^{50}Cr(γ,γ'),(pol γ,γ') 2016Pa04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 157, 1 (2019)	15-Apr-2019

This dataset adapted from a compiled dataset in the XUNDL database by C. Smith and C.D. Nesaraja (ORNL).

2016Pa04: two experiments were performed. 1. E(γ)=7.5, 9.7 MeV unpolarized bremsstrahlung beam from Darmstadt accelerator facility S-DALINAC. Measured Eγ, Iγ, $\gamma(\theta)$ at 90° and 130° with respect to the beam direction. 2. E(γ)=6-9.7 MeV quasi-monoenergetic and linearly polarized photon beam from the High Intensity γ-ray source (HIγS) facility at TUNL. Measured Eγ, polarization asymmetries. In both experiments, target was 2.0 g, 96.416% enriched ^{50}Cr. Deduced levels, J^π, energy-integrated cross sections, widths, B(M1). Comparison with Skyrme quasiparticle random-phase approximation (QRPA) and large scale shell model (LSSM) calculations. See also 2018Di14 for analysis of the fluctuation properties in the subspectra of the energy levels and also of the distributions of their respective dipole transition strength.

Others:

1998En05: E(γ)=7.0 MeV beam from the S-DALINAC facility. Measured Eγ, Iγ with HPGe detectors. Data for 783 and 3628 levels.

1973MoYZ, 1970Mo26: E(γ)=8888 keV. Measured Eγ, $\gamma(\theta)$, widths, $\sigma(\theta$=135°), temperature variation and self-absorption. Data for 7646 and 8888 levels.

1983BeYU.

All data are from 2016Pa04 unless otherwise noted.

Polarization data corresponding to Fig. 2 in 2016Pa04 are from e-mail reply of Oct 1, 2018 from H. Pai, first author of 2016Pa04.

^{50}Cr Levels

E(level)†	J$^\pi$†	$\Gamma_{\gamma 0}$	I$_{i,0}$ (eVb)#	Comments
0.0	0$^+$			
783.3 *5*	2$^+$‡			
3628.2 *5*	1$^+$‡	0.205 eV *9*	120 *5*	B(M1)↑=1.113 *49* Γ_0^{red}=4.29 meV/MeV^3 *19*. Level also reported by 1998En05. E(level): theoretical analysis indicates the 1$^+$ state has an isovector orbital character with a minor spin admixture which supports trends for the scissors-like mode in the *fp*-shell region (2016Pa04).
4997.0 *5*	1$^{(+)}$‡	0.070 eV *7*	16.2 *12*	B(M1)↑=0.145 *15* Γ_0^{red}=0.56 meV/MeV^3 *6*.
5931.2 *5*	1$^+$	0.073 eV *6*	23.9 *20*	B(M1)↑=0.091 *7* Γ_0^{red}=0.35 meV/MeV^3 *3*.
7600.8 *5*	1$^+$	0.334 eV *37*	66.4 *73*	B(M1)↑=0.197 *22* Γ_0^{red}=0.76 meV/MeV^3 *8*.
7645.7 *5*	1$^+$	0.118 eV *14*	23.2 *28*	B(M1)↑=0.068 *8* Γ_0^{red}=0.26 meV/MeV^3 *3*. Level also reported by 1970Mo26, 1973MoYZ.
7948.1 *5*	1$^+$	1.382 eV *79*	197.7 *96*	B(M1)↑=0.714 *41* Γ_0^{red}=2.75 meV/MeV^3 *16*.
8045.8 *5*	1$^+$	0.238 eV *26*	42.2 *47*	B(M1)↑=0.118 *13* Γ_0^{red}=0.46 meV/MeV^3 *5*.
8121.5 *5*	1$^+$	0.094 eV *11*	16.4 *20*	B(M1)↑=0.045 *5* Γ_0^{red}=0.18 meV/MeV^3 *2*.
8528.1 *5*	1$^+$	0.85 eV *11*	96 *11*	B(M1)↑=0.353 *48* Γ_0^{red}=1.36 meV/MeV^3 *18*.
8885.6 *5*	1$^+$	0.534 eV *47*	77.7 *68*	B(M1)↑=0.197 *17* Level also reported by 1970Mo26, 1973MoYZ with spin=1 from $\gamma(\theta)$. Γ_0^{red}=0.76 meV/MeV^3 *7*. Other Γ_γ=0.75 eV *20* (1970Mo26,1973MoYZ) from temperature variation

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^{50}Cr(γ,γ′),(pol γ,γ′) 2016Pa04 (continued)

^{50}Cr Levels (continued)

E(level)[†]	Jπ[†]	$\Gamma_{\gamma 0}$	$I_{i,0}$ (eVb)[#]	Comments
				and self-absorption is consistent with that from 2016Pa04.
9007.9 *5*	1^+	0.286 eV *34*	40.5 *48*	B(M1)↑=0.101 *12* Γ_0^{red}=0.39 meV/MeV^3 *5*.
9208.3 *5*	1^+	0.369 eV *89*	50 *12*	B(M1)↑=0.123 *30* Γ_0^{red}=0.47 meV/MeV^3 *11*.
9409.5 *5*	1^+	0.81 eV *13*	105 *17*	B(M1)↑=0.252 *41* Γ_0^{red}=0.97 meV/MeV^3 *16*.
9579.1 *5*	1^+	0.301 eV *62*	37.7 *78*	B(M1)↑=0.089 *18* Γ_0^{red}=0.34 meV/MeV^3 *7*.
9719.1 *5*	1^+	1.42 eV *17*	173 *21*	B(M1)↑=0.402 *49* Γ_0^{red}=1.55 meV/MeV^3 *19*.

[†] From 2016Pa04, unless noted otherwise. The J^π assignments are from M1 multipolarity based on $\gamma(\theta)$ measured in Darmstadt experiment, and from polarization asymmetries measured in HIγS experiment at TUNL. Uncertainty in level energy is stated as <0.5 keV in 2016Pa04. Evaluators assign 0.5 keV for each level.
[‡] From Adopted Levels.
[#] Energy-integrated scattering cross section.

γ(^{50}Cr)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
783.3	2^+	783.3 *5*		0.0	0^+		E_γ: deduced by evaluators from averaged energy differences of Eγ values for the decay of 3628, 4997, 7948 and 8528 levels.
3628.2	1^+	2845.0 *5*	49 *1*	783.3	2^+		I_γ: other: Γ(2845γ)/Γ=0.38 *13* (1998En05) consistent with value from 2016Pa04, but much less precise.
		3628.0 *5*	100	0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.74 *2*.
4997.0	$1^{(+)}$	4213.8 *5*	100 *10*	783.3	2^+		
		4996.7 *5*	100	0.0	0^+	(M1)	Iγ(90°)/Iγ(130°)=0.78 *6*.
5931.2	1^+	5930.8 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.92 *9*. POL=+0.74 *19*.
7600.8	1^+	7600.2 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.80 *10*. POL=+0.75 *13*.
7645.7	1^+	7645.1 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.69 *17*. POL=+0.74 *26*.
7948.1	1^+	7164.5 *5*	27 *2*	783.3	2^+		
		7947.4 *5*	100	0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.78 *3*. POL=+0.91 *4*.
8045.8	1^+	8045.1 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.77 *10*. POL=+0.76 *15*.
8121.5	1^+	8120.8 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.76 *20*. POL=+0.66 *25*.
8528.1	1^+	7743.1 *5*	39 *6*	783.3	2^+		
		8527.4 *5*	100	0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.70 *8*. POL=+0.76 *7*.
8885.6	1^+	8884.8 *5*		0.0	0^+	M1	I_γ: other: Γ_0/Γ=0.90 *8* (1970Mo26,1973MoYZ) consistent with 100% branch for 8884.8γ as in 2016Pa04. Iγ(90°)/Iγ(130°)=0.82 *8*. POL=+0.68 *13*. Also mult=dipole (1970Mo26,1973MoYZ,from $\gamma(\theta)$).
9007.9	1^+	9007.0 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.88 *13*. POL=+0.64 *11*.
9208.3	1^+	9207.4 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.77 *20*. POL=+0.70 *12*.
9409.5	1^+	9408.5 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.78 *14*. POL=+0.92 *8*.
9579.1	1^+	9578.1 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.97 *25*. POL=+0.64 *16*.
9719.1	1^+	9718.1 *5*		0.0	0^+	M1	Iγ(90°)/Iγ(130°)=0.85 *11*. POL=+0.69 *10*.

[†] From 2016Pa04. Uncertainty of 0.5 keV for Eγ is assigned by evaluators from a general comment in 2016Pa04 that uncertainties of excitation energies are <0.5 keV.

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^{50}Cr(γ,γ'),(pol γ,γ') 2016Pa04 (continued)

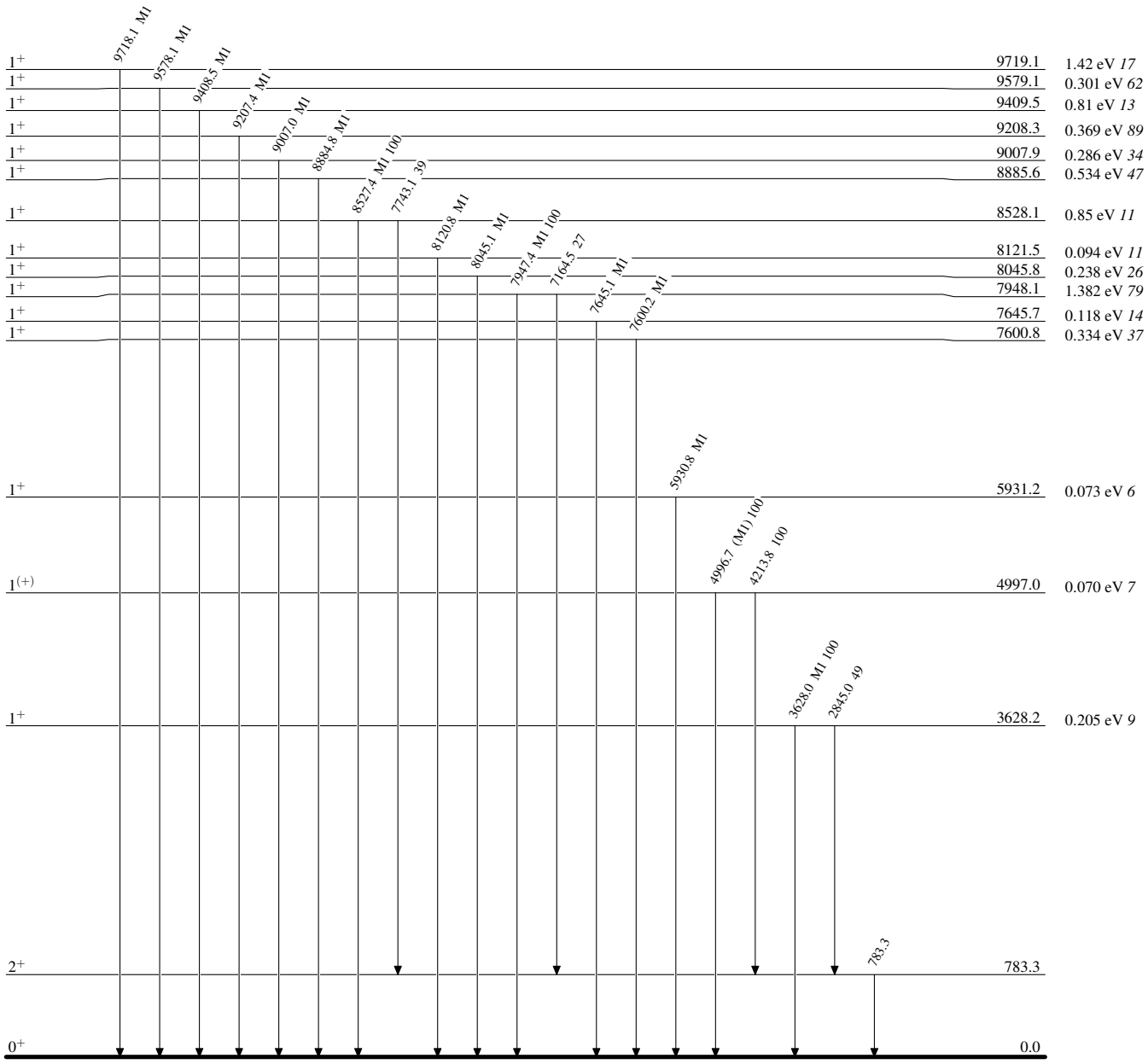
$\gamma(^{50}Cr)$ (continued)

‡ From $\gamma(\theta)$ and polarization asymmetry values in 2016Pa04, the former are given in comments here, and the latter are shown in Fig. 2 of 2016Pa04.

^{50}Cr(γ,γ′),(pol γ,γ′) **2016Pa04**

Level Scheme

Intensities: Relative photon branching from each level



$^{50}_{24}Cr_{26}$