Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178, 41 (2021).	12-Nov-2021

Q(β^-)=4823 *21*; S(n)=7405 *7*; S(p)=15371 *6*; Q(α)=−10486 *5* 2021Wa16
S(2n)=12234 *6*, S(2p)=28695 *6* (2021Wa16).
Mass measurement: 2008Bl05, 2010Fe01 (also 2011Kw02).
1980Gu09: ^{64}Fe produced and identified in ^{238}U(^{40}Ar,X) reaction.
1985Ru05: ^{64}Fe produced and identified in W(^{82}Se,X) reaction.
1990Tu01, 1994Se12: ^{64}Fe identified by mass separation in Th(p,f), E=800 MeV reaction followed by time-of-flight detection of fission fragments.
2020Av04: ^{197}Au(^{64}Fe,^{64}Fe′γ),E(^{64}Fe)=400-440 MeV/nucleon at FAIR-GSI. Measured γ-ray yields using the AGATA array. Deduced summed E1 strength of 0.26 e^{2}fm^2 *10* between 6 MeV and 8 MeV region of measured continuum γ-ray spectrum.
Additional information 1.
Theory references for structure and other topics: 33 primary references in the NSR database at www.nndc.bnl.gov.

^{64}Fe Levels

Cross Reference (XREF) Flags

- A ^{64}Mn β^- decay (90 ms)
- B ^{65}Mn β^-n decay (91.8 ms)
- C ^{64}Ni(^{238}U,Xγ),^{197}Au(^{64}Ni,Xγ)
- D ^{238}U(^{64}Ni,Xγ)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	XREF	Comments
0.0[&]	0$^+$	2.0 s *4*	ABCD	%β^-=100 $T_{1/2}$: from β^- decay curve in 1985Ru05, weighted average of 2.5 s *6* and 1.8 s *4* (which gives 2.0 s *4*, whereas 2.0 s *2* in 1985Ru05). Other: ≈3.5 s (1985Ru05) from decay curve for β-gated 310.8γ in ^{64}Co from the decay of ^{64}Fe. Additional information 2.
746.4[&] *1*	2$^+$	6.8 ps *7*	ABCD	J$^\pi$: ΔJ=2, E2 γ to 0$^+$. $T_{1/2}$: weighted average of 7.1 ps *7* (2011Ro02, RDDS and line-shape analysis); and 5.1 ps *18* (2010Lj01, RDDS and differential decay-curve analysis); both measurements in ^{64}Ni(^{238}U,Xγ).
1443.6 *7*	(1,2$^+$)[#]		A	
1763.2[&] *2*	4$^+$	<1.25 ps	ABCD	$T_{1/2}$: measured effective mean lifetime τ<1.8 ps using RDDS method (2017Kl01) in (^{238}U,Xγ). Authors state that mean lifetime is 0.19 ps *98* if the feeding from the 5$^-$ state and unobserved feeding are included, and that 57% of the feeding was observed with an effective mean lifetime of 32 ps *29*. J$^\pi$: ΔJ=2, E2 γ to 2$^+$; 0$^+$ not allowed from $\gamma\gamma(\theta)$.
1852.8 *4*	(1,2$^+$)[#]		AB	
2117.0 *5*	(1,2$^+$)[#]		AB	
2841.0 *3*	(5$^-$)		CD	J$^\pi$: ΔJ=1, D+Q γ to 4$^+$.
2842.1[&] *4*	6$^+$		CD	J$^\pi$: ΔJ=2, Q γ to 4$^+$.
3093.2 *8*	(0,1,2)[@]		A	
3306.6 *6*	(1,2$^+$)[#]		A	
3316.8 *8*	(0,1,2)[@]		A	
3423.0 *4*	(7$^-$)		D	J$^\pi$: γ to (5$^-$).
3529.0 *5*	(6,7,8$^+$)		D	J$^\pi$: γ to (6$^+$).
3623.1[&] *4*	8$^+$		D	J$^\pi$: ΔJ=2, Q γ to 6$^+$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{64}Fe Levels (continued)

E(level)[†]	J$^\pi$[‡]	XREF	Comments
4226.8 *5*	(1,2$^+$)[#]	A	
4628.5[&] *7*	(10$^+$)	D	J$^\pi$: γ to 8$^+$; member of yrast sequence.

[†] From a least-squares fit to Eγ data, assuming 1 keV uncertainty for each γ ray when not stated.
[‡] The assignments for states of spin >2 are based on $\gamma\gamma(\theta)$ data in ^{238}U(^{64}Ni,Xγ), yrast sequence and similarity with yrast sequence in ^{72}Se.
[#] γ to 0$^+$, g.s.
[@] Possible β feeding from 1$^{(+)}$ parent state.
[&] Seq.(A): Yrast cascade.

γ(^{64}Fe)

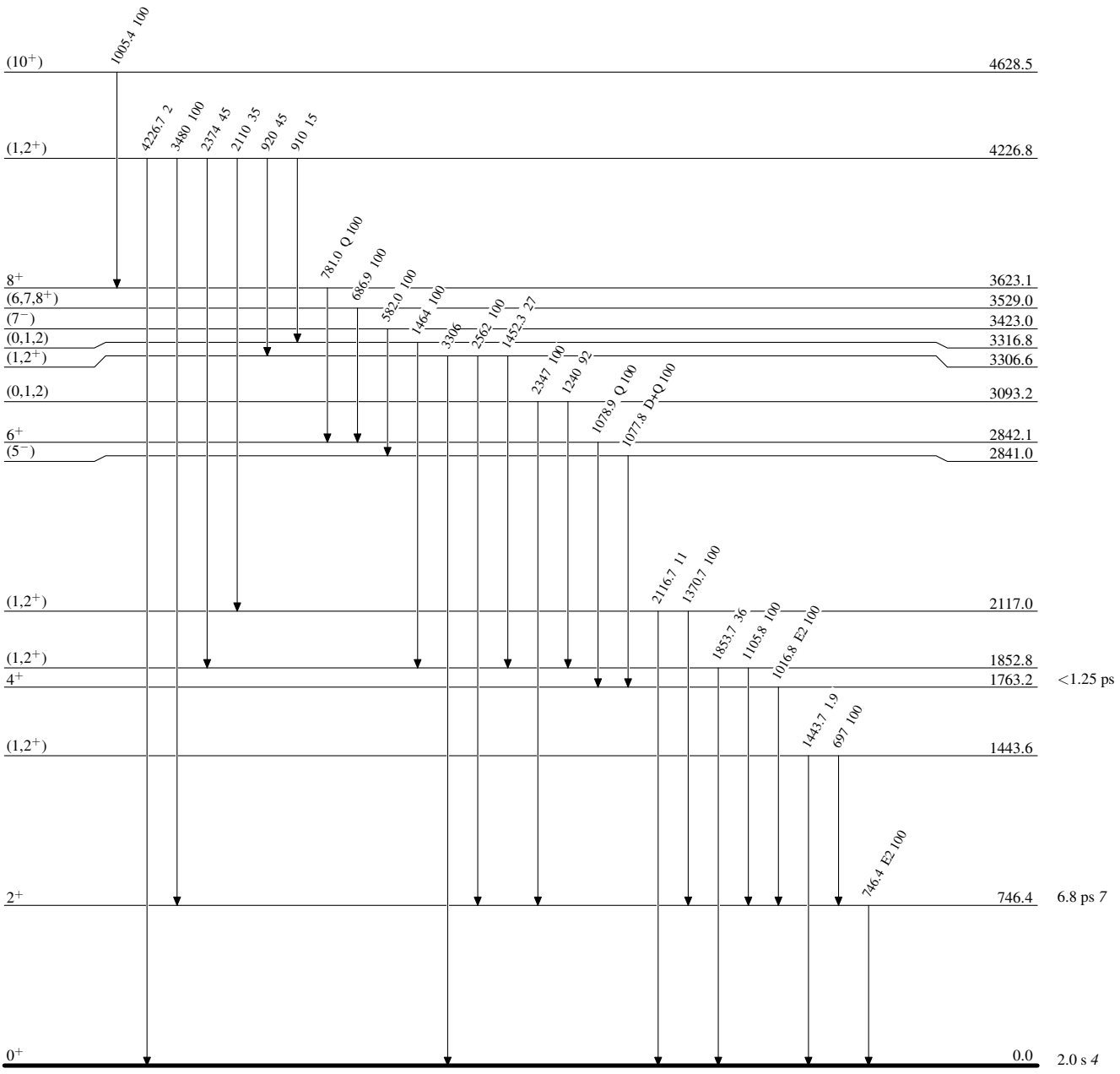
E$_i$(level)	J$_i^\pi$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
746.4	2$^+$	746.4 *1*	100	0.0	0$^+$	E2	B(E2)(W.u.)=23.6 *25* E$_\gamma$: weighted average of 746.4 *1* in β^-n decay, 746.4 *1* and 746.0 *2* in ^{238}U(^{64}Ni,Xγ). Mult.: ΔJ=2, Q from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,Xγ); RUL.
1443.6	(1,2$^+$)	697	100	746.4	2$^+$		
		1443.7	1.9	0.0	0$^+$		
1763.2	4$^+$	1016.8 *2*	100	746.4	2$^+$	E2	B(E2)(W.u.)>27 E$_\gamma$: weighted average of 1017.4 *3* in β^-n decay, 1016.7 *1* and 1016.7 *3* in ^{238}U(^{64}Ni,Xγ). Mult.: ΔJ=2, Q from $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,Xγ); RUL.
1852.8	(1,2$^+$)	1105.8 *5*	100	746.4	2$^+$		E$_\gamma$: from β^-n decay.
		1853.7	36	0.0	0$^+$		E$_\gamma$: from β^- decay, not reported in β^-n decay.
2117.0	(1,2$^+$)	1370.7 *5*	100	746.4	2$^+$		E$_\gamma$: from β^-n decay.
		2116.7	11	0.0	0$^+$		E$_\gamma$: from β^- decay, not reported in β^-n decay.
2841.0	(5$^-$)	1077.8 *2*	100	1763.2	4$^+$	D+Q	
2842.1	6$^+$	1078.9 *3*	100	1763.2	4$^+$	Q	
3093.2	(0,1,2)	1240	92	1852.8	(1,2$^+$)		
		2347	100	746.4	2$^+$		
3306.6	(1,2$^+$)	1452.3	27	1852.8	(1,2$^+$)		
		2562	100	746.4	2$^+$		
		3306		0.0	0$^+$		
3316.8	(0,1,2)	1464	100	1852.8	(1,2$^+$)		
3423.0	(7$^-$)	582.0 *2*	100	2841.0	(5$^-$)		
3529.0	(6,7,8$^+$)	686.9 *2*	100	2842.1	6$^+$		
3623.1	8$^+$	781.0 *1*	100	2842.1	6$^+$	Q	
4226.8	(1,2$^+$)	910	15	3316.8	(0,1,2)		
		920	45	3306.6	(1,2$^+$)		
		2110	35	2117.0	(1,2$^+$)		
		2374	45	1852.8	(1,2$^+$)		
		3480	100	746.4	2$^+$		
		4226.7	2	0.0	0$^+$		
4628.5	(10$^+$)	1005.4 *5*	100	3623.1	8$^+$		

[†] From either β^- decay or (^{64}Ni,Xγ), unless otherwise stated.
[‡] From $\gamma\gamma(\theta)$ in ^{238}U(^{64}Ni,Xγ), unless otherwise noted.

Adopted Levels, Gammas

Level Scheme

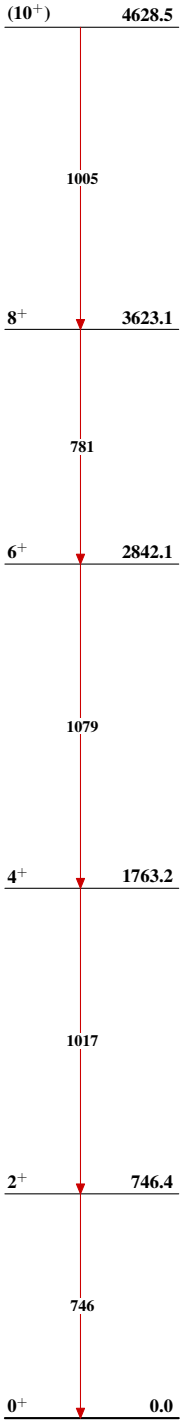
Intensities: Relative photon branching from each level



$^{64}_{26}Fe_{38}$

Adopted Levels, Gammas

Seq.(A): Yrast cascade



$^{64}_{26}Fe_{38}$