^{50}Cr(^{58}Ni,3pγ) 1997Ko51

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Lalkovski, J. Timar and Z. Elekes	NDS 161, 1 (2019)	1-Apr-2019

Facility: Niels Bohr Institute's Tandem; Beam: E(^{58}Ni)=261, 270 MeV; Targets: two 4.8 and 3.1 mg/cm^2 thick enriched to 96.8% in ^{50}Cr on Au backing, one 10 mg/cm^2 thick enriched to 99.8% in ^{54}Fe; Reactions: ^{50}Cr(^{58}Ni,3pγ) and ^{54}Fe(^{58}Ni,2$\alpha\gamma$); Detectors: 15 HPGe with AC shields, 21 ΔE Si detectors in 4π geometry, 1π neutron detector at forward angles, 2π multiplicity filter built of 30 BaF_2 scintillators; Measured: γ, γ-γ coinc., Eγ, Iγ; Deduced: level scheme.

^{105}In Levels

E(level)[†]	J$^\pi$[‡]	Comments
0.0[#]	9/2$^+$	
992.07[#] *17*	11/2$^+$	
1341.64[#] *17*	13/2$^+$	
1826.3[#] *3*	17/2$^+$	
2097.8[#] *3*	19/2$^+$	
2937.9[#] *4*	21/2$^+$	
3345.3[#] *4*	23/2$^+$	
3631.5[#] *4*	25/2$^+$	
3654.2[@] *4*	19/2$^-$	
3827.7[@] *4*	21/2$^-$	
3957.9[@] *4*	23/2$^-$	
3971.3[&] *4*	21/2$^-$	
4310.3[&] *4*	23/2$^-$	
4356.0[@] *4*	25/2$^-$	
4490.1[#] *4*	29/2$^+$	J$^\pi$: (29/2$^+$) in 1999De50.
4843.1[a] *4*	25/2$^-$	
4953.9[&] *4*	25/2$^-$	
5046.4[@] *4*	27/2$^-$	
5249.7[#] *5*	29/2$^{(+)}$	
5274.0[&] *4*	27/2$^-$	
5315.8[a] *5*	27/2$^-$	
5488.1[@] *4*	29/2$^-$	
5620.1[&] *4*	29/2$^-$	
5743.5[a] *6*	29/2$^-$	
5890.6[@] *4*	31/2$^-$	
6021.0[&] *4*	31/2$^-$	
6381.8[@] *5*	33/2$^-$	
6586.1[&] *5*	33/2$^-$	
6875.4[#] *7*		
7055.7[&] *5*	35/2$^-$	
7106.5[@] *6*	(35/2$^-$)	
7552.5[&] *5*	37/2$^-$	
7739.8[@] *7*		
8561.8[@] *12*		

[†] From a least-squares fit to Eγ.

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$^{50}Cr(^{58}Ni,3p\gamma)$ 1997Ko51 (continued)

^{105}In Levels (continued)

‡ From 1997Ko51, based on γ-ray multipolarity and band structure.
# Seq.(C): γ sequence based on $9/2^+$.
@ Seq.(D): γ sequence based on $19/2^-$.
& Band(A): γ sequence based on $21/2^-$.
a Band(B): γ sequence based on $25/2^-$.

$\gamma(^{105}In)$

E_γ†	I_γ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ	α@	Comments
130.2# *2*	13.0 *1*	3957.9	$23/2^-$	3827.7	$21/2^-$	(M1)		0.244	Mult.: R(asym)=0.92 *1* in 1997Ko51.
173.4 *3*	1.9 *1*	3827.7	$21/2^-$	3654.2	$19/2^-$	(M1)		0.1111	Mult.: R(asym)=0.94 *7* in 1997Ko51.
203.1 *3*	0.45 *5*	5046.4	$27/2^-$	4843.1	$25/2^-$				Mult.: R(asym)=0.67 *8* in 1997Ko51.
214.1 *2*	3.74 *9*	5488.1	$29/2^-$	5274.0	$27/2^-$				Mult.: R(asym)=0.75 *2* in 1997Ko51.
271.5 *2*	91.8 *5*	2097.8	$19/2^+$	1826.3	$17/2^+$	M1			Mult.: R(asym)=0.84 *1* in 1997Ko51.
286.2 *2*	18.3 *2*	3631.5	$25/2^+$	3345.3	$23/2^+$				Mult.: R(asym)=0.85 *1* in 1997Ko51.
317.1 *2*	2.24 *9*	3971.3	$21/2^-$	3654.2	$19/2^-$	(M1)		0.0226	Mult.: R(asym)=0.76 *5* in 1997Ko51.
320.4 *4*	1.3 *2*	5274.0	$27/2^-$	4953.9	$25/2^-$	(M1)		0.0220	
339.0 *2*	3.4 *1*	4310.3	$23/2^-$	3971.3	$21/2^-$	(M1)		0.0191	Mult.: R(asym)=0.84 *4* in 1997Ko51.
346.2 *3*	1.46 *6*	5620.1	$29/2^-$	5274.0	$27/2^-$	(M1)		0.0181	Mult.: R(asym)=0.89 *5* in 1997Ko51.
349.6 *2*	27.5 *1*	1341.64	$13/2^+$	992.07	$11/2^+$	M1			Mult.: R(asym)=0.86 *1* in 1997Ko51.
361.0 *6*	3 *1*	6381.8	$33/2^-$	6021.0	$31/2^-$				
361.9 *5*	2 *1*	5315.8	$27/2^-$	4953.9	$25/2^-$				
398.2 *2*	48.0 *4*	4356.0	$25/2^-$	3957.9	$23/2^-$	(M1)		0.01273	Mult.: R(asym)=0.88 *1* in 1997Ko51.
400.9 *2*	11.8 *3*	6021.0	$31/2^-$	5620.1	$29/2^-$	(M1)		0.01252	Mult.: R(asym)=0.77 *3* in 1997Ko51.
402.5 *2*	19.7 *4*	5890.6	$31/2^-$	5488.1	$29/2^-$	(M1)		0.01240	Mult.: R(asym)=0.75 *2* in 1997Ko51.
407.4 *2*	18.0 *2*	3345.3	$23/2^+$	2937.9	$21/2^+$	E2			Mult.: R(asym)=0.86 *1* in 1997Ko51.
427.7 *3*	2.9 *1*	5743.5	$29/2^-$	5315.8	$27/2^-$				Mult.: R(asym)=0.67 *3*.
441.7 *2*	24.7 *2*	5488.1	$29/2^-$	5046.4	$27/2^-$	(M1)		0.00985	Mult.: R(asym)=0.76 *1* in 1997Ko51.
469.6 *3*	3.7 *2*	7055.7	$35/2^-$	6586.1	$33/2^-$	(M1)		0.00847	Mult.: R(asym)=0.64 *3* in 1997Ko51.
472.6 *3*	3.0 *1*	5315.8	$27/2^-$	4843.1	$25/2^-$				Mult.: R(asym)=0.64 *3* in 1997Ko51.
484.7 *2*	100.0 *5*	1826.3	$17/2^+$	1341.64	$13/2^+$	E2			Mult.: R(asym)=1.46 *1* in 1997Ko51.
491.1 *2*	11.8 *1*	6381.8	$33/2^-$	5890.6	$31/2^-$	(M1)		0.00759	Mult.: R(asym)=0.74 *1* in 1997Ko51.
496.8 *2*	3.8 *1*	7552.5	$37/2^-$	7055.7	$35/2^-$	(M1)		0.00738	Mult.: R(asym)=0.61 *4* in 1997Ko51.
532.8 *2*	1.6 *7*	4843.1	$25/2^-$	4310.3	$23/2^-$				Mult.: R(asym)=0.64 *3* in 1997Ko51.
532.9 *2*	4.9 *7*	6021.0	$31/2^-$	5488.1	$29/2^-$				Mult.: R(asym)=0.64 *3* in 1997Ko51.
565.0 *3*	4.9 *2*	6586.1	$33/2^-$	6021.0	$31/2^-$	(M1)		0.00541	Mult.: R(asym)=0.75 *6* in 1997Ko51.
573.7 *2*	8.7 *2*	5620.1	$29/2^-$	5046.4	$27/2^-$				Mult.: R(asym)=0.81 *2* in 1997Ko51.
612.5 *3*	1.7 *1*	3957.9	$23/2^-$	3345.3	$23/2^+$				Mult.: R(asym)=1.36 *6* in 1997Ko51.
633.3 *4*	1.8 *2*	7739.8		7106.5	$(35/2^-)$				
643.8 *3*	1.6 *2*	4953.9	$25/2^-$	4310.3	$23/2^-$	(M1)		0.00397	Mult.: R(asym)=1.05 *8* in 1997Ko51.
673.9 *4*	2.8 *3*	7055.7	$35/2^-$	6381.8	$33/2^-$				
690.4 *2*	34.6 *4*	5046.4	$27/2^-$	4356.0	$25/2^-$	(M1)		0.00336	Mult.: R(asym)=0.81 *1* in 1997Ko51.
695.6 *3*	2.5 *2*	6586.1	$33/2^-$	5890.6	$31/2^-$				
724.7 *3*	2.2 *2*	7106.5	$(35/2^-)$	6381.8	$33/2^-$	(M1)		0.00300	Mult.: R(asym)=1.01 *8* in 1997Ko51.
759.6 *3*	2.4 *2*	5249.7	$29/2^{(+)}$	4490.1	$29/2^+$				Mult.: R(asym)=0.73 *9* in 1997Ko51.
822 *1*	1.6 *1*	8561.8		7739.8					
840.0 *2*	54.4 *4*	2937.9	$21/2^+$	2097.8	$19/2^+$	M1+E2			Mult.: R(asym)=0.97 *1* in 1997Ko51.
858.5 *2*	9.0 *2*	4490.1	$29/2^+$	3631.5	$25/2^+$				Mult.: R(asym)=0.89 *3* in 1997Ko51.

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$^{50}Cr(^{58}Ni,3p\gamma)$ 1997Ko51 (continued)

$\gamma(^{105}In)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	α[@]	Comments
885.1 *3*	1.5 *1*	4843.1	$25/2^-$	3957.9	$23/2^-$				Mult.: R(asym)=0.93 *7* in 1997Ko51.
918.0 *2*	3.6 *2*	5274.0	$27/2^-$	4356.0	$25/2^-$				Mult.: R(asym)=0.83 *4* in 1997Ko51.
992.1 *2*	34.7 *2*	992.07	$11/2^+$	0.0	$9/2^+$	M1+E2	0.5 *1*		Mult.: R(asym)=1.30 *1* in 1997Ko51.
998.1 *3*	2.0 *1*	5488.1	$29/2^-$	4490.1	$29/2^+$				Mult.: R(asym)=1.15 *4* in 1997Ko51.
1010.7 *2*	6.6 *1*	4356.0	$25/2^-$	3345.3	$23/2^+$	(E1)		5.05×10^{-4}	Mult.: R(asym)=0.85 *2* in 1997Ko51.
1020.0 *2*	35.2 *4*	3957.9	$23/2^-$	2937.9	$21/2^+$	(E1)		4.97×10^{-4}	Mult.: R(asym)=0.80 *1* in 1997Ko51.
1033.4 *4*	1.0 *2*	3971.3	$21/2^-$	2937.9	$21/2^+$	(E1)		4.84×10^{-4}	Mult.: R(asym)=1.6 *4* in 1997Ko51.
1088.4 *3*	1.5 *1*	5046.4	$27/2^-$	3957.9	$23/2^-$				Mult.: R(asym)=1.85 *8* in 1997Ko51.
1111.6 *3*	3.7 *2*	2937.9	$21/2^+$	1826.3	$17/2^+$				Mult.: R(asym)=1.39 *7* in 1997Ko51.
1130.0 *3*	1.0 *1*	5620.1	$29/2^-$	4490.1	$29/2^+$	(E1)		4.19×10^{-4}	Mult.: R(asym)=0.8 *2* in 1997Ko51.
1132.1 *3*	2.1 *2*	5488.1	$29/2^-$	4356.0	$25/2^-$				Mult.: R(asym)=1.34 *8* in 1997Ko51.
1247.5 *2*	12.6 *3*	3345.3	$23/2^+$	2097.8	$19/2^+$				Mult.: R(asym)=1.54 *4* in 1997Ko51.
1264.2 *3*	2.0 *1*	5620.1	$29/2^-$	4356.0	$25/2^-$	(E2)		7.50×10^{-4}	Mult.: R(asym)=1.5 *1* in 1997Ko51.
1341.6 *2*	77.1 *4*	1341.64	$13/2^+$	0.0	$9/2^+$	E2			Mult.: R(asym)=1.48 *1* in 1997Ko51.
1372.3 *4*	0.6 *1*	4310.3	$23/2^-$	2937.9	$21/2^+$	(E1)		4.28×10^{-4}	Mult.: R(asym)=0.7 *1* in 1997Ko51.
1498.0 *4*	0.9 *1*	4843.1	$25/2^-$	3345.3	$23/2^+$	(E1)		4.80×10^{-4}	Mult.: R(asym)=0.6 *2* in 1997Ko51.
1556.4[&] *4*	0.3 *1*	3654.2	$19/2^-$	2097.8	$19/2^+$				Mult.: R(asym)=1.7 *5* in 1997Ko51.
1642.5 *3*	0.9 *1*	5274.0	$27/2^-$	3631.5	$25/2^+$	(E1)		5.55×10^{-4}	Mult.: R(asym)=0.5 *1* in 1997Ko51.
1729.8[#] *2*	18.7 *1*	3827.7	$21/2^-$	2097.8	$19/2^+$	(E1)		6.04×10^{-4}	Mult.: R(asym)=0.79 *1* in 1997Ko51.
1827.8 *3*	3.2 *1*	3654.2	$19/2^-$	1826.3	$17/2^+$	(E1)		6.62×10^{-4}	Mult.: R(asym)=0.85 *6* in 1997Ko51.
2385.3 *5*	1.1 *1*	6875.4		4490.1	$29/2^+$				

[†] From 1997Ko51.

[‡] From $\gamma\gamma(\theta)$ in 1997Ko51, based on R(asym)=Iγ(143°)/[Iγ(79°)+Iγ(101°)] ≈0.8 for ΔJ=1 and 1.5 for ΔJ=2 quadrupole transitions, respectively.

[#] Ordering of the 130-1730 cascade is reversed from that in 1992Is02 and 1995Is06.

[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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

$^{50}Cr(^{58}Ni,3p\gamma)$ 1997Ko51

Level Scheme

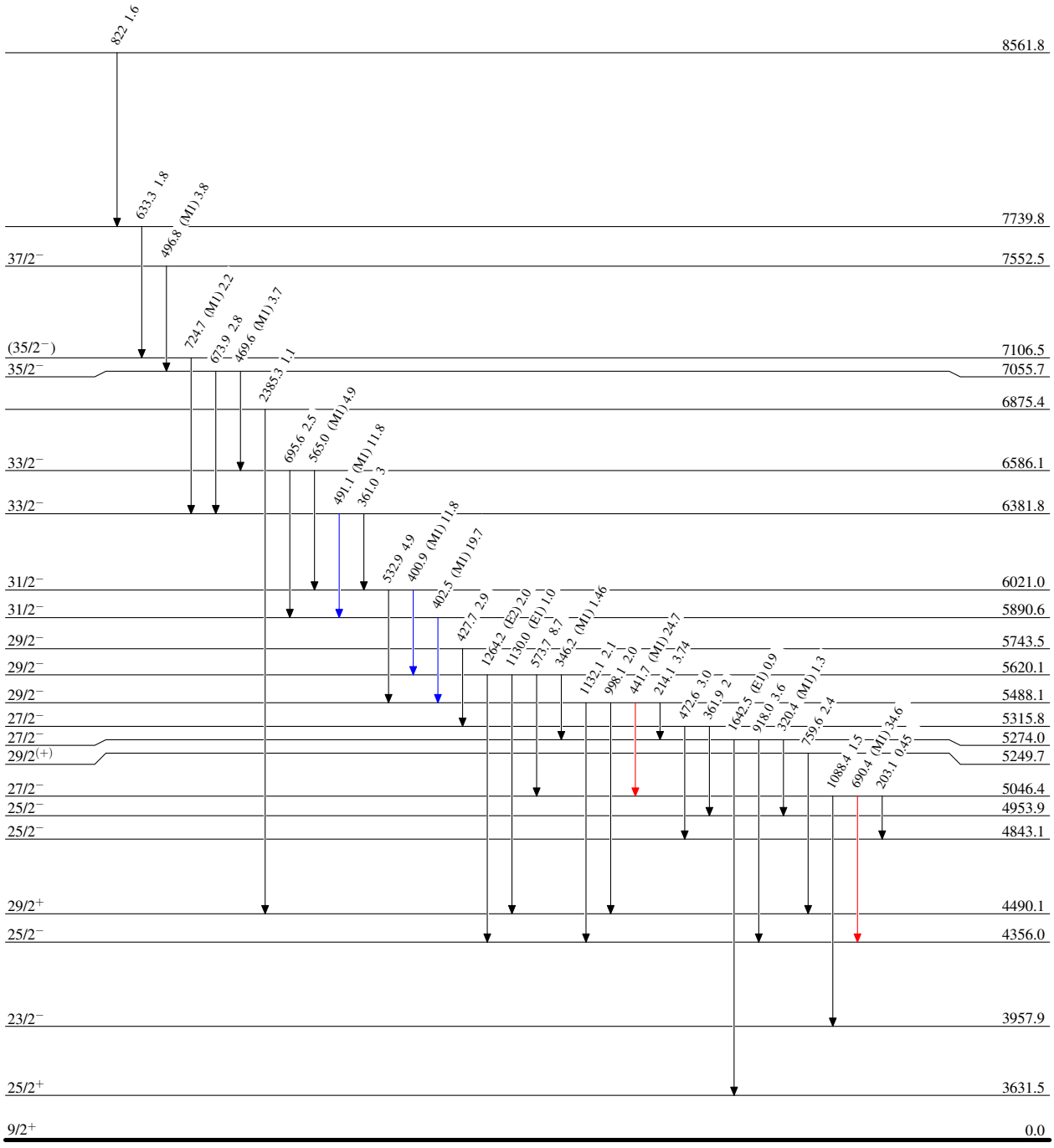
Intensities: Relative I_γ

Legend

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

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

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



$^{105}_{49}In_{56}$

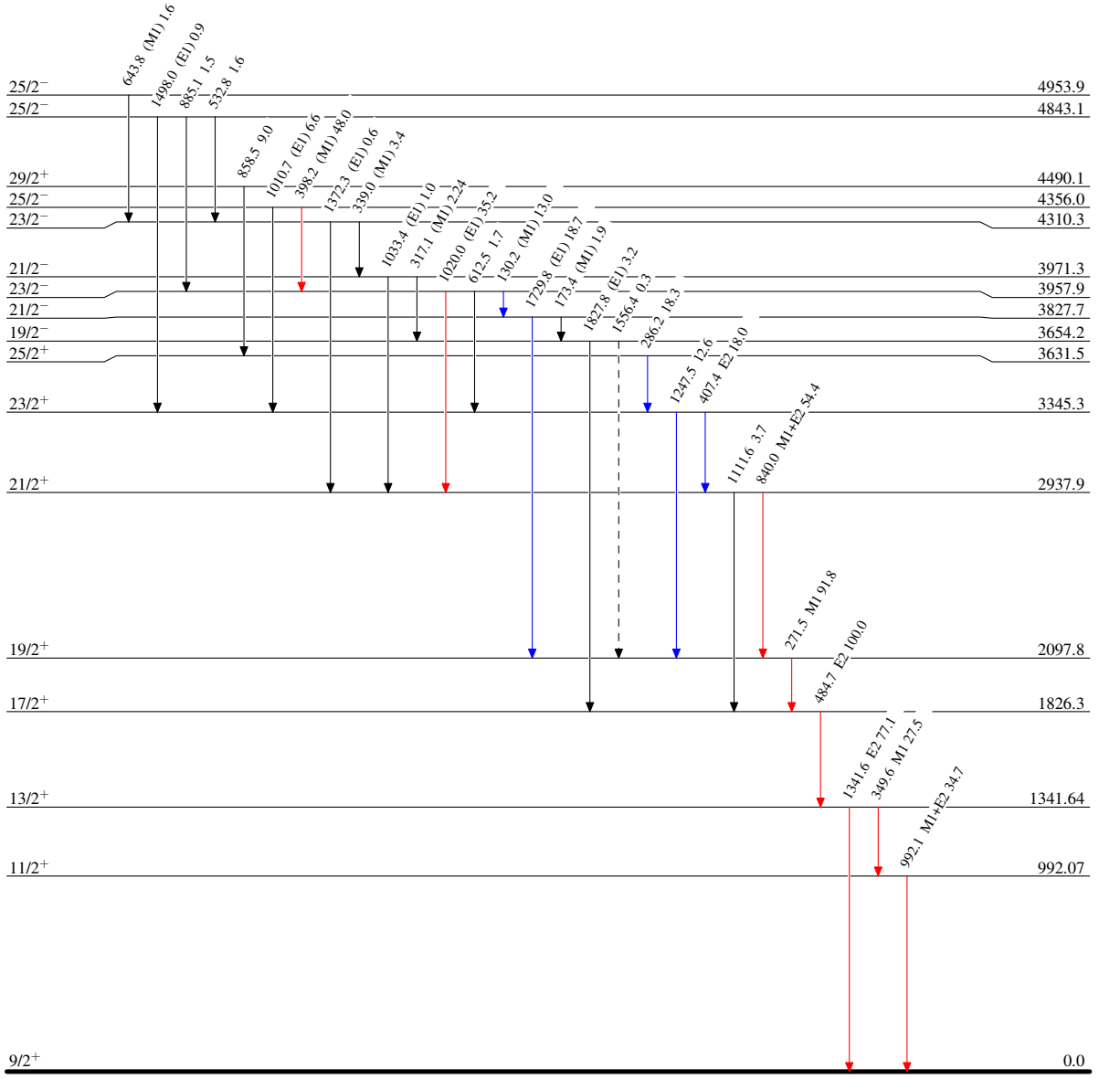
$^{50}Cr(^{58}Ni,3p\gamma)$ 1997Ko51

Level Scheme (continued)

Intensities: Relative I_γ

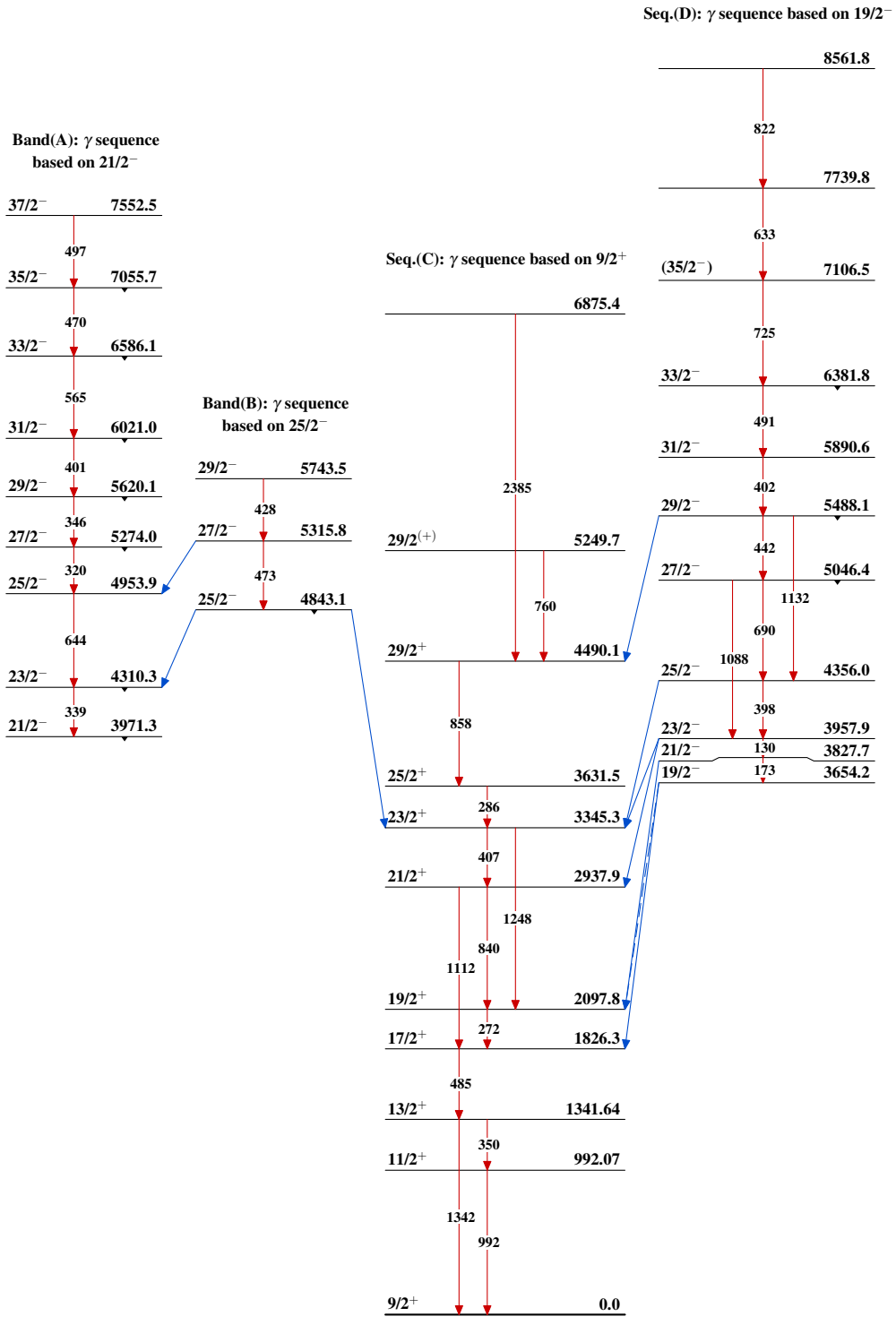
Legend

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



$^{105}_{49}In_{56}$

$^{50}Cr(^{58}Ni,3p\gamma)$ 1997Ko51



$^{105}_{49}In_{56}$