Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Kumar(a), J. Chen(b) and F. G. Kondev	NDS 137, 1 (2016)	31-May-2016

Q(β^-)=−11500 *SY*; S(n)=13100 *SY*; S(p)=−819.5 *19*; Q(α)=3918 *21* 2012Wa38
Additional information 1.

^{109}I Levels

Cross Reference (XREF) Flags

A ^{58}Ni(^{54}Fe,p2nγ)
B ^{54}Fe(^{58}Ni,p2nγ)

E(level)†	J$^\pi$	$T_{1/2}$	XREF	Comments
0.0	(1/2$^+$,3/2$^+$)	92.8 μs *8*	AB	%p=99.986 *4*; %α=0.014 *4* %α: from 2007Ma35. J$^\pi$: from comparison between experimental and theoretical proton-decay half-lives using a deformed single particle Nilsson model (1999Ma05). non-favored α-decay (HF=37 *12* with r_0(^{105}Sb)=1.67 *3*, unweighted average of 1.632 14 (^{104}Sn) and 1.70 6 (^{106}Te)) to J^π=(5/2$^+$) in ^{105}Sb. Note, that J^π=5/2$^+$ ($d_{5/2}$), if a spherical shape is assumed. $T_{1/2}$: unweighted average of 93.5 μs 3 (2007Ma35) and 92 μs 1 (2007Pe32). Others: 103 μs *5* (1995Ho26), 100 μs *5* (1993Se04), 109 μs *17* (1987Gi02) and >25 μs (1984Fa04). E(α)=3774 keV 20 (2007Ma35). E(p)=813 keV 4 (1995Ho26) and 830 keV 80 (1984Fa04). configuration: π1/2$^+$[420] ($g_{7/2}$). The assignment is tentative.
x‡	(7/2$^+$)		A	Additional information 2. J$^\pi$: proposed by 2007Pe32 based on systematics of odd-A iodine isotopes and self-consistent cranking calculations. configuration: π1/2$^+$[420] ($g_{7/2}$). The assignment is tentative.
593.90+x‡ *20*	(11/2$^+$)	10.7 ps *13*	A	J$^\pi$: 593.9γ E2 to (7/2$^+$); band assignment. $T_{1/2}$: From recoil-decay tagging and RDDS method (2011Pr12).
1142.1+x# *3*	(11/2$^-$)		A	J$^\pi$: proposed by 2007Pe32 based on systematics of odd-A iodine isotopes and self-consistent cranking calculation; 548.2γ (E1) to (11/2$^+$). configuration: π1/2$^-$[550] ($h_{11/2}$). The assignment is tentative.
1312.0+x‡ *3*	(15/2$^+$)		A	J$^\pi$: 718.1γ E2 to (11/2$^+$); band assignment.
1650.3+x@ *5*	(13/2$^-$)		A	J$^\pi$: 1056.4γ (E1) to (11/2$^+$); band assignment.
1680.0+x# *3*	(15/2$^-$)		A	J$^\pi$: 537.8γ E2 to (11/2$^-$); band assignment.
2146.9+x@ *5*	(17/2$^-$)		A	J$^\pi$: 496.6γ E2 to (13/2$^-$); band assignment.
2193.7+x‡ *4*	(19/2$^+$)		A	J$^\pi$: 881.7γ E2 to (15/2$^+$); band assignment.
2346.1+x# *4*	(19/2$^-$)		A	J$^\pi$: 661.1γ E2 to (15/2$^-$); band assignment.
2790.6+x@ *6*	(21/2$^-$)		A	J$^\pi$: 643.7γ E2 to (17/2$^-$); band assignment.
3083.8+x# *5*	(23/2$^-$)		A	J$^\pi$: 737.7γ E2 to (19/2$^-$); band assignment.
3112.6+x‡ *6*	(23/2$^+$)		A	J$^\pi$: 918.9γ to (19/2$^+$); band assignment.

† From a least-squares fit to Eγ.
‡ Band(A): $\pi g_{7/2}$ band.
# Band(B): $\pi h_{11/2}$ intruder orbital.
@ Band(C): $\pi g_{7/2}\otimes\nu(h_{11/2}g_{7/2})$. The$\pi g_{7/2}\otimes 3^-$ configuration is also possible.

Adopted Levels, Gammas (continued)

$\gamma(^{109}I)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	α[@]	Comments
593.90+x	(11/2$^+$)	593.9 *2*	100	x	(7/2$^+$)	E2	0.00536	B(E2)(W.u.)=23 *3* α(K)=0.00458 *7*; α(L)=0.000628 *9*; α(M)=0.0001269 *18* α(N)=2.55×10^{-5} *4*; α(O)=2.89×10^{-6} *4* Mult.: R(θ)=1.0 *1* used for normalization in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
1142.1+x	(11/2$^-$)	548.2 *2*	100	593.90+x	(11/2$^+$)	(E1)	0.00226	α(K)=0.00196 *3*; α(L)=0.000240 *4*; α(M)=4.80×10^{-5} *7* α(N)=9.69×10^{-6} *14*; α(O)=1.130×10^{-6} *16* Mult.: R(θ)=1.0 *1* suggests ΔJ=0, dipole transition in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
1312.0+x	(15/2$^+$)	718.1 *2*	100	593.90+x	(11/2$^+$)	E2	0.00330	α(K)=0.00283 *4*; α(L)=0.000376 *6*; α(M)=7.58×10^{-5} *11* α(N)=1.525×10^{-5} *22*; α(O)=1.750×10^{-6} *25* Mult.: R(θ)=1.1 *1* in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
1650.3+x	(13/2$^-$)	1056.4 *4*	100	593.90+x	(11/2$^+$)	(E1)	5.84×10^{-4}	α(K)=0.000508 *8*; α(L)=6.09×10^{-5} *9*; α(M)=1.215×10^{-5} *17* α(N)=2.46×10^{-6} *4*; α(O)=2.89×10^{-7} *4* Mult.: R(θ)=0.7 *1* suggests ΔJ=1, dipole transition in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
1680.0+x	(15/2$^-$)	368.1 *3*	<19	1312.0+x	(15/2$^+$)			
		537.8[‡] *2*	100	1142.1+x	(11/2$^-$)	E2	0.00700	α(K)=0.00596 *9*; α(L)=0.000835 *12*; α(M)=0.0001689 *24* α(N)=3.39×10^{-5} *5*; α(O)=3.82×10^{-6} *6* Mult.: R(θ)=1.0 *1* in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
2146.9+x	(17/2$^-$)	496.6 *2*	100	1650.3+x	(13/2$^-$)	E2	0.00873	α(K)=0.00741 *11*; α(L)=0.001057 *15*; α(M)=0.000214 *3* α(N)=4.29×10^{-5} *6*; α(O)=4.81×10^{-6} *7* Mult.: R(θ)=1.2 *2* in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
2193.7+x	(19/2$^+$)	881.7 *3*	100	1312.0+x	(15/2$^+$)	E2	0.00203	α(K)=0.001750 *25*; α(L)=0.000225 *4*; α(M)=4.53×10^{-5} *7* α(N)=9.13×10^{-6} *13*; α(O)=1.057×10^{-6} *15* Mult.: R(θ)=1.2 *2* in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
2346.1+x	(19/2$^-$)	666.1 *2*	100	1680.0+x	(15/2$^-$)	E2	0.00399	α(K)=0.00341 *5*; α(L)=0.000459 *7*; α(M)=9.25×10^{-5} *13* α(N)=1.86×10^{-5} *3*; α(O)=2.13×10^{-6} *3* Mult.: R(θ)=1.1 *1* in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

γ(^{109}I) (continued)

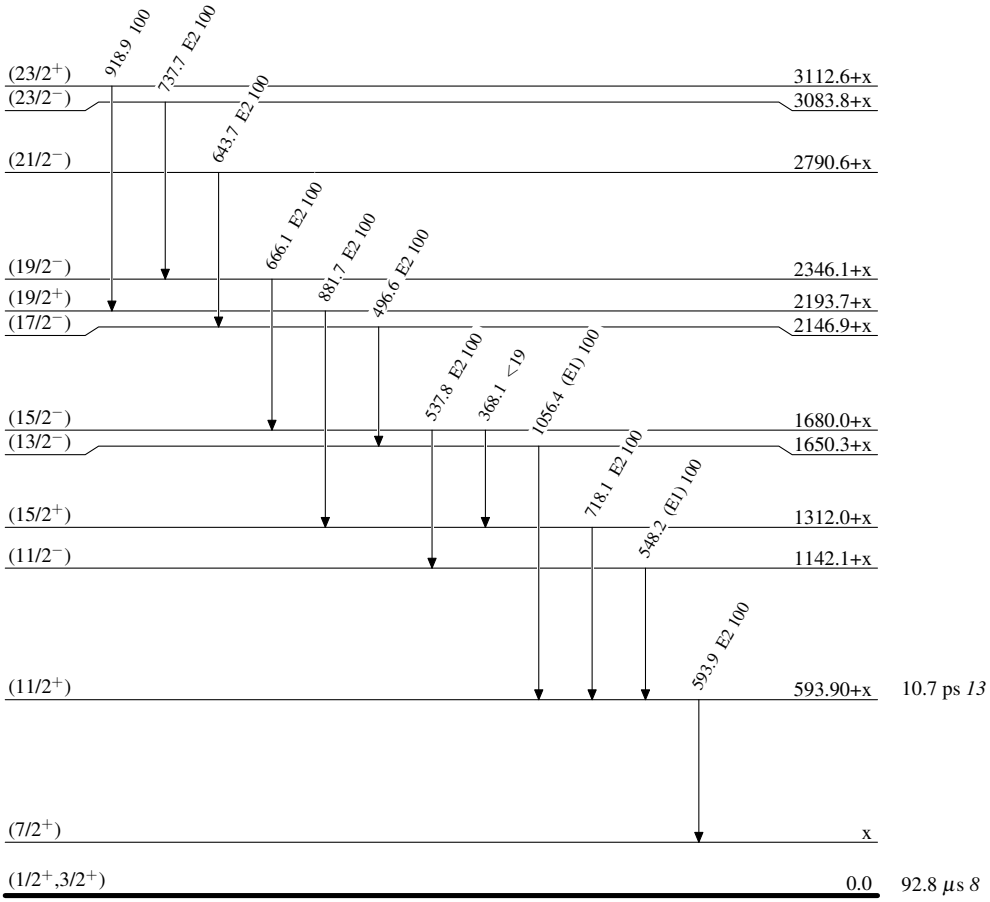
E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[#]	α[@]	Comments
2790.6+x	(21/2$^-$)	643.7[‡] *2*	100	2146.9+x	(17/2$^-$)	E2	0.00435	α(K)=0.00372 *6*; α(L)=0.000503 *7*; α(M)=0.0001015 *15* α(N)=2.04×10^{-5} *3*; α(O)=2.33×10^{-6} *4* Mult.: R(θ)=1.2 *2* in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
3083.8+x	(23/2$^-$)	737.7 *3*	100	2346.1+x	(19/2$^-$)	E2	0.00309	α(K)=0.00266 *4*; α(L)=0.000351 *5*; α(M)=7.06×10^{-5} *10* α(N)=1.422×10^{-5} *20*; α(O)=1.634×10^{-6} *23* Mult.: R(θ)=1.2 *2* in ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
3112.6+x	(23/2$^+$)	918.9 *4*	100	2193.7+x	(19/2$^+$)			

[†] From ^{58}Ni(^{54}Fe,p2nγ) (2007Pe32).
[‡] Possible doublet.
[#] Based on R(angular) in 2007Pe32; R(θ)=Iγ(θ=157.6°,133.6°)/Iγ(θ=94.2°,85.8°), normalized to R=1.0 for 593.9γ.
[@] Additional information 3.

Adopted Levels, Gammas

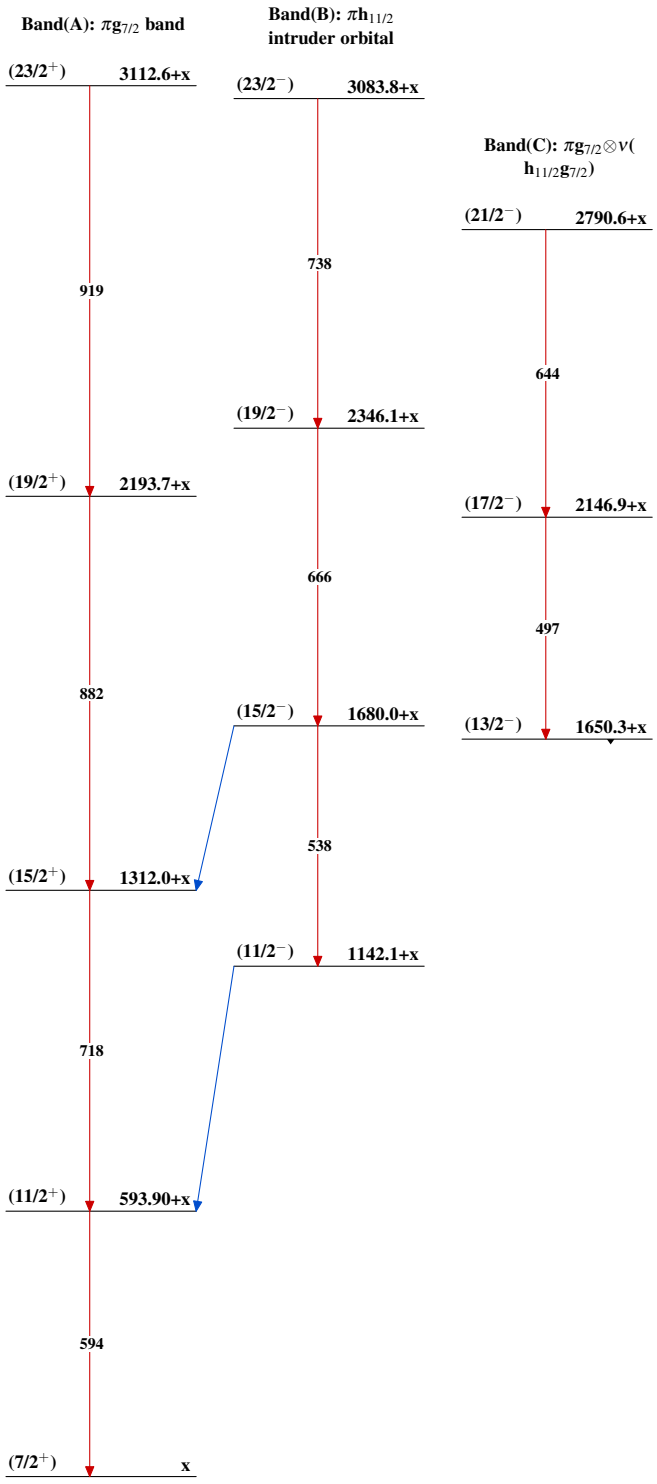
Level Scheme

Intensities: Relative photon branching from each level



$^{109}_{53}I_{56}$

Adopted Levels, Gammas



$^{109}_{53}I_{56}$