Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 196,17 (2024)	30-Sep-2023

Q(β^-)=6216 *19*; S(n)=4829 *5*; S(p)=14401 *8*; Q(α)=−9945 *4* 2021Wa16
S(2n)=12858 *5*, S(2p)=27717 *5* (2021Wa16).

Mass measurements: 2022Po02 (mass excess=−55.6354 MeV *54*, MR-TOF at TRIUMF), 2012Na15 (M.E.=−55.6355 MeV *43*, ISOLTRAP at CERN), 2010Fe01 (M.E.=−55.6341 MeV *67*, LEBIT at NSCL), 2008Bl05 (M.E.=−55.6307 MeV *96*, LEBIT at NSCL), 1994Se12 (M.E.=−55.49 MeV *27*, TOFI at LAMPF), 1990Tu01 (M.E.=−55.14 MeV *23*, TOFI at LAMPF).

Theoretical calculations:
2022Oz02,1976Da02: calculated mass excess.
2016Ku21,1998Ka34,1988Be23: calculated β-decay $T_{1/2}$.
2012Lo04: calculated M1 transition strength distributions.
2010Sr02: calculated levels, J, π.
2003Mi23,1995Ri05: calculated binding energies.

^{63}Fe Levels

Cross Reference (XREF) Flags

A ^{63}Mn β^- decay
B ^{238}U(^{64}Ni,Xγ)

E(level)[†]	J$^\pi$	$T_{1/2}$[‡]	XREF	Comments
0.0	5/2$^-$	6.1 s *6*	AB	%β^-=100 J$^\pi$: allowed β^- feeding to 7/2$^-$ g.s.; strong and possibly allowed β^- feeding to 3/2$^-$, 995 level in ^{63}Co. 5/2$^-$ also from systematics of neighboring isotones. Other: 1/2$^-$ proposed by 2009Ma22 in ^{63}Mn β^- decay based on comparisons of theoretical calculations with their preliminary level scheme. $T_{1/2}$: from γ(t) in 1985Ru05. Other: 4.9 s *5* from an earlier measurement (1983Ru06) by the authors of 1985Ru05 and superseded by the remeasurement in 1985Ru05.
0+x[@]	(9/2$^+$)[#]		B	Additional information 1.
356.56 *17*	(3/2)$^-$	0.11 ns	AB	J$^\pi$: from shell-model predictions in 2007Lu13; strong β^- feeding from (5/2)$^-$ parent.
450.7	(3/2$^-$,5/2$^-$)	0.78 ns	A	J$^\pi$: possible allowed β^- feeding from (5/2)$^-$ parent; 93.8γ to (3/2)$^-$ cannot be E2 based on RUL.
625.2	(1/2$^-$,5/2$^-$)		A	J$^\pi$: (1/2,5/2$^-$,9/2$^+$) from theoretical predictions in 2005GaZR; 625.7γ to (5/2$^-$).
680.9	(3/2,5/2,7/2)		A	J$^\pi$: possible β^- feeding from (5/2)$^-$ parent.
819.0+x[@] *4*	(13/2$^+$)[#]		B	
875.2			A	
906.0	(3/2,5/2,7/2)		A	J$^\pi$: possible β^- feeding from (5/2)$^-$ parent.
1132.4	(3/2,5/2,7/2)$^-$		A	J$^\pi$: strong β^- feeding from (5/2)$^-$ parent.
1177.4			A	
1533.9	(3/2$^-$,5/2$^-$,7/2$^-$)		A	J$^\pi$: possible allowed β^- feeding from (5/2)$^-$ parent.
1542.6			A	
2223.1+x[@] *7*	(17/2$^+$)[#]		B	

[†] From a least-squares fit to γ-ray energies, assuming $\Delta E\gamma$=0.5 keV where not given.
[‡] From $\beta\gamma$(t) in 2009Ma22 in ^{63}Mn β^- decay for excited states.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{63}Fe Levels (continued)

[#] Proposed by 2007Lu13 in (^{64}Ni,Xγ) based on shell-model predictions and band assignments. The two transitions of 819 and 1404 keV are proposed by 2007Lu13 in (^{64}Ni,Xγ) to depopulate the states corresponding to the coupling of the $g_{9/2}$ neutron to the ^{62}Fe 2^+ and 4^+ states above a $9/2^+$ level of unknown excitation energy.
[@] Band(A): Band based on ($9/2^+$) (2007Lu13).

γ(^{63}Fe)

Additional information 2.

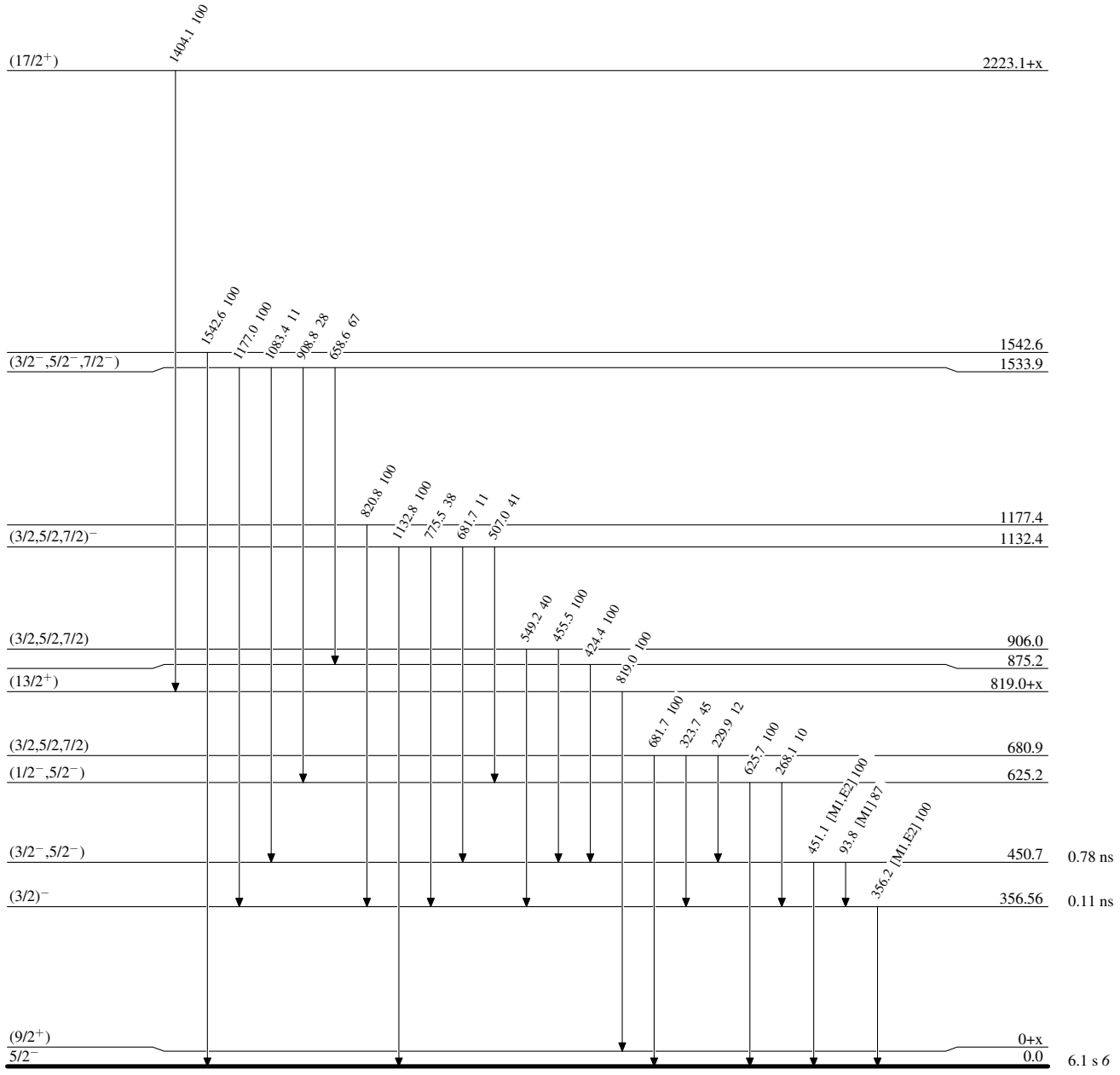
E_i(level)	J_i^π	E_γ[‡]	I_γ[‡]	E_f	J_f^π	Mult.	α[†]	Comments
356.56	$(3/2)^-$	356.2[#] *2*	100	0.0	$5/2^-$	[M1,E2]	0.0028 *14*	α(K)=0.0026 *12*; α(L)=2.5×10^{-4} *12*; α(M)=3.4×10^{-5} *17* α(N)=1.5×10^{-6} *7* E$_\gamma$: other: 357.2 from ^{63}Mn β^- decay. B(M1)(W.u.)=0.0044 if M1, B(E2)(W.u.)=60 if E2.
450.7	$(3/2^-,5/2^-)$	93.8	87	356.56	$(3/2)^-$	[M1]	0.0417 *6*	B(M1)(W.u.)=0.016 α(K)=0.0374 *5*; α(L)=0.00371 *5*; α(M)=0.000512 *7* α(N)=2.306×10^{-5} *32*
		451.1	100	0.0	$5/2^-$	[M1,E2]	0.0014 *5*	α(K)=0.0012 *5*; α(L)=1.2×10^{-4} *5*; α(M)=1.6×10^{-5} *6* α(N)=7.5×10^{-7} *28* B(M1)(W.u.)=1.6×10^{-4} if M1, B(E2)(W.u.)=1.4 if E2.
625.2	$(1/2^-,5/2^-)$	268.1	10	356.56	$(3/2)^-$			
		625.7	100	0.0	$5/2^-$			
680.9	(3/2,5/2,7/2)	229.9	12	450.7	$(3/2^-,5/2^-)$			
		323.7	45	356.56	$(3/2)^-$			
		681.7	100	0.0	$5/2^-$			
819.0+x	$(13/2^+)$	819.0[#] *4*	100	0+x	$(9/2^+)$			
875.2		424.4	100	450.7	$(3/2^-,5/2^-)$			
906.0	(3/2,5/2,7/2)	455.5	100	450.7	$(3/2^-,5/2^-)$			
		549.2	40	356.56	$(3/2)^-$			
1132.4	$(3/2,5/2,7/2)^-$	507.0	41	625.2	$(1/2^-,5/2^-)$			
		681.7	11	450.7	$(3/2^-,5/2^-)$			
		775.5	38	356.56	$(3/2)^-$			
		1132.8	100	0.0	$5/2^-$			
1177.4		820.8	100	356.56	$(3/2)^-$			
1533.9	$(3/2^-,5/2^-,7/2^-)$	658.6	67	875.2				
		908.8	28	625.2	$(1/2^-,5/2^-)$			
		1083.4	11	450.7	$(3/2^-,5/2^-)$			
		1177.0	100	356.56	$(3/2)^-$			
1542.6		1542.6	100	0.0	$5/2^-$			
2223.1+x	$(17/2^+)$	1404.1[#] *5*	100	819.0+x	$(13/2^+)$			

[†] Additional information 3.
[‡] From ^{63}Mn β^- decay, unless otherwise noted.
[#] From (^{64}Ni,Xγ).

Adopted Levels, Gammas

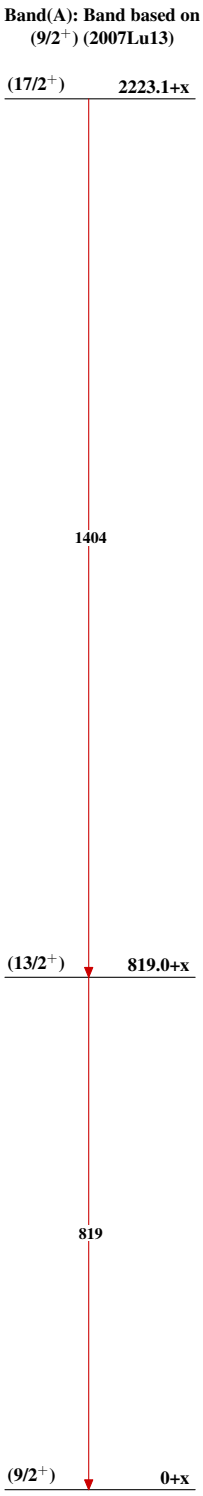
Level Scheme

Intensities: Relative photon branching from each level



$^{63}_{26}Fe_{37}$

Adopted Levels, Gammas



$^{63}_{26}Fe_{37}$