

Adopted Levels, Gammas

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	20-Feb-2010

$Q(\beta^-) = -1.65 \times 10^4$ syst; $S(n) = 1.803 \times 10^4$ 4; $S(p) = 4882$ 22; $Q(\alpha) = -6794$ 20 [2012Wa38](#)

Note: Current evaluation has used the following Q record \$ -17100 syst 18.58E350 4883 26 -6777 21 [2009AuZZ,2003Au03](#).

Estimated uncertainty=110 for $Q(\beta^-)$ ([2009AuZZ,2003Au03](#)).

$Q(\epsilon p) = 2243$ 20 ([2009AuZZ,2003Au03](#)).

Mass excess = -29.472 20 MeV ([1992Bo37](#)).

[1972Zi02](#): identification and production of ⁴⁶Cr in ³²S(¹⁶O,2n) reaction.

[1991Wi13](#): ⁴⁶Ti(π^+, π^-) E=450 MeV, measured cross section for double isobaric analog state using LAMPF facility and Large Acceptance spectrometer (las). Measured $d\sigma/d\Omega = 0.25$ $\mu\text{b/sr}$ 10 at 5°.

[1990We05](#): ⁴⁶Ti(π^+, π^-) E=33.9 MeV, measured cross section and $\sigma(\theta)$ for double isobaric analog state using LAMPF facility, Measured $d\sigma/d\Omega = 3.1$ $\mu\text{b/sr}$ 8 at 0° and 2.5 $\mu\text{b/sr}$ 6 at 25.1°.

[1994Bi10](#): ⁹Be(⁵⁸Ni,X) E=650 MeV/nucleon, Fragment separator FRS at GSI facility, measured cross section for the production of ⁴⁶Cr.

[2005On03](#): measured half-life of ⁴⁶Cr g.s.

Structure calculations using shell model: [2008Ma44](#), [2007He32](#), [2002Ca48](#): levels, B(E2), mirror states, etc.

⁴⁶Cr Levels

Cross Reference (XREF) Flags

A	⁴⁶ Mn ϵ decay (36.2 ms)
B	⁴⁷ Fe ϵp decay (21.9 ms)
C	¹² C(³⁶ Ar,2n γ)
D	Coulomb excitation

E(level) [†]	J π^{\ddagger}	T _{1/2}	XREF	Comments
0.0 [#]	0 ⁺	0.26 s 6	ABCD	$\% \epsilon + \% \beta^+ = 100$ T _{1/2} : from 1972Zi02 , timing of β decays. Other: 0.24 s 14 (2005On03) from $\beta(993\gamma)$ coin decay curve. Additional information 1 .
892.16 [#] 10	2 ⁺	5.4 ps 12	ABCD	J π : level is Coulomb excited. T _{1/2} : from B(E2)=0.093 20 (2005Ya26) in Coulomb excitation.
1987.1 [#] 3	(4 ⁺)		ABC	
3196.5 [@] 6	(3 ⁻)		BC	
3226.9 [#] 6	(6 ⁺)		C	
3296 3			C	
3494.3 7			C	
3593.7 [@] 7	(4 ⁻)		C	
3682.2 16			C	
3715.8 9			C	
3778.1 12			C	
3986.7 [@] 7	(5 ⁻)		C	
4235 3			C	
4305.5 12			C	
4434.4 10			C	
4817.4 [#] 8	(8 ⁺)		C	
4830 [@] 3	(6 ⁻)		C	
5117 4			C	
5346 [@] 3	(7 ⁻)		C	

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Adopted Levels, Gammas (continued) ^{46}Cr Levels (continued)

E(level) [†]	J ^π [‡]	XREF	Comments
6179.5 [#] 11	(10 ⁺)	C	
8162.5 [#] 15	(12 ⁺)	C	
9152 24	(4 ⁺)	A	T=2 E(level): from 2007Do17 , see detailed comment in ^{46}Mn ε decay. J ^π : T=2 quadruplet in ^{46}Sc (g.s., 4 ⁺), ^{46}Ti (9168, 4 ⁺ , probable IAS of ^{46}Sc g.s.), ^{46}Cr (9152 state) and ^{46}Mn (g.s.). Superallowed type β^+ decay ($\log ft \approx 3.4$) from ^{46}Mn g.s. to the 9152 level of ^{46}Cr is consistent with this interpretation. Also mirror analogy with 9168, 4 ⁺ state of ^{46}Ti . This state decays mainly by proton emission, but only 17.3% 12 branch is so far accounted in measurements of 2007Do17 and 1992Bo37 . Energetically, two-proton and α -decay modes are also possible but these are expected to be small (2007Do17).

[†] From least-squares fit to $E\gamma$'s.[‡] As proposed in [2007Ga03](#) based on $\gamma(\theta)$ data for selected transitions observed in $^{12}\text{C}(^{36}\text{Ar}, 2n\gamma)$ and mirror analogy with ^{46}Ti and ^{46}V .# Band(A): Yrast (T=1) band. Structure is similar to T=1 states in mirror nuclide ^{46}Ti and ^{46}V .@ Band(B): $\Delta J=1$ band based on (3⁻). $\gamma(^{46}\text{Cr})$

E _i (level)	J _i ^π	E _γ [†]	I _γ	E _f	J _f ^π	Mult.	Comments
892.16	2 ⁺	892.15 [‡] 10	100	0.0	0 ⁺	[E2]	B(E2)(W.u.)=19 4
1987.1	(4 ⁺)	1094.9 [‡] 3	100	892.16	2 ⁺		
3196.5	(3 ⁻)	2304.6 7	100	892.16	2 ⁺	D [#]	
3226.9	(6 ⁺)	1239.9 5	100	1987.1	(4 ⁺)	Q [#]	
3296		2404 3	100	892.16	2 ⁺		
3494.3		1506.9 8	100	1987.1	(4 ⁺)		
3593.7	(4 ⁻)	397.4 6	100 13	3196.5	(3 ⁻)	D [#]	
		1605.3 15	75 19	1987.1	(4 ⁺)		
3682.2		1695.0 15	100	1987.1	(4 ⁺)		
3715.8		519.3 6	100	3196.5	(3 ⁻)		
3778.1		581.7 11	50 30	3196.5	(3 ⁻)		
		1790 3	100 60	1987.1	(4 ⁺)		
3986.7	(5 ⁻)	393.0 15	12 7	3593.7	(4 ⁻)		
		492.3 7	60 11	3494.3			
		760.3 10	43 13	3226.9	(6 ⁺)		
		790.1 8	100 22	3196.5	(3 ⁻)	Q [#]	
4235		2248 3	100	1987.1	(4 ⁺)		
4305.5		711.8 9	100	3593.7	(4 ⁻)		
4434.4		841.0 22	22 13	3593.7	(4 ⁻)		
		1207.4 9	100 17	3226.9	(6 ⁺)		
4817.4	(8 ⁺)	1590.4 6	100	3226.9	(6 ⁺)		
4830	(6 ⁻)	1236 3	100	3593.7	(4 ⁻)		
5117		1401 3	100	3715.8			
5346	(7 ⁻)	1359 3	100	3986.7	(5 ⁻)		
6179.5	(10 ⁺)	1362.1 7	100	4817.4	(8 ⁺)		
8162.5?	(12 ⁺)	1983.0 [@] 10	100	6179.5	(10 ⁺)		

[†] From $^{12}\text{C}(^{36}\text{Ar}, 2n\gamma)$, unless otherwise stated.

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Adopted Levels, Gammas (continued)

 $\gamma(^{46}\text{Cr})$ (continued)

[‡] Weighted average of values from ε decay, εp decay and $^{12}\text{C}(^{36}\text{Ar}, 2\text{n}\gamma)$.

[#] The $\gamma(\theta)$ patterns in $^{12}\text{C}(^{36}\text{Ar}, 2\text{n}\gamma)$ are consistent with $\Delta J=2$, quadrupole for 1240 γ and 790 γ ; and $\Delta J=1$ for 2305 γ and 397 γ .

[@] Placement of transition in the level scheme is uncertain.

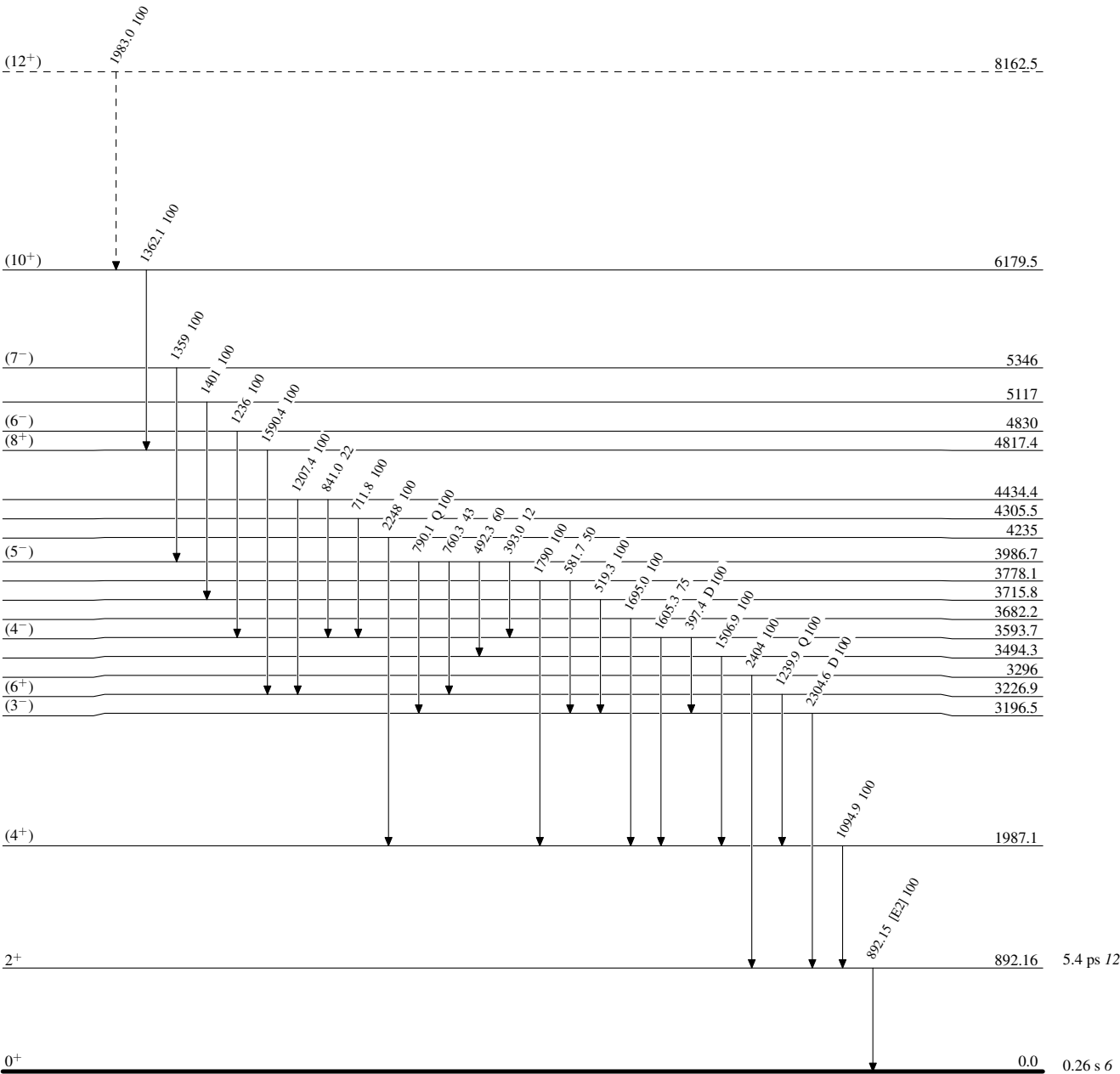
Adopted Levels, Gammas

Legend

Level Scheme

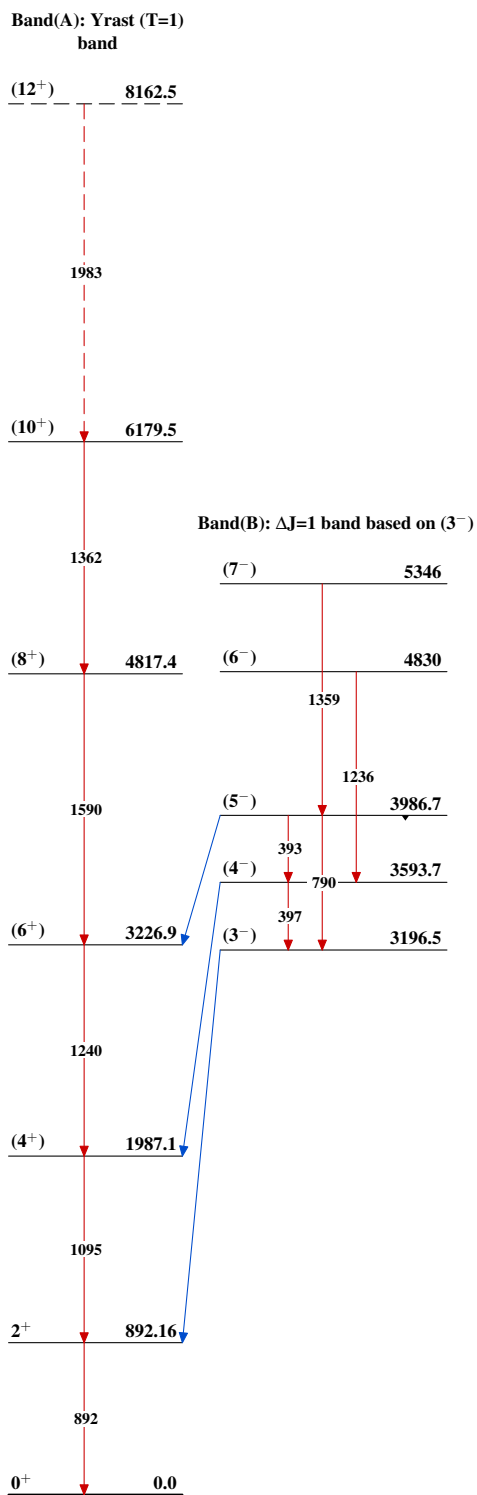
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)



⁴⁶₂₄Cr₂₂

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 $^{46}_{24}\text{Cr}_{22}$