^{52}Cr(γ,γ′),(pol γ,γ′) 2013Pa38,1981Be32,1979Ku14

History

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

1979Ku14: E=14 MeV, bremsstrahlung, Eγ, Iγ(θ) θ=125°, 150°, a 40 cm^3 Ge(Li) detector (overall energy resolution of the detector system was 8 keV (FWHM) for 9 MeV.).
1983Sm02: (pol γ,γ′), E=9.14 MeV σ(total), σ(E,θ), two high-energy window 7.5*12.5 cm^2 NaI scintillation detectors.
1981Be32: (pol γ,γ′), E=7-9 MeV, bremsstrahlung, spectra and asymmetry of photon scattering, Ge(Li) detectors.
1998En05: electron beam of 7 MeV, HPGE detectors surrounded by a BGO suppression shield, measured Eγ, Iγ and γγ(θ).
2000Is11: E=6.7 MeV, bremsstrahlung, Eγ, Iγ(θ), HPGe.
2007En02: E=8.0, 9.9 MeV, bremsstrahlung, Eγ, Iγ(θ) θ=90,130°,
2013Pa38: E(end point)=8.0, 9.9 MeV, bremsstrahlung beam from S-DALINAC accelerator at Darmstadt. Measured Eγ, Iγ, γ(θ), HPGe detectors.
Resonance fluorescence self-absorption experiment for the 1434 keV first excited state, see 1981Ah02.
Others: 1959Of14, 1964Bo22, 1982NoZW.
All data are from 2013Pa38, except as noted.

^{52}Cr Levels

E(level)	Jπ	Γ$_0$[d]	I$_{i,0}$[c]	Comments
0.0	0$^+$			
1433.9 *5*	2$^+$[b]	0.679 ps *13*	<60.6	Γ$_0$: from Γ$_{γ0}$=673×10^{-6} eV *13*. Others: resonance fluorescence: 0.55 ps *14* (1959Of14), 0.76 ps *21* (1964Bo22). I$_{i,0}$<64.
3161.7‡	2$^+$[b]			
3739.6‡	1$^+$,1$^-$,2$^+$&			B(M1)↑=0.008 *1*; B(E1)↑=0.0000009 *1*; B(E2)↑=0.0015 *2* (1998En05).
3771.5 *5*	2$^+$&		<7.2	I$_{i,0}$<8.1. B(E2)↑=0.0076 *11* (1998En05); B(E2)↑=0.0071 *8* (2007En02).
4800.1‡	1$^+$,1$^-$,2$^+$&			B(M1)↑=0.009 *2*; B(E1)↑=0.0000010 *2*; B(E2)↑=0.00105 *20* (1998En05). $J^π$=1$^+$, 1$^-$, 2$^+$ for B(M1), B(E1), B(E2), respectively.
4841.3‡	1$^+$,1$^-$,2$^+$&			B(M1)↑=0.011 *2*; B(E1)↑=0.00000126 *23*; B(E2)↑=0.00131 *24* (1998En05).
5098.6 *5*	1	0.045 eV *10*	11.2 *18*	B(M1)↑=0.089 *21*, B(E1)↑=0.98×10^{-5} *23*. B(M1)↑=0.075 *24*, B(E1)↑=0.84×10^{-5} *26* (2000Is11). B(M1)↑=0.085 *13*; B(E1)↑=0.0000094 *14*; B(E2)↑=0.0071 *12* (1998En05).
5213.7 *5*	1	0.013 eV *3*	5.4 *12*	B(M1)↑=0.023 *6*, B(E1)↑=0.26×10^{-5} *6*.
5490.8‡	1$^+$,1$^-$,2$^+$&			B(M1)↑=0.008 *2*; B(E1)↑=0.0000009 *3*; B(E2)↑=0.00074 *20* (1998En05).
5526.0 *5*	1	0.016 eV *3*	5.9 *10*	B(M1)↑=0.024 *5*, B(E1)↑=0.27×10^{-5} *5*.
5544.7 *5*	1	0.112 eV *7*	41.9 *25*	B(M1)↑=0.171 *11*, B(E1)↑=1.88×10^{-5} *12*. B(M1)↑=0.164 *21* (2000Is11). B(M1)↑=0.19 *4*; B(E1)↑=0.000021 *4* (1998En05).
5796.0‡	1$^+$,1$^-$,2$^+$&			B(M1)↑=0.017 *5*; B(E1)↑=0.0000019 *5*; B(E2)↑=0.0014 *4* (1998En05).
6136.7‡	2$^+$&			B(E2)↑≤0.0030 *11* (1998En05).
6389.9 *5*	1	0.069 eV *7*	19.5 *19*	B(M1)↑=0.071 *7*, B(E1)↑=0.78×10^{-5} *8*.
6462.4 *5*	1	0.074 eV *7*	20.3 *20*	B(M1)↑=0.071 *7*, B(E1)↑=0.78×10^{-5} *8*. B(M1)↑=0.044 *25*; B(E1)↑=0.0000049 *28*; B(E2)↑=0.0029 *16* (1998En05).
6495.5 *5*	1	0.131 eV *9*	35.6 *25*	B(M1)=0.124 *9*, B(E1)=1.37×10^{-5} *10*. B(E2)↑=0.0687 *13* (1981Ah02) B(E2)↑=0.0061 *36* (1998En05).
6752.0 *5*	1	0.089 eV *10*	22.3 *24*	B(M1)↑=0.075 *9*, B(E1)↑=0.82×10^{-5} *9*.
7014.1 *5*	1	0.210 eV *30*	39.5 *44*	B(M1)↑=0.158 *23*, B(E1)↑=1.74×10^{-5} *25*.
7090.8 *5*	1	0.062 eV *11*	14.1 *25*	B(M1)↑=0.045 *8*, B(E1)↑=0.50×10^{-5} *9*.

Continued on next page (footnotes at end of table)

^{52}Cr(γ,γ′),(pol γ,γ′) 2013Pa38,1981Be32,1979Ku14 (continued)

^{52}Cr Levels (continued)

E(level)	Jπ	Γ_0[d]	$I_{i,0}$[c]	Comments
7166.2 *5*	1^+	0.054 eV *11*	12.0 *24*	B(M1)↑=0.038 *8*.
7368.8 *5*	1	0.229 eV *18*	48.4 *38*	B(M1)↑=0.148 *12*, B(E1)↑=1.64×10^{-5} *13*.
7403.2 *5*	1	0.107 eV *15*	22.5 *32*	B(M1)↑=0.069 *10*, B(E1)↑=0.76×10^{-5} *11*.
7524.1 *5*	$1^{+\#}$	0.400 eV *28*	81.1 *56*	B(M1)↑=0.243 *18*. $\Gamma^2_{\gamma 0}/\Gamma$=0.97 eV *23* (1979Ku14).
7731.9 *5*	$1^{-\#}$	0.960 eV *24*	185 *12*	B(E1)↑=5.96×10^{-5} *40*. $\Gamma^2_{\gamma 0}/\Gamma$=1.75 eV *32* (1979Ku14).
7865.1 *5*	1^+	0.435 eV *27*	80.9 *51*	B(M1)↑=0.232 *15*.
7889.0 *5*	1	0.480 eV *45*	88.6 *83*	B(M1)↑=0.253 *24*, B(E1)↑=2.80×10^{-5} *26*.
7897.4 *5*	$1^{-\#}$	3.38 eV *17*	623 *32*	B(E1)↑=19.7×10^{-5} *10*. $\Gamma^2_{\gamma 0}/\Gamma$=5.7 eV *8* (1979Ku14).
8015.3 *5*	1	0.260 eV *59*	30.2 *50*	B(M1)↑=0.131 *30*, B(E1)↑=1.45×10^{-5} *33*.
8091.3 *5*	$1^{@}$	0.734 eV *44*	128.8 *78*	B(M1)↑=0.359 *22*, B(E1)↑=3.97×10^{-5} *24*. $\Gamma^2_{\gamma 0}/\Gamma$=1.60 eV *35* (1979Ku14).
8179.2 *5*	1	0.90 eV *18*	36.3 *58*	B(M1)↑=0.43 *9*, B(E1)↑=4.7×10^{-5} *10*.
8765.9 *5*	1	0.441 eV *37*	66.0 *56*	B(M1)↑=0.170 *15*, B(E1)↑=1.88×10^{-5} *17*.
8958.4 *5*	1	0.233 eV *36*	33.3 *52*	B(M1)↑=0.084 *13*, B(E1)↑=0.93×10^{-5} *15*.
9140.3 *5*	$1^{+\#}$	2.65 eV *15*	364 *21*	B(M1)↑=0.90 *5*. $\Gamma^2_{\gamma 0}/\Gamma$=2.68 eV *16* (1983Sm02). $\Gamma^2_{\gamma 0}/\Gamma$=2.9 eV *5* (1979Ku14).
9211.9 *5*	$1^{+\#}$	2.11 eV *14*	286 *19*	B(M1)↑=0.70 *5*. $\Gamma^2_{\gamma 0}/\Gamma$=2.8 eV *6* (1979Ku14).
9236.6 *5*	1	0.503 eV *55*	67.8 *74*	B(M1)↑=0.166 *18*, B(E1)↑=1.83×10^{-5} *20*.
9327.0 *5*	1^+	0.746 eV *80*	99 *11*	B(M1)↑=0.238 *26*.
9429.0 *5*	1^+	0.95 eV *11*	123 *15*	B(M1)↑=0.295 *35*.
9736[†]	$(^+)^a$			
9787[†] *3*	1^{-a}			$\Gamma^2_{\gamma 0}/\Gamma$=4.0 eV *6* (1979Ku14).
9981[†] *3*	$(^-)^a$			
10433[†] *4*				
10927[†] *3*				
11765[†] *3*				
11837[†] *3*				

† From 1981Be32.
‡ From 1998En05, ΔE<1 keV.
# J based on comparison of intensity ratios for the observed ground state transitions at scattering angles of 150° and 125° with theoretically calculated values, see 1979Ku14 for details. π based on asymmetries for different g.s. dipole transition (1981Be32).
@ J based on comparison of intensity ratios for the observed ground state transitions at scattering angles 150° and 125° with theoretically calculated values, see 1979Ku14.
& From 1998 En05, based on values of reduced transition strengths(↑).
[a] π based on asymmetries for different g.s. dipole transition (1981Be32).
[b] From Adopted Levels.
[c] Energy-integrated cross section (2013Pa38).
[d] Partial decay width into ground state (2013Pa38), except as noted.

^{52}Cr(γ,γ'),(pol γ,γ') 2013Pa38,1981Be32,1979Ku14 (continued)

$\gamma(^{52}Cr)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	Comments
1433.9	2^+	1433.9 *5*		0.0	0^+		W(90°)/W(130°)=1.05 *12*.
3771.5	2^+	3771.4 *5*		0.0	0^+		W(90°)/W(130°)=1.07 *29*.
5098.6	1	3664.5 *5*	79 *22*	1433.9	2^+		
		5098.3 *5*	100	0.0	0^+		W(90°)/W(130°)=1.14 *50*.
5213.7	1	5213.4 *5*		0.0	0^+		W(90°)/W(130°)=1.14 *50*.
5526.0	1	5525.7 *5*		0.0	0^+		W(90°)/W(130°)=1.13 *36*.
5544.7	1	5544.4 *5*		0.0	0^+		W(90°)/W(130°)=0.81 *10*.
6136.7	2^+	6136.6		0.0	0^+	Q	Mult.: from W(130°)/W(90°)=0.34 *14* (1998En05).
6389.9	1	6389.5 *5*		0.0	0^+		W(90°)/W(130°)=1.09 *22*.
6462.4	1	6462.0 *5*		0.0	0^+		W(90°)/W(130°)=0.70 *14*.
6495.5	1	6495.1 *5*		0.0	0^+		W(90°)/W(130°)=0.72 *11*.
6752.0	1	6751.5 *5*		0.0	0^+		W(90°)/W(130°)=0.69 *15*.
7014.1	1	5580.5 *5*	24 *6*	1433.9	2^+		
		7013.6 *5*	100	0.0	0^+		W(90°)/W(130°)=0.71 *11*.
7090.8	1	7090.3 *5*		0.0	0^+		W(90°)/W(130°)=0.72 *31*.
7166.2	1^+	7165.7 *5*		0.0	0^+		W(90°)/W(130°)=0.68 *27*.
7368.8	1	7368.2 *5*		0.0	0^+		W(90°)/W(130°)=0.88 *14*.
7403.2	1	7402.6 *5*		0.0	0^+		W(90°)/W(130°)=0.62 *21*.
7524.1	1^+	7523.5 *5*		0.0	0^+		W(90°)/W(130°)=0.52 *8*.
7731.9	1^-	7731.3 *5*		0.0	0^+		W(90°)/W(130°)=0.57 *8*.
7865.1	1^+	7864.5 *5*		0.0	0^+		W(90°)/W(130°)=0.70 *9*.
7889.0	1	7888.4 *5*		0.0	0^+		W(90°)/W(130°)=0.58 *11*.
7897.4	1^-	7896.8 *5*		0.0	0^+		W(90°)/W(130°)=0.76 *8*.
8015.3	1	6580.9 *5*	54 *16*	1433.9	2^+		
		8014.6 *5*	100	0.0	0^+		W(90°)/W(130°)=0.83 *18*.
8091.3	1	8090.6 *5*		0.0	0^+		W(90°)/W(130°)=0.80 *10*.
8179.2	1	6744.8 *5*	326 *50*	1433.9	2^+		E_γ: if 8179.2 level energy is correct, then Eγ should be 6744.8, not 6740.8 as listed in table I of 2013Pa38.
		8178.5 *5*	100	0.0	0^+		W(90°)/W(130°)=0.74 *20*.
8765.9	1	8765.1 *5*		0.0	0^+		W(90°)/W(130°)=0.95 *16*.
8958.4	1	8957.6 *5*		0.0	0^+		W(90°)/W(130°)=0.49 *15*.
9140.3	1^+	9139.4 *5*		0.0	0^+		W(90°)/W(130°)=0.82 *10*.
9211.9	1^+	9211.0 *5*		0.0	0^+		W(90°)/W(130°)=0.63 *8*.
9236.6	1	9235.7 *5*		0.0	0^+		W(90°)/W(130°)=0.53 *12*.
9327.0	1^+	9326.1 *5*		0.0	0^+		W(90°)/W(130°)=0.55 *12*.
9429.0	1^+	9428.1 *5*		0.0	0^+		W(90°)/W(130°)=0.51 *12*.

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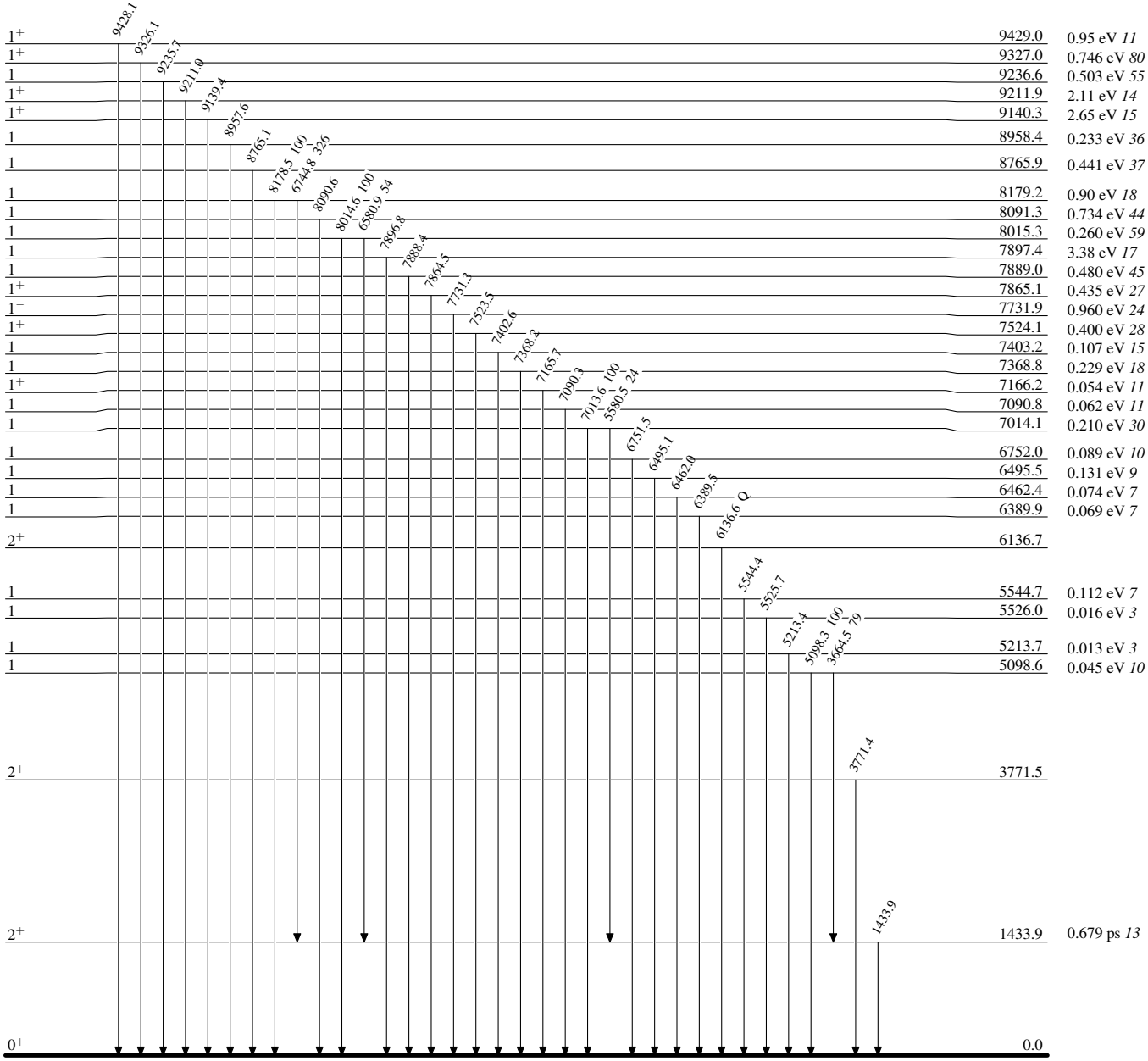
Level Scheme

Intensities: $\Gamma(\gamma$ to 1434,2^+ level)/Γ (1998En05)



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