^{110}Cd(γ,γ′) 2005Ko32,1969Mi13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal and F. G. Kondev	NDS 113, 1315 (2012)	1-Aug-2011

2005Ko32: The nuclear resonance fluorescence experiments were performed at the bremsstrahlung facility of the 4.3 MV Dynamitron accelerator in Stuttgart. Metal Cd targets, 95.5% to 97.3% enriched in ^{110}Cd and sandwiched between ^{27}Al disks were used. The scattered γ-rays were detected by three HPGe detectors placed at θ=90°, 127° and 150° respect to the incoming bremsstrahlung beam. (FWHM ≈2 keV for 1.3 MeV γ-ray and ≈3 keV at 3 MeV γ-ray). For linear polarization measurements, two sectored single-crystal Ge Compton polarimeters positioned at slightly backward angles of ≈95° were used. The polarization sensitivities of the polarimeters were ≈15% at 1.5 MeV γ and 10% at 4 MeV γ. Measured: Eγ, Iγ, γ(θ) (θ=90°,127°), integrated scattering cross sections. Deduced: ^{110}Cd energy levels, mult., J^π, decay widths.

1969Mi13: Energy levels of ^{110}Cd in the range of 6-8 MeV were excited by the n-capture γ′s. The experiment was performed at the 100 kW Texas A&M University Research Reactor. The neutrons from the core of the reactor were captured in the source material placed adjacent to the core. The γ-rays produced in the (n,γ) reactions in the source material were transferred to the research area adjacent to the reactor. The scattering target of natural cadmium was placed in the γ-ray beam. The scattered γ-rays were detected using a 30 cm^3 Ge(Li) detector. The details of experimental set-up are from 1969Ra09. Measured: Eγ, Iγ, σ(Eγ′,θ), θ=90°, 150°.

Other: 2001Ko49.

^{110}Cd Levels

E(level)[†]	Jπ[#]	$T_{1/2}$[@]	$I_{S,0}$ eV b[&]	Comments
0.0	0^+			
658[‡] *10*	2^+[b]			
1790[‡] *10*	2^+[b]			
2650	1^-	29.8[a] fs *8*	25.1 *6*	B(E1)↑=2.35×10^{-5} *5* (2005Ko32) B(E1)↑: deduced using Γ_0=0.0153 eV *4* (2005Ko32). Interpreted as member of two-phonon quintuplet (2^+⊗3^-).
3044	1^+	31 fs *4*	22 *3*	B(M1)↑=0.161 *5* (2005Ko32) B(M1)↑: Deduced using Γ_0=0.0176 eV *6* (2005Ko32).
3079	1	187 fs *40*	9.5 *17*	B(M1)↑=0.069 *10*; B(E1)↑=0.77×10^{-5} *11* (2005Ko32) $T_{1/2}$: 18 fs 3 from author′s deduced transition probabilities. B(M1)↑,B(E1)↑: Deduced using Γ_0=0.0078 eV *12* (2005Ko32).
3281	$1^{(+)}$	37.4[a] fs *1*	13.1 *4*	B(M1)↑=0.090 *3*; B(E1)↑=0.99×10^{-5} *3* (2005Ko32) B(M1)↑,B(E1)↑: Deduced using Γ_0=0.0122 eV *4* (2005Ko32).
3298	1	134[a] fs *12*	3.6 *3*	B(M1)↑=0.025 *2*; B(E1)↑=0.27×10^{-5} *2* (2005Ko32) B(M1)↑,B(E1)↑: Deduced using Γ_0=0.0034 eV *3* (2005Ko32).
3359	1^-	11.7[a] fs *2*	40.0 *8*	B(E1)↑=2.96×10^{-5} *6* (2005Ko32) B(E1)↑: Deduced using Γ_0=0.0391 eV *8* (2005Ko32).
3475	1	72[a] fs *4*	6.0 *3*	B(M1)↑=0.039 *2*; B(E1)↑=0.43×10^{-5} *2* (2005Ko32) B(M1)↑,B(E1)↑: Deduced using Γ_0=0.0063 eV *3* (2005Ko32).
3598	1^+	71[a] fs *6*	5.7 *4*	B(M1)↑=0.036 *3* (2005Ko32) B(M1)↑: Deduced using Γ_0=0.0064 eV *5* (2005Ko32).
3772	1^+	12.8 fs *1*	38 *4*	B(M1)↑=0.225 *8* (2005Ko32) B(M1)↑: Deduced using Γ_0=0.0465 eV *17* (2005Ko32).
3854	$1^{(+)}$	46[a] fs *6*	7.7 *10*	B(M1)↑=0.045 *6*; B(E1)↑=0.50×10^{-5} *6* (2005Ko32) B(M1)↑,B(E1)↑: Deduced using Γ_0=0.0099 eV *13* (2005Ko32).
3862	$1^{(+)}$	13.3 fs *5*	30 *10*	B(M1)↑=0.173 *10*; B(E1)↑=1.91×10^{-5} *11* (2005Ko32) B(M1)↑,B(E1)↑: Deduced using Γ_0=0.0384 eV *21* (2005Ko32).
6490[‡] *10*	(1)			Jπ: From γ(θ) in 1969Mi13.

† From 2005Ko32, unless otherwise stated.
‡ From 1969Mi13.

Continued on next page (footnotes at end of table)

^{110}Cd(γ,γ′) 2005Ko32,1969Mi13 (continued)

^{110}Cd Levels (continued)

[#] From deduced transition multipolarities in 2005Ko32, unless otherwise stated.
[@] Deduced using ground state transition width Γ_0 and branching ratios given in 2005Ko32, unless otherwise stated.
[&] Integrated cross section (2005Ko32).
[a] Upper limit given since Γ_0/Γ = 1 is assumed.
[b] From Adopted Levels.

γ(^{110}Cd)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[@]	Comments
2650	1⁻	2650		0.0	0⁺	E1	POL=−0.11 *5*.
3044	1⁺	2386	18.3 *24*	658	2⁺		
		3044	100	0.0	0⁺	M1	POL=+0.06 *5*.
3079	1	2421	220 *32*	658	2⁺		
		3079	100	0.0	0⁺	D	Mult.: From the intensity ratios W(90°)/W(127°) in Figure 2.
3281	$1^{(+)}$	3281		0.0	0⁺	(M1)	POL=+0.03 *6*.
3298	1	3298		0.0	0⁺	D	Mult.: From the intensity ratios W(90°)/W(127°) in Figure 2.
3359	1⁻	3359		0.0	0⁺	E1	POL=−0.14 *4*.
3475	1	3475		0.0	0⁺	D	Mult.: From the intensity ratios W(90°)/W(127°) in Figure 2.
3598	1⁺	3598		0.0	0⁺	M1	POL=+0.24 *16*.
3772	1⁺	3114	30 *3*	658	2⁺		
		3772	100	0.0	0⁺	M1	POL=+0.13 *8*.
3854	$1^{(+)}$	3854		0.0	0⁺	(M1)[&]	POL=+0.09 *7* for 3854+3862 doublet.
3862	$1^{(+)}$	3204	12 *4*	658	2⁺		
		3862	100	0.0	0⁺	(M1)[&]	POL=+0.09 *7* for 3854+3862 doublet.
6490	(1)	4707[#]		1790	2⁺		E_γ: 4695 keV was measured to populate 1.795 MeV state but authors stated that 1.795 MeV state is in fair agreement with 1.78 MeV state in ^{110}Cd. 4707 keV was adopted by the evaluators using the adopted level energy 1783 keV.
		5831[#]		658	2⁺		
		6490[#]		0.0	0⁺	D	Mult.: Iγ(150°)/Iγ(90°)=1.66 *8*, 1.75 expected for 0(1)1(1)0 transition (1969Mi13).

[†] From 2005Ko32, unless otherwise stated.
[‡] From 2005Ko32, deduced using R_{exp}= $(\Gamma_f/\Gamma_0)*(E^3_{\gamma J_0}/E^3_{\gamma J_f})$ given by the authors.
[#] From 1969Mi13.
[@] From 2005Ko32, deduced from γ(θ) and linear polarization measurements, unless otherwise stated.
[&] 3854γ and 3862γ could not be resolved in the polarization measurements in 2005Ko32.

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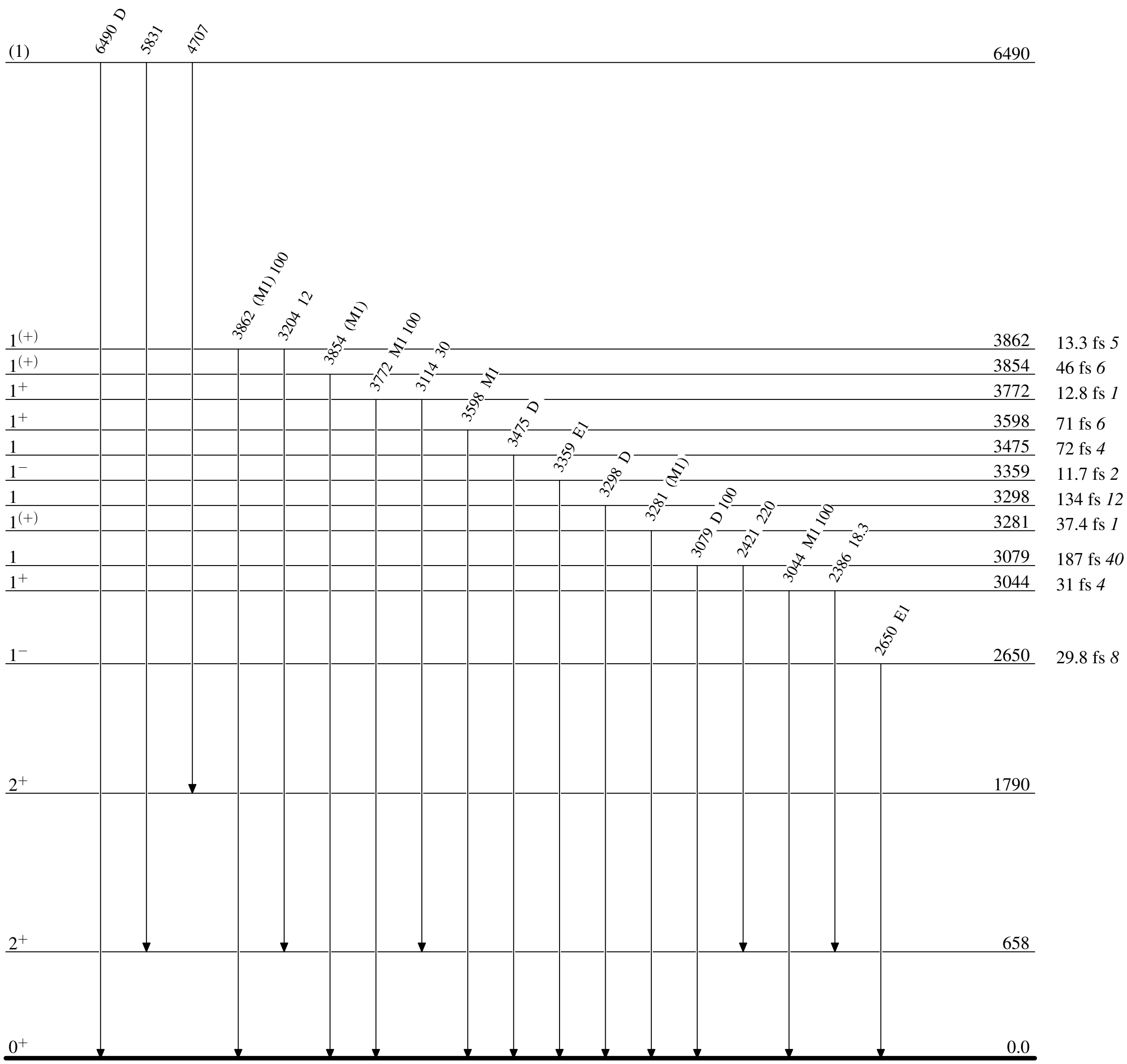
Level Scheme

Intensities: Relative photon branching from each level



$^{110}_{48}Cd_{62}$