

**Adopted Levels, Gammas**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	12-Apr-2010

Q(β<sup>-</sup>)=4962.0 24; S(n)=5314 3; S(p)=1.369×10<sup>4</sup> 18; Q(α)=-8.12×10<sup>3</sup> 10 2012Wa38

Note: Current evaluation has used the following Q record 4962.7 26 5314.2 26 13.73E320-8.12E3 10 2009AuZZ,2003Au03. S(2n)=13559.3 20, S(2p)=25430 150 (2009AuZZ,2003Au03).

1978Da04: first identification and production of <sup>57</sup>Cr in <sup>48</sup>Ca(<sup>11</sup>B,np) at E=21 MeV. Measured half-life.

1990Tu01: <sup>57</sup>Cr activity produced by 800 MeV proton induced fission and fragmentation using natural Th target and subsequent particle analysis with a tof isochronous spectrometer.

1990Da15: yield measurement in Ti(α,xnyp) at E=30-60 MeV.

1994Se12: mass measurement.

2005Gu37: mass measurement using Penning-trap method.

2007Na31: production yield in <sup>136</sup>Xe(p,X) E=1 GeV/nucleon, GSI.

2008Ka41: shell-model calculations, B(E2).

Other reaction:

1982Se09: <sup>59</sup>Co(π<sup>-</sup>,2p) E=stopped pions. Negative pions at momentum of 110 MeV/c were moderated and stopped in <sup>59</sup>Co target at Swiss Institute for Nuclear Research. Measured pp-coin and σ(θ) for coincident protons using six ΔE-E silicon telescopes. Deduced yields for pp-, pd- and pt-channels and missing mass spectra.

<sup>57</sup>Cr Levels

Cross Reference (XREF) Flags

- A <sup>57</sup>V β<sup>-</sup> decay (350 ms)
- B <sup>14</sup>C(<sup>48</sup>Ca,αnγ)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub>	XREF	Comments
0.0 <sup>a</sup>	(3/2) <sup>-</sup>	21.1 s 10	AB	%β <sup>-</sup> =100 J <sup>π</sup> : log ft=5.45 9 to 5/2 <sup>-</sup> g.s. in <sup>57</sup> Mn. 3/2 <sup>-</sup> in isotones (N=33) <sup>59</sup> Fe, <sup>61</sup> Ni and <sup>63</sup> Zn. T <sub>1/2</sub> : from timing of 205.8γ (1978Da04).
267.87 <sup>a</sup> 8	(5/2 <sup>-</sup> ) <sup>#</sup>		AB	
692.69 <sup>a</sup> 9	(5/2 <sup>-</sup> ) <sup>#</sup>		AB	
941.79 <sup>a</sup> 10	(7/2 <sup>-</sup> ) <sup>#</sup>		AB	
1506.91 <sup>@</sup> 14	(9/2 <sup>+</sup> )		B	
1581.13 <sup>&amp;</sup> 19	(9/2 <sup>-</sup> )		AB	E(level): a 1581 level is reported in <sup>14</sup> C( <sup>48</sup> Ca,αnγ) deexciting by 639.1 2 and 1313.8 4 γ rays, Iγ(1313.8γ)/Iγ(639.1γ)=28 8/100 6. In <sup>57</sup> V β <sup>-</sup> decay, a 1582 level is reported deexciting by 892.5 6 and 1314.3 5 γ rays, Iγ(1314.3γ)/Iγ(892.5γ)=100 50/50 25. Moreover 892.5γ fits poorly if placed from the same level as 639.1γ 1313.8γ, thus two levels are defined by the evaluator, although, it remains unclear why 639.1γ was missed in β <sup>-</sup> decay experiment.
1585.2 6			A	
1858.1 4	(9/2 <sup>-</sup> )		B	
2098.14 <sup>&amp;</sup> 22	(11/2 <sup>-</sup> )		B	
2344.50 <sup>@</sup> 19	(13/2 <sup>+</sup> )		B	
2611.6 <sup>&amp;</sup> 3	(13/2 <sup>-</sup> )		B	
3377.6 6			B	
3500.4 <sup>@</sup> 3	(17/2 <sup>+</sup> )		B	
3555.4 <sup>&amp;</sup> 5	(15/2 <sup>-</sup> )		B	
4136.4 8			B	

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**Adopted Levels, Gammas (continued)**

<sup>57</sup>Cr Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	XREF	Comments
4827.0	15	B	
4856.4	11	B	
4920.1	& 10	B	
5018.6	@ 5 (21/2 <sup>+</sup> )	B	
6814.7	@ 10 (25/2 <sup>+</sup> )	B	
8844.4	@ 21 (29/2 <sup>+</sup> )	B	
10972	@ 5 (33/2 <sup>+</sup> )	B	
12950?	@ 6 (37/2 <sup>+</sup> )	B	Configuration= $\pi(f_{7/2}^4)\nu(g_{9/2})\nu(f_{5/2}p_{3/2}p_{1/2})^4$ .

<sup>†</sup> From least-squares fit to E $\gamma$ 's. Reduced  $\chi^2=2.0$ , but still within the critical  $\chi^2$  value.

<sup>‡</sup> Assignments based on  $\gamma(\theta)$  data and band assignments.

# Parity assignment based on observed direct  $\beta$ -feeding of level in decay of <sup>57</sup>V. The level is based on excitations of *pf*-shell neutrons.

@ Band(A):  $\nu 1/2[440]$ , prolate decoupled band. Positive parity assignment is from comparison with <sup>55</sup>Cr isotone. The 1/2<sup>+</sup> and 5/2<sup>+</sup> band members are expected at  $\approx 120$  keV and  $\approx 360$  keV, respectively, below the 9/2<sup>+</sup> member.

& Band(B):  $\gamma$ -sequence based on 9/2<sup>(-)</sup>.

<sup>a</sup> Band(C):  $\gamma$ -sequence based on g.s.

$\gamma(^{57}\text{Cr})$

E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E $\gamma$ <sup>†</sup>	I $\gamma$ <sup>†</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>‡</sup>	Comments
267.87	(5/2 <sup>-</sup> )	267.92 9	100	0.0	(3/2 <sup>-</sup> )	D	
692.69	(5/2 <sup>-</sup> )	424.90 14	24.7 17	267.87	(5/2 <sup>-</sup> )		I $\gamma$ : other: 15 5 in $\beta^-$ decay.
		692.61 12	100 5	0.0	(3/2 <sup>-</sup> )	D+Q	
941.79	(7/2 <sup>-</sup> )	249.08 8	60.9 22	692.69	(5/2 <sup>-</sup> )	D	I $\gamma$ : other: 28 14 in $\beta^-$ decay.
		673.8 2	28.3 18	267.87	(5/2 <sup>-</sup> )		$\gamma$ not reported in $\beta^-$ decay.
		941.75 18	100 5	0.0	(3/2 <sup>-</sup> )	(Q)	
1506.91	(9/2 <sup>+</sup> )	565.11 10	100	941.79	(7/2 <sup>-</sup> )	D+Q	
1581.13	(9/2 <sup>-</sup> )	639.1 2	100 6	941.79	(7/2 <sup>-</sup> )	D+Q	E $\gamma$ : $\gamma$ from <sup>14</sup> C( <sup>48</sup> Ca, $\alpha n\gamma$ ) only, not reported in $\beta^-$ decay.
		1313.8 4	28 8	267.87	(5/2 <sup>-</sup> )	(Q)	
1585.2		892.5 6	100	692.69	(5/2 <sup>-</sup> )		
1858.1	(9/2 <sup>-</sup> )	1166.5 6	61 12	692.69	(5/2 <sup>-</sup> )		
		1593.8 17	100 23	267.87	(5/2 <sup>-</sup> )		
2098.14	(11/2 <sup>-</sup> )	240.8 4	9.4 12	1858.1	(9/2 <sup>-</sup> )		
		516.88 19	68 4	1581.13	(9/2 <sup>-</sup> )		
		1156.0 4	100 24	941.79	(7/2 <sup>-</sup> )	(Q)	
2344.50	(13/2 <sup>+</sup> )	837.59 12	100	1506.91	(9/2 <sup>+</sup> )	(Q)	
2611.6	(13/2 <sup>-</sup> )	513.4 2	76 8	2098.14	(11/2 <sup>-</sup> )		
		1030.8 5	100 50	1581.13	(9/2 <sup>-</sup> )		
3377.6		1279.4 5	100	2098.14	(11/2 <sup>-</sup> )		
3500.4	(17/2 <sup>+</sup> )	1155.9 2	100	2344.50	(13/2 <sup>+</sup> )	(Q)	
3555.4	(15/2 <sup>-</sup> )	943.8 4	100	2611.6	(13/2 <sup>-</sup> )	D+Q	
4136.4		758.8 5	100	3377.6			
4827.0		1326.6 14	100	3500.4	(17/2 <sup>+</sup> )		
4856.4		720.0 8	100	4136.4			
4920.1		1364.7 8	100	3555.4	(15/2 <sup>-</sup> )		
5018.6	(21/2 <sup>+</sup> )	1518.2 4	100	3500.4	(17/2 <sup>+</sup> )	(Q)	
6814.7	(25/2 <sup>+</sup> )	1796.0 8	100	5018.6	(21/2 <sup>+</sup> )		
8844.4	(29/2 <sup>+</sup> )	2029.7 18	100	6814.7	(25/2 <sup>+</sup> )		

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**Adopted Levels, Gammas (continued)** $\gamma(^{57}\text{Cr})$  (continued)

<u><math>E_i(\text{level})</math></u>	<u><math>J_i^\pi</math></u>	<u><math>E_\gamma^\dagger</math></u>	<u><math>I_\gamma^\dagger</math></u>	<u><math>E_f</math></u>	<u><math>J_f^\pi</math></u>
10972	(33/2 <sup>+</sup> )	2128 4	100	8844.4	(29/2 <sup>+</sup> )
12950?	(37/2 <sup>+</sup> )	1978 <sup>#</sup> 4	100	10972	(33/2 <sup>+</sup> )

<sup>†</sup> From  $^{14}\text{C}(^{48}\text{Ca},\alpha n\gamma)$ , except that for 1585 level which is from  $\beta^-$  decay only.

<sup>‡</sup> From  $\gamma(\text{q})$  data in  $^{14}\text{C}(^{48}\text{Ca},\alpha n\gamma)$ . Mult=D or D+Q is from negative  $A_2$  and indicates  $\Delta J=1$  transition, mult=Q is from positive  $A_2$  and indicates  $\Delta J=2$  transition.

<sup>#</sup> Placement of transition in the level scheme is uncertain.

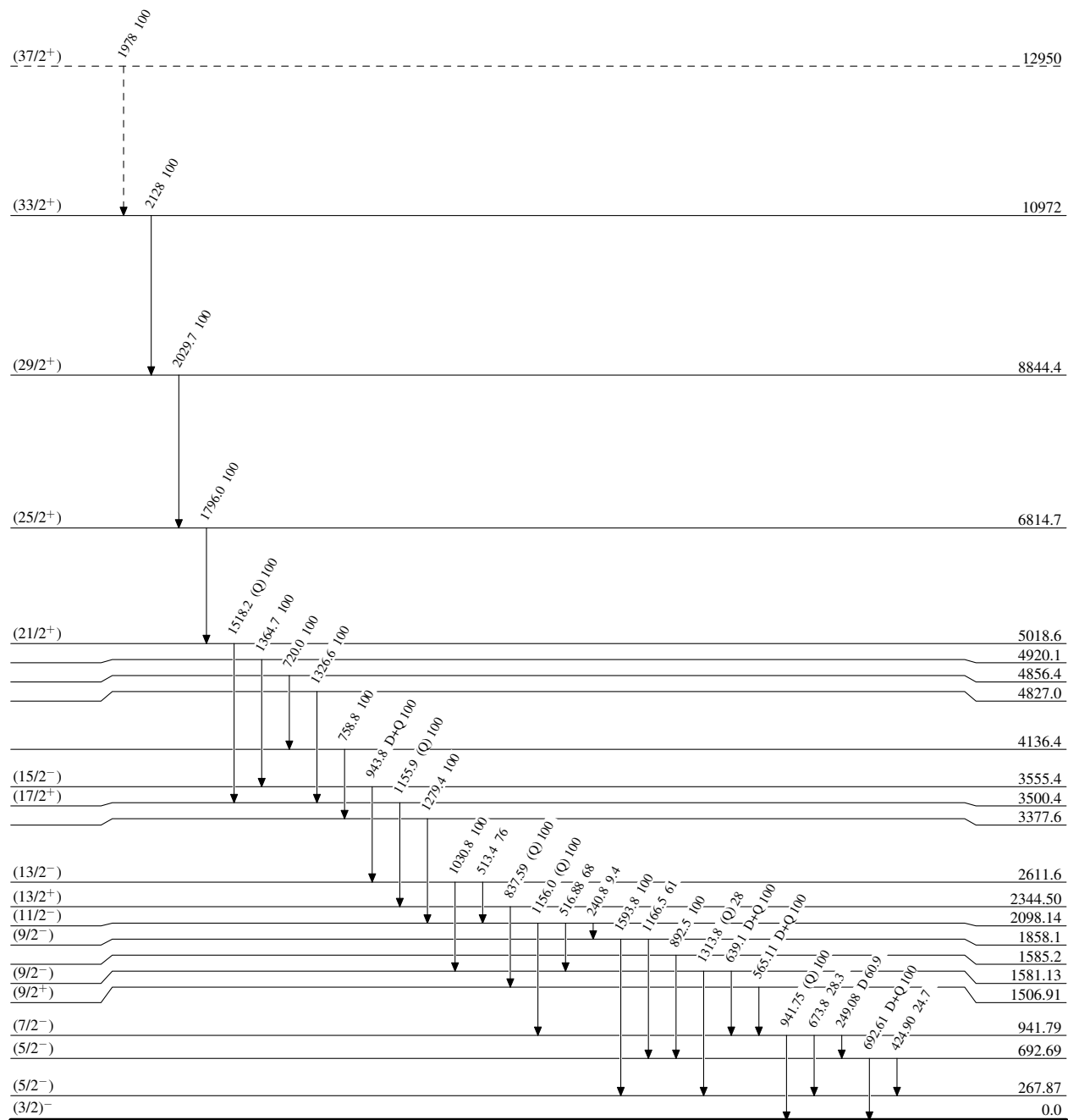
**Adopted Levels, Gammas**

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶  $\gamma$  Decay (Uncertain)



21.1 s 10

<sup>57</sup>Cr<sub>33</sub>

Adopted Levels, Gammas