

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 179, 1 (2022)	30-Nov-2021

Q(β^-)=-11290 90; S(n)=14800 30; S(p)=2023 6; Q(α)=-7913 10 2021Wa16

S(2n)=33020 90, S(2p)=6799 7, Q(ϵ)=13525 10, Q(ϵp)=5421 7 (2021Wa16).

Mass measurements: 2018Zh29 and 2017Zh12 (M.E.=-29299 keV 7, Lanzhou), 2004St05 (M.E.=-29320 keV 110, GSI).

Other measurement:

2002Pf03: Be(⁵⁸Ni,X) E=650 MeV/nucleon at GSI. Measured fragment yields.

1987Ki14: ¹²C(⁴⁰Ca,X) E=7.3, 9.8 and 13 MeV/nucleon at GSI. Measured yields.

Nuclear structure calculations: 2017Si17, 2017Sm02, 2006Is01, 2005Sv02, 2005Va32, 2004Sv04, 2001Fi23, 1999Ca12, 1997Or04, 1994Ca21.

⁴⁸Mn Levels

Band assignments are from ¹⁰B(⁴⁰Ca,2n γ) (2006Be45); proton decay branching ratios are from ⁴⁸Fe ϵ decay (2016Or03).

Cross Reference (XREF) Flags

- A ⁴⁸Fe ϵ decay
- B ⁵⁰Ni $\epsilon 2p$ decay
- C ¹⁰B(⁴⁰Ca,2n γ)

E(level) [†]	J π^{\ddagger}	T _{1/2}	XREF	Comments
0.0 ^{&}	4 ⁺	157.7 ms 22	ABC	% ϵ +% β^+ =100; % β^+ p=0.28 4; % β^+ α <6 \times 10 ⁻⁴ T=1 J π ,T: from log ft=3.5 to 5792, 4 ⁺ level with T=1. T _{1/2} : from 752 γ (t) in ⁴⁸ Mn ϵ decay, weighted average of 158.1 22 (1991Sz03) and 150 ms 10 (1987Se07). % β^+ p: from comparison of Ip to I γ (752 γ) measured simultaneously (1991Sz03). Other: 0.27 12 (1987Se07). % β^+ α : only one β^+ -delayed α emission observed (1987Se07).
313.3? 4	(2 ⁺) [#]		A C	
403.2 7	1 ⁺		A C	
430.0 [@] 8	(5 ⁺)		C	
636.0 ^{&} 8	(6 ⁺)		C	
689.2 ^a 12	(1 ⁻)		C	
912.2 ^a 16	(2 ⁻)		C	
1220.2 ^a 19	(3 ⁻)		C	
1273.0 ^b 10	(4 ⁻)		C	
1281.5 [@] 11	(7 ⁺)		C	
1717.2 ^a 21	(4 ⁻)		C	
1854.0 ^b 14	(5 ⁻)		C	
2219.2 ^a 24	(5 ⁻)		C	
2229.5 ^{&} 11	(8 ⁺)		C	
2565.0 ^b 17	(6 ⁻)		C	
2652.0 [@] 13	(9 ⁺)		C	
2940 ^a 3	(6 ⁻)		C	
3036.8 9	0 ⁺		A	%p=14 2 (2016Or03) T=2 E(level): IAS of ⁴⁸ Fe g.s.

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Adopted Levels, Gammas (continued)

⁴⁸Mn Levels (continued)

E(level) [†]	J ^π [‡]	XREF	Comments
3204 <i>14</i>	1 ⁺	A	%p=100
3343.0? ^b 20	(7 ⁻)	C	
3495 <i>14</i>	1 ⁺	A	%p=100
3619? <i>14</i>	1 ⁺	A	%p=100
3713 <i>14</i>	1 ⁺	A	%p=100
4169.7? ^{&} 15	(10 ⁺)	C	
4299? <i>14</i>	1 ⁺	A	%p=100
E(level): from 2281-keV proton peak, which gives a 4299-keV level in ⁴⁸ Mn, while it can also be explained as entirely feeding the 98-keV level in ⁴⁷ Cr, thus giving a level at 4399 keV in ⁴⁸ Mn (2016Or03).			
4341.4 [@] 15	(11 ⁺)	C	
4399 <i>14</i>	1 ⁺	A	%p=100
4517 <i>14</i>	1 ⁺	A	%p=100
4755 <i>14</i>	1 ⁺	A	%p=100
6291.4 [@] 18	(13 ⁺)	C	

[†] From least-squares fit to γ -ray energies for levels connected by γ transitions assuming $\Delta E\gamma=1$ keV if not given; for other excited levels with proton decay, energies are from measured proton energies in ⁴⁸Fe ϵ decay.

[‡] Assignments based on allowed β feedings in ⁴⁸Fe ϵ decay, unless otherwise noted.

From similarity of sequences of transitions to those in mirror nuclide ⁴⁸V in (⁴⁰Ca,2n γ) (2006Be45). Parentheses added by the evaluator due to no experimental evidence.

@ Band(A): Yrast structure, odd spins.

& Band(a): Yrast structure, even spins.

^a Band(B): Band based on 1⁻.

^b Band(C): Band based on 4⁻.

γ (⁴⁸Mn)

E _i (level)	J _i ^π	E _{γ} [†]	I _{γ}	E _f	J _f ^π	Mult.	α [#]	Comments
313.3?	(2 ⁺)	313.3 [@] 4		0.0	4 ⁺			
403.2	1 ⁺	89.9 6	100	313.3?	(2 ⁺)	(M1)	0.040	Mult.: possible assignment deduced from γ -intensity balance at 313-keV level in ⁴⁸ Fe ϵ decay.
430.0	(5 ⁺)	430 [‡]		0.0	4 ⁺			
636.0	(6 ⁺)	206 [‡]		430.0	(5 ⁺)			
		636		0.0	4 ⁺			
689.2?	(1 ⁻)	286 [‡]		403.2	1 ⁺			
912.2?	(2 ⁻)	223 [‡]		689.2?	(1 ⁻)			
1220.2?	(3 ⁻)	308 [‡]		912.2?	(2 ⁻)			
1273.0	(4 ⁻)	1273 [‡]		0.0	4 ⁺			
1281.5	(7 ⁺)	646 [‡]		636.0	(6 ⁺)			
1717.2	(4 ⁻)	497 [‡]		1220.2?	(3 ⁻)			
1854.0	(5 ⁻)	581 [‡]		1273.0	(4 ⁻)			
2219.2	(5 ⁻)	502 [‡]		1717.2	(4 ⁻)			
2229.5	(8 ⁺)	948 [‡]		1281.5	(7 ⁺)			
		1593 [‡]		636.0	(6 ⁺)			
2565.0?	(6 ⁻)	711 ^{‡@}		1854.0	(5 ⁻)			

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Adopted Levels, Gammas (continued) $\gamma(^{48}\text{Mn})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ	E_f	J_f^π	$E_i(\text{level})$	J_i^π	E_γ^\dagger	E_f	J_f^π
2652.0	(9 ⁺)	422		2229.5	(8 ⁺)	4169.7?	(10 ⁺)	1518 ^{‡@}	2652.0	(9 ⁺)
		1371		1281.5	(7 ⁺)	4341.4	(11 ⁺)	172 ^{‡@}	4169.7?	(10 ⁺)
2940?	(6 ⁻)	721 ^{‡@}		2219.2	(5 ⁻)			1689 [‡]	2652.0	(9 ⁺)
3036.8	0 ⁺	2633.5	5	403.2	1 ⁺	6291.4	(13 ⁺)	1950 [‡]	4341.4	(11 ⁺)
3343.0?	(7 ⁻)	778 ^{‡@}		2565.0?	(6 ⁻)					

[†] From ^{48}Fe ε decay, unless otherwise noted.

[‡] From $^{10}\text{B}(^{40}\text{Ca}, 2n\gamma)$ (2006Be45).

Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

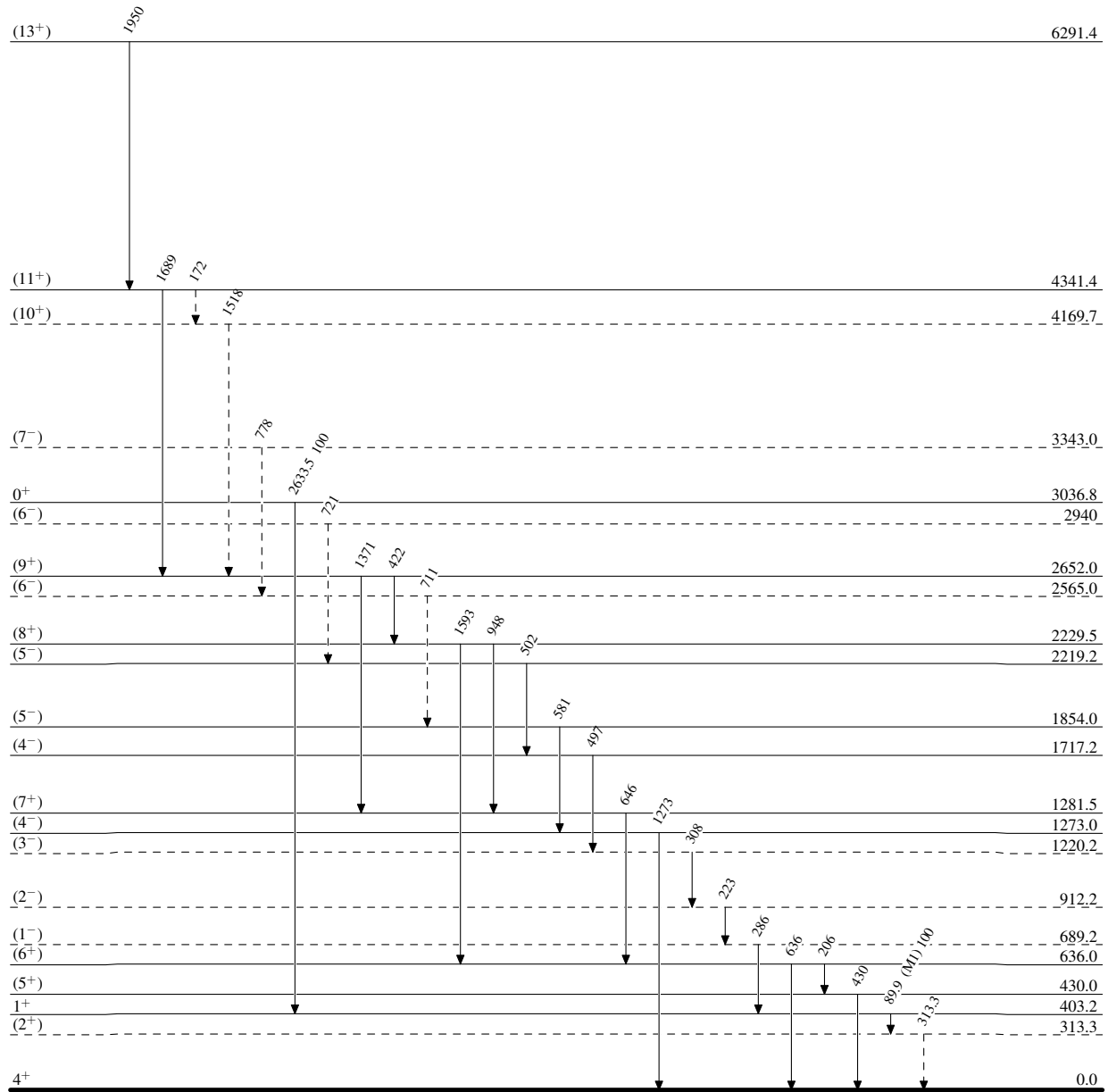
@ Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

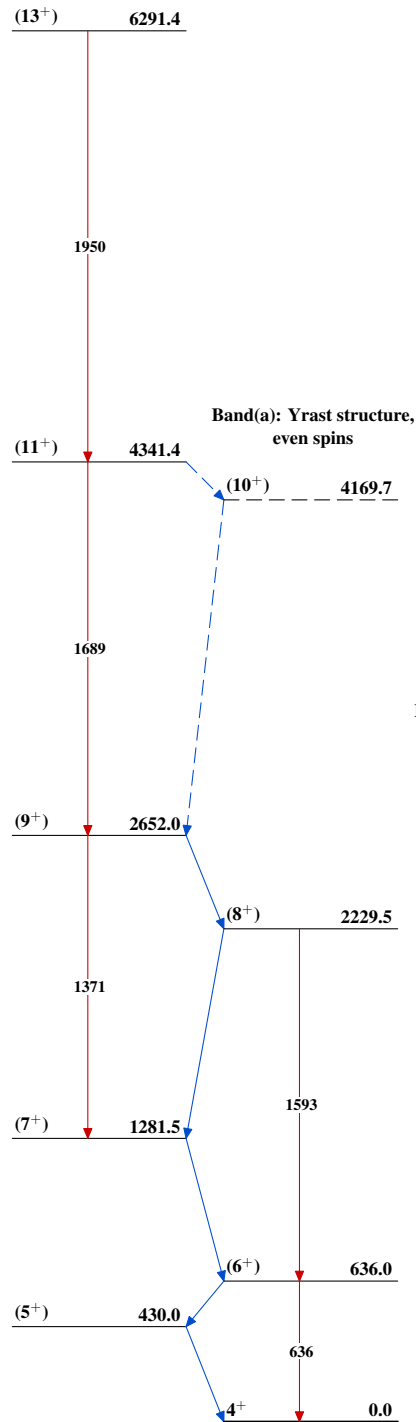
Level Scheme

Intensities: Relative photon branching from each level

-----> γ Decay (Uncertain)

157.7 ms 22

 $^{48}_{25}\text{Mn}_{23}$

Adopted Levels, GammasBand(A): Yrast structure,
odd spinsBand(a): Yrast structure,
even spins(10⁺) 4169.7Band(C): Band based on 4⁻(7⁻) 3343.0Band(B): Band based on 1⁻(6⁻) 2940(5⁻) 2219.2(4⁻) 1717.2(3⁻) 1220.2(2⁻) 912.2(1⁻) 689.2(6⁻) 2565.0(5⁻) 1854.0(4⁻) 1273.0 $^{48}_{25}\text{Mn}_{23}$