(HI,xnγ)

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yang Dong, Huo Junde	NDS 128, 185 (2015)	10-Jul-2015

1984Ko31: ^{7}Li(^{51}V,α2nγ) E=180 MeV, Eγ, αγ-coin.
1978Me19: ^{27}Al(^{28}Si,3pγ) E=65-81 MeV, σ(Eγ,E).
2007Ku19: ^{27}Al(^{28}Si,3pγ) E=70 MeV, Enriched target. Measured Eγ, Iγ, γγ, γγ(θ)(DCO), γ(lin pol), using INGA array of eight Compton-suppressed Clover detectors.
1979Me03: ^{28}Si(^{28}Si,4pγ) E=65-90 MeV, σ(Eγ,θ).
2000ApZX: ^{48}Ca(^{9}Be,5nγ) E=50 MeV, Eγ, Iγ,γγ, and γγ(θ)(DCO) using 8π spectrometer.
Additional information 1.
1974Br04: ^{49}Ti(α,nγ) E=14.5 MeV, RDM.
1979St13: ^{50}Ti(α,2nγ) E=24-33 MeV, γ(θ), p(Eγ), γγ-coin.
1977Be22: ^{50}Ti(α,2nγ) E=18-25 MeV, γ(θ), γγ-coin, DSAM.
1977Ev03: ^{50}Cr(α,2pγ) E=23.5, 27.2 MeV, γγ-coin. two 60 cm^3 Ge(Li) counters.
1987Ba72: ^{51}V(α,p2nγ) E=30-45 MeV, RDM, DSAM, γ(θ), γγ-coin. Ge(Li) detector: 2.7 keV at 1333.6 keV (FWHM), HPGE detector: 2.4 keV at 1333.6 keV (FWHM).
1974Po15: ^{51}V(^{7}Li,α2nγ),(^{6}Li,αnγ) E=25 MeV, RDM, DSA, γ(θ).
1985Io02: ^{51}V(^{7}Li,α2nγ) E=18 MeV, αγ-coin, studied reaction mechanism.
Others: 1978BeZC, 1978Ha17, 1978TaZO.

^{52}Cr Levels

E(level)	Jπ†	$T_{1/2}$‡	Comments
0.0&	0+		
1434.22& *10*	2+	2.3 ps *+6−5*	
2369.72& *14*	4+	9.4 ps *+24−16*	$T_{1/2}$: from RDM, 1974Br04. Inconsistent with $T_{1/2}$=2.7 ps *+8−7* (DSAM) from 1977Be22. 1974Br04 explicitly take feeding into account, 1977Be22 make no correction.
2767.97 *20*	4+	2.5 ps *6*	$T_{1/2}$: other: 1.4 ps − 8.7 ps, lower limit from DSAM, upper limit from RDM, see 1974Po15.
3113.92& *17*	6+	41.4# ps *14*	$T_{1/2}$: RDM. Others: 45 ps *6* (1987Ba72) RDM, 2.5 ps *6* (1977Be22) DSAM. The DSAM result appears to be incorrect.
3415.4 *3*	4+	0.33 ps *9*	$T_{1/2}$: From 1974Po15. Others: 0.10 ps *+8−6* (1987Ba72), 0.44 ps *10* (1977Be22). Value of 1977Be22 not corrected for cascade feedings.
3471.8 *8*	3+	7.2 ps *8*	$T_{1/2}$: from 1974Br04 (RDM). Other: 1.9 ps *+7−5* (1977Be22). Value of 1977Be22 not corrected for cascade feedings. Jπ: from 2007Ku19.
3615.9 *3*	5+		$T_{1/2}$: <3.8 ps (1974Br04) RDM, >1.4 ps (1974Po15) DSAM.
4016.0a *4*	5+	0.7 ps *5*	$T_{1/2}$: other: <1.2 ps (1987Ba72).
4038.6 *13*	4+		
4584.0 *8*	(6+)		
4750.4& *3*	8+	0.64 ps *+20−17*	$T_{1/2}$: other: 0.7 to 4.2 ps, lower limit from DSAM, upper limit from RDM, see 1974Po15. 0.30 ps *+17−12* (1987Ba72).
4806.2a *4*	6+	0.49@ ps *+28−14*	$T_{1/2}$: Other: 0.5 ps *+12−3* (1977Be22). Jπ: from 2007Ku19.
5397.1a *4*	7+	0.15 ps *+12−9*	Jπ: from 2007Ku19.
5633.5 *11*	(8+)		
5824.9a *5*	8+	1.0 ps *+6−4*	$T_{1/2}$: Other: 0.29 ps *+17−10* (1987Ba72). Jπ: from 2007Ku19.
6356.6 *12*	(9+)		Jπ: from 2000ApZX.
6365.4 *11*	(10+)		Jπ: from 2007Ku19.
6381.0 *11*	(6+)		E(level),Jπ: From 2007Ku19.

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(HI,xnγ) (continued)

^{52}Cr Levels (continued)

E(level)	Jπ†	T1/2‡	Comments
6453.5[a] 5	9+	0.14[@] ps +9−8	T1/2: Others: 0.29 ps +12−10 (1977Be22), <1.4 ps (1987Ba72).
7238.1[a] 7	10+	0.16 ps +15−8	T1/2: from 1987Ba72. Jπ: from 2007Ku19.
7401.7 15	(12+)		E(level),Jπ: From 2007Ku19.
8216.5[a] 8	11+	0.24 ps +17−9	T1/2: From 1987Ba72. Jπ: From 2007Ku19.
9438.7[a] 9	12(+)		
10160.1[a] 10	13(+)		

† From γ(θ) analysis of 1977Be22.
‡ From DSAM measurements of 1977Be22, except as noted.
# Weighted average of values from 1974Br04 and 1974Po15.
@ From 1987Ba72, DSAM.
& Band(A): γ cascade based on g.s..
a Band(B): γ cascade based on 5+.

γ(^{52}Cr)

Eγ†	Iγb	Ei(level)	Jiπ	Ef	Jfπ	Mult.d	δd	Comments
346.2		3113.92	6+	2767.97	4+	(Q)		Eγ,Mult.: From 2007Ku19.
397.7[@] 5	0.41[c] 3	2767.97	4+	2369.72	4+	Q		DCO=1.30 25 (2000ApZX). Mult.: From 2000ApZX.
400.4[@] 6	2.5 3	4016.0	5+	3615.9	5+	D+Q		DCO=1.30 4, gate on 1434 quadrupole transition (2007Ku19). Iγ: based on Iγ(398γ) and Iγ for the sum. Mult.: DCO=1.30 4 (2007Ku19).
427.9 3	11.2 4	5824.9	8+	5397.1	7+	M1+E2[e]	−0.03 4	DCO=0.63 6 (2000ApZX), DCO=0.800 22, gate on 1434 quadrupole transition (2007Ku19), pol=−0.12 4 (2007Ku19).
501.5[a] 10	0.35[a] 11	3615.9	5+	3113.92	6+			
566.8	1.61 21	4038.6	4+	3471.8	3+			
590.9 3	12.5[@] 8	5397.1	7+	4806.2	6+	M1+E2[e]	−0.27 6	δ: from 1977Be22. DCO=0.77 8 (2000ApZX), DCO=0.72 3, gate on 1434 quadrupole transition (2007Ku19), pol=−0.11 3 (2007Ku19).
600.5[a] 6	11.1[a] 4	4016.0	5+	3415.4	4+	M1[ef]		DCO=0.58 11 (2000ApZX), DCO=0.73 8, gate on 1434 quadrupole transition (2007Ku19), pol=−0.20 5 (2007Ku19).
628.9[@] 5	2.7[@] 14	6453.5	9+	5824.9	8+	M1+E2[e]	+0.22 +15−8	Eγ: from 2007Ku19. DCO=0.78 7 (dipole gated) (2000ApZX), DCO=0.650 18, gate on 1434 quadrupole trasition (2007Ku19), pol=−0.04 4 (2007Ku19).
647.4[‡] 2	8.4[@] 5	3415.4	4+	2767.97	4+	M1+E2[e]	−0.22[@] 8	DCO=1.27 15 (2000ApZX), DCO=1.20 7, gate on 1434 quadrupole transition (2007Ku19), pol=+0.17 4 (2007Ku19).
703.9[&]	2.61[&] 42	3471.8	3+	2767.97	4+	D		DCO=0.66 3, gate on 1434 quadrupole transition (2007Ku19).

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(HI,xnγ) (continued)

γ(^{52}Cr) (continued)

E_γ[†]	I_γ[b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	δ[d]	Comments
721.3[a] *10*	0.83[a] *11*	10160.1	13$^{(+)}$	9438.7	12$^{(+)}$			
725.5[ag] *12*	0.23[a] *11*	6356.6	(9$^+$)	5633.5	(8$^+$)			
744.2[‡] *1*	39.6 *12*	3113.92	6$^+$	2369.72	4$^+$	E2[e]		DCO=1.08 *4* (2000ApZX), DCO=1.10 3, gate on 1434 quadrupole transition (2007Ku19), pol=+0.15 *3* (2007Ku19).
784.5[@] *5*	4.2[@] *5*	7238.1	10$^+$	6453.5	9$^+$	M1+E2	−0.06 *+3−5*	I_γ: from γγ-coin spectra. DCO=0.57 *3*, gate on 1434 quadrupole transition (2007Ku19), pol=−0.14 *5*, (2007Ku19).
790.0 *3*	11.17 *90*	4806.2	6$^+$	4016.0	5$^+$	M1+E2[e]	−0.16[@] *5*	DCO=1.02 *17* (dipole gated) (2000ApZX), DCO=0.750 16, gate on 1434 quadrupole transition (2007Ku19), pol=−0.08 *4* (2007Ku19).
847.5[@] *5*	4.8[@] *3*	3615.9	5$^+$	2767.97	4$^+$	M1[e]		DCO=0.70 *9*, gate on 1434 quadrupole transition (2007Ku19). POL=−0.12 5 (2007Ku19).
883.7[ag] *10*	1.17[a] *16*	7238.1	10$^+$	6356.6	(9$^+$)			
902.4[ag] *9*	1.13[a] *13*	4016.0	5$^+$	3113.92	6$^+$			
935.5[‡] *1*	57.3 *20*	2369.72	4$^+$	1434.22	2$^+$	E2[e]		DCO=1.13 *5* (2000ApZX), DCO=1.06 8, gate on 1434 quadrupole transition (2007ku19), pol=+0.10 *2* (2007ku19).
978.5 *5*	2.1[@] *2*	8216.5	11$^+$	7238.1	10$^+$	M1+E2[e]	+0.10 *+5−8*	DCO=0.54 *6* (2000ApZX), DCO=0.70 7, gate on 1434 quadrupole transition (2007Ku19), pol=−0.04 *5* (2007Ku19).
1018.4[a] *10*	0.95[a] *16*	5824.9	8$^+$	4806.2	6$^+$			
1036.3		7401.7	(12$^+$)	6365.4	(10$^+$)	(Q)		E_γ,Mult.: From 2007Ku19.
1049.4[a] *8*	1.98[a] *21*	5633.5	(8$^+$)	4584.0	(6$^+$)			
1056.0[a] *10*	2.03[a] *19*	6453.5	9$^+$	5397.1	7$^+$			
1189.7[&]	2.24[&] *57*	4806.2	6$^+$	3615.9	5$^+$			
1222.4[a] *8*	6.6[a] *3*	9438.7	12$^{(+)}$	8216.5	11$^+$			
1246.4[#] *3*	4.4[c] *13*	3615.9	5$^+$	2369.72	4$^+$			
1247.5[a] *6*	9.5[a] *4*	4016.0	5$^+$	2767.97	4$^+$	D[f]		Mult.: From 2007Ku19. DCO=0.57 *10* (2000ApZX), DCO=0.72 6, gate on 1434 quadrupole transition (2007Ku19).
1333.7[‡] *2*	23.4 *10*	2767.97	4$^+$	1434.22	2$^+$	E2[e]		DCO=0.87 *9* (2000ApZX), DCO=1.07 4, gate on 1434 quadrupole transition (2007Ku19), pol=+0.13 *4* (2007Ku19).
1381.5[@] *5*	1.9[@] *2*	5397.1	7$^+$	4016.0	5$^+$	Q		DCO=1.25 *9*, gate on 1434 quadrupole transition (2007Ku19). Mult.: from 2007Ku19.
1413.6[ag] *10*	0.34[a] *16*	7238.1	10$^+$	5824.9	8$^+$			

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(HI,xnγ) (continued)

γ(^{52}Cr) (continued)

E_γ[†]	I_γ[b]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[d]	δ[d]	Comments
1434.2[‡] *1*	100.0 *51*	1434.22	2^+	0.0	0^+	E2[e]		DCO=0.96 *4* (2000ApZX), DCO=1.10 2, gate on 936 quadrupole transition (2007Ku19), pol=+0.09 *3* (2007Ku19).
1470.1[a] *7*	2.2[a] *3*	4584.0	(6^+)	3113.92	6^+			
1606.0[ag] *20*	0.63[a] *16*	7238.1	10^+	5633.5	(8^+)			
1615.0[@] *10*	2.0[@] *10*	6365.4	(10^+)	4750.4	8^+			
1636.4[‡] *2*	12.23 *53*	4750.4	8^+	3113.92	6^+	E2[e]		DCO=1.02 *7* (2000ApZX), DCO=1.20 3, gate on 1434 quadrupole transition (2007Ku19), pol=+0.16 *4* (2007Ku19).
1693.0[@] *6*	2.53 *36*	4806.2	6^+	3113.92	6^+			
1702.9 *5*	7.7 *4*	6453.5	9^+	4750.4	8^+	M1+E2[e]	−0.04 *+7−3*	DCO=0.61 *6* (2000ApZX), DCO=0.78 4, gate on 1434 quadrupole trasition (2007Ku19), pol=−0.15 *5* (2007Ku19).
1763.3[a] *10*	2.16[a] *23*	8216.5	11^+	6453.5	9^+	Q		Mult.: From 2007Ku19. DCO=1.10 *3* (2007Ku19).
1943.6[a] *7*	17.6[a] *3*	10160.1	$13^{(+)}$	8216.5	11^+	E2[e]		DCO=1.10 *27* (2000ApZX), DCO=1.26 8, gate on 1434 quadrupole transition (2007Ku19), pol=+0.14 *5* (2007Ku19).
2037.4[&]	1.07[&] *26*	3471.8	3^+	1434.22	2^+			
2200.0[a] *10*	1.11[a] *11*	9438.7	$12^{(+)}$	7238.1	10^+			
2765.0		6381.0	(6^+)	3615.9	5^+			E_γ: From 2007Ku19.

[†] From weighted average of values from 1979St13 and 1977Ev03, except as noted.
[‡] From weighted average of values from 1979St13, 1977Ev03, and 1974Po15.
[#] From weighted average of values from 1979St13 and 1974Po15.
[@] From 1979St13.
[&] From 1977Be22.
[a] From 2000ApZX.
[b] Relative photon intensity, θ=125°, see 1977Be22.
[c] Calculated by evaluator from the branching (ε decay) and measured doublet Iγ (1977Be22).
[d] The χ^2 analysis of γ(θ), see 1987Ba72, except as noted.
[e] From polarization measurements, see 2007Ku19.
[f] From DCO ratios. Mult=Q for ΔJ=2 and mult=D for ΔJ=1 or 0, see 2000ApZX.
[g] Placement of transition in the level scheme is uncertain.

(HI,xnγ)

Level Scheme

Intensities: Relative I_γ

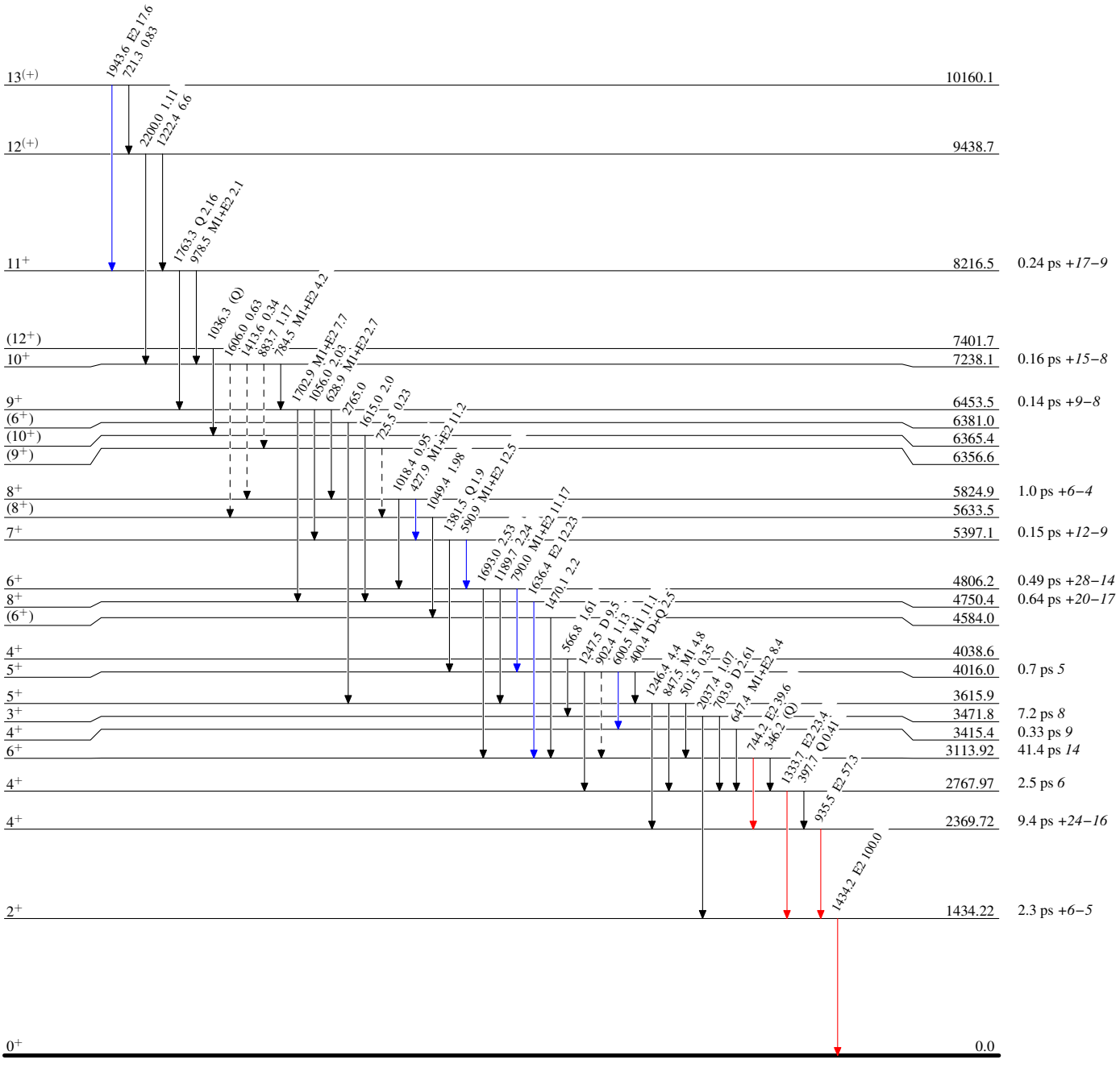
Legend

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

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

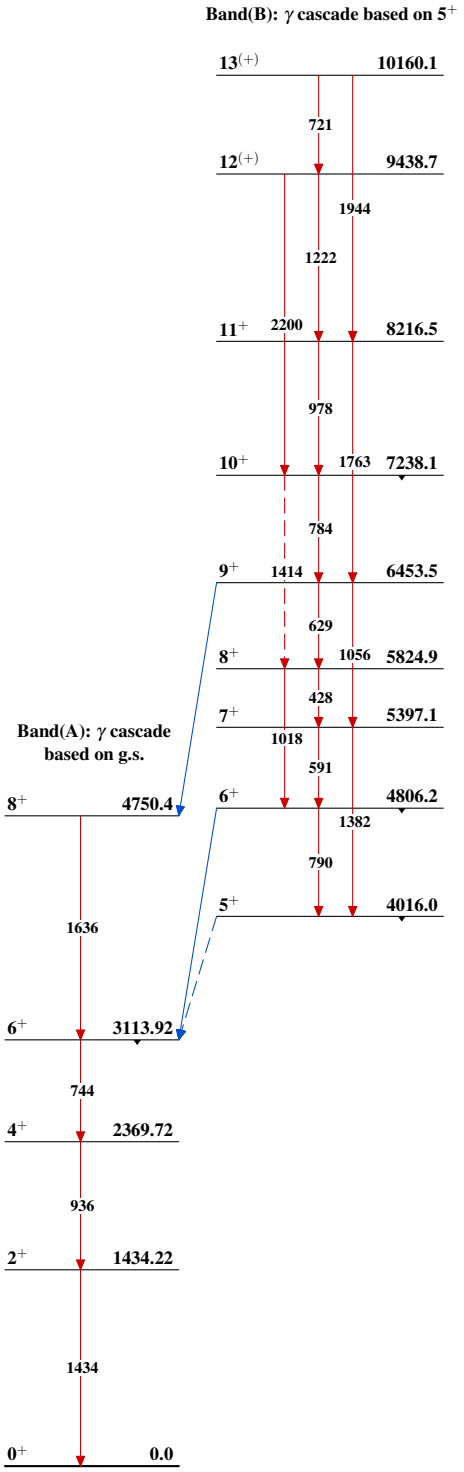
$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{52}_{24}Cr_{28}$

(HI,xnγ)



$^{52}_{24}Cr_{28}$