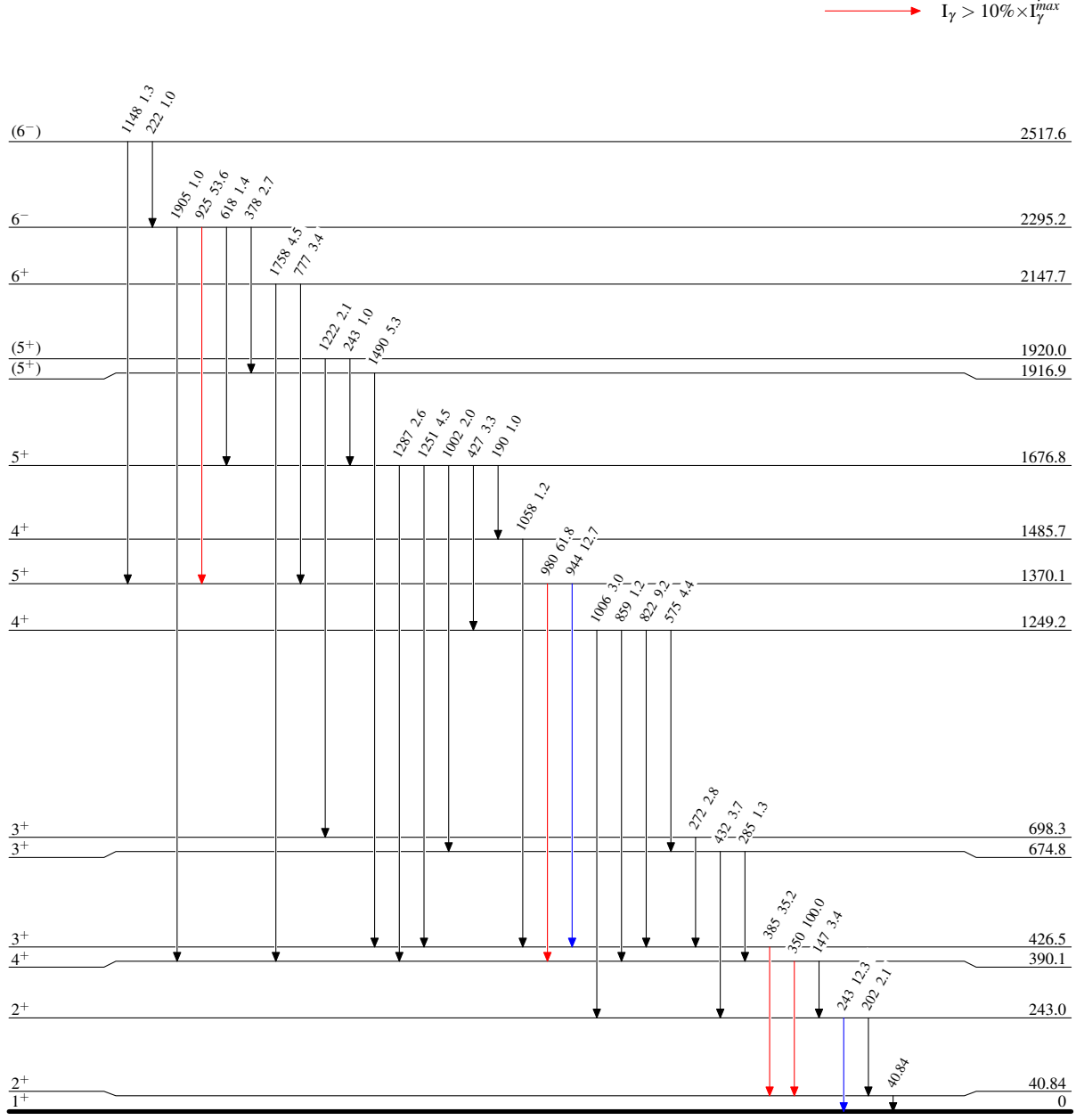


$^{62}_{29}Cu_{33}$

^{52}Cr(^{16}O,αpnγ) 2001Mu14

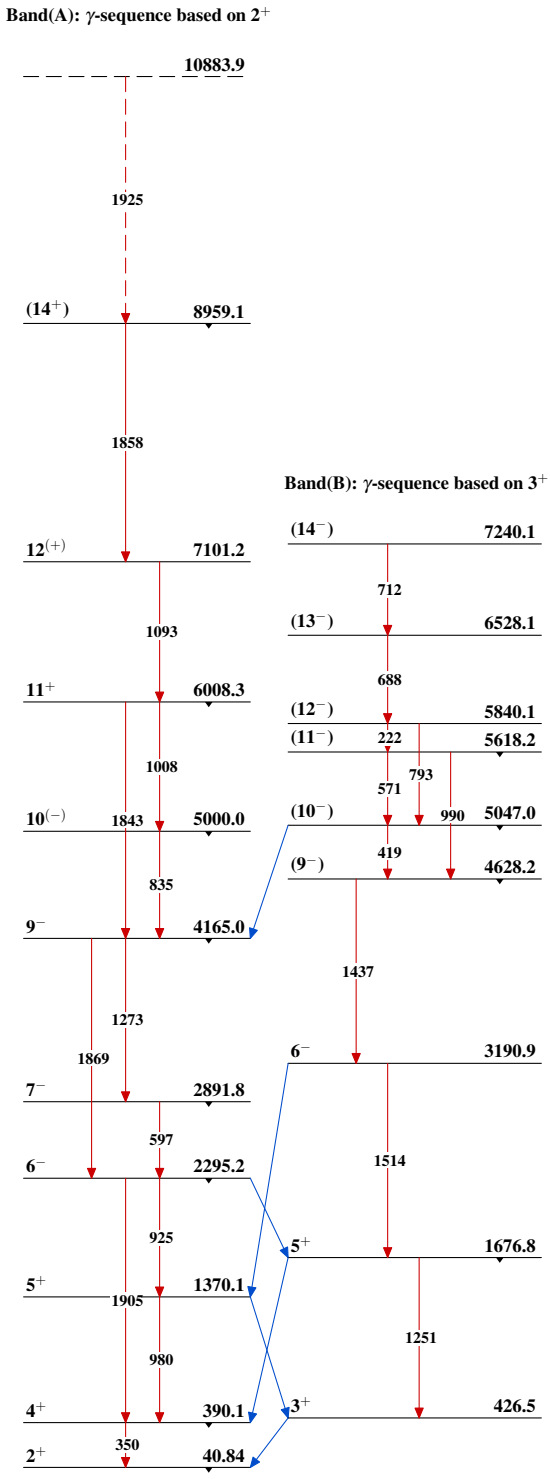
Level Scheme (continued)

Intensities: Relative I_γ



$^{62}_{29}Cu_{33}$

$^{52}Cr(^{16}O,\alpha pn\gamma)$ 2001Mu14



$^{62}_{29}Cu_{33}$