Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	21-Jan-2015

S(n)=13550 *90*; S(p)=−973.5 *26*; Q(α)=3484 *7* 2012Wa38
S(2p)=1388 *10*, Q(εp)=8010 *13* (2012Wa38). S(2n)=25100 (theory,1997Mo25).
1984Fa04, 1987Gi02: production and identification: 250 MeV ^{58}Ni on ^{58}Ni. Analyzed by a gas-detector system in a backward position during the beam pause. The identification was based on the fact that the ^{116}Ba compound nucleus with low excitation energy allows only two channels: p2n giving ^{113}Cs and αp2n giving ^{109}I. The proton line of ^{109}I has a different energy. It can also be produced by ^{54}Fe(^{58}Ni,p2n). Preliminary $T_{1/2}$ measurement of 0.9 μs *+13−4* in 1984Fa04 was reanalyzed in their later paper 1987Gi02 to 33 μs *7* with better statistics. Since then several other measurements have been made. 1993HeZV is a later work from the same group. Experiments at Munich accelerator facility.
2003YuZW, 1998GrZT, 1998GrZZ, 1998Ba13: ^{113}Cs produced by ^{58}Ni(^{58}Kr,p2n) at E=230 MeV. Measured E(p), implant-decay time and spatial correlations, $T_{1/2}$, experiments at HRIBF-ORNL and ATLAS-ANL facility.
1994Pa12: Facility: Daresbury, UK; Beam: E(^{58}Ni)=529 MeV; Target: 520 μg/cm^2 isotopically enriched in ^{58}Ni; Detectors: Daresbury Recoil Mass Separator, one DSSSD; Measured: E(p), E(α), implant-decay time and spatial correlations, $T_{1/2}$.
1995Ho26: measured E(p) and $T_{1/2}$ using SHIP at GSI facility; also a review article. See also GSI-93-04 (preprint by S. Hofmann).
2015Wa02 (also 2012Wa10): ^{58}Ni(^{58}Ni,2pn),E=230 MeV; measured E(p), $T_{1/2}$ at JYFL facility.
Consult NSR database for a large number of theory references for calculation of half-life of proton emitter ^{113}Cs.

^{113}Cs Levels

Cross Reference (XREF) Flags

A ^{58}Ni(^{58}Ni,p2nγ)

E(level)	Jπ	$T_{1/2}$	XREF	Comments
0.0	(3/2$^+$)	17.7 μs *4*	A	%p=100 No evidence for α decay was found by 1994Pa12. $T_{1/2}$: LWM weighted average of 17.1 μs *2* (2015Wa02, from 18,000 proton events); 18.3 μs *3* (2003YuZW, 1998GrZT, from 5500 proton events, earlier value from this group was 16.7 μs *7* in 1998Ba13 based on 600 events), and 17 μs *2* (1994Pa12). Others: 22 μs *8* (1993HeZV, earlier values from this group: 33 μs *7* in 1987Gi02, 0.9 μs *+13−4* in 1984Fa04), 28 μs *7* (1995Ho26). Weighted average of of values from 2015Wa02, 2003YuZW, 1995Ho26, 1994Pa12 and 1993HeZV is also 17.7 μs *4*. Jπ: from the proposed π3/2[411] configuration, based on a comparison between the measured proton-decay $T_{1/2}$ and theoretical values (1998GrZZ); 3/2$^+$ is also consistent with systematics presented by 2006De07. Measured E(p)=969 keV *8* (2015Wa02,2012Wa10), 960 keV *3* (1995Ho26), 959 keV *6* (1994Pa12), 974 keV *4* (1993HeZV; earlier value: 980 keV *80* in 1987Gi02 and 1984Fa04). σ=20 μb *10* (2015Wa20), ≈30 μb (1987Gi02).
74.1 *3*	(5/2$^+$)		A	
165.1† *4*	(7/2$^+$)		A	
166.30‡ *20*	(5/2$^+$)		A	
549.0† *5*	(11/2$^+$)		A	
677.0‡ *4*	(9/2$^+$)		A	
1145.2† *5*	(15/2$^+$)		A	
1287.0‡ *6*	(13/2$^+$)		A	
1882.3† *6*	(19/2$^+$)		A	
2005.7‡ *7*	(17/2$^+$)		A	
2696.0† *8*	(23/2$^+$)		A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{113}Cs Levels (continued)

E(level)	J^π	XREF	E(level)	J^π	XREF	E(level)	J^π	XREF
2816.9‡ *8*	(21/2$^+$)	A	4564.8† *12*	(35/2$^+$)	A	6473.9‡ *17*	(41/2$^+$)	A
3204.0† *10*	(27/2$^+$)	A	4828.3‡ *13*	(33/2$^+$)	A	7239.9† *20*	(47/2$^+$)	A
3475.3‡ *9*	(25/2$^+$)	A	5384.0† *15*	(39/2$^+$)	A	7425‡ *3*	(45/2$^+$)	A
3820.0† *11*	(31/2$^+$)	A	5621.6‡ *14*	(37/2$^+$)	A	8290† *3*	(51/2$^+$)	A
4093.2‡ *11*	(29/2$^+$)	A	6281.9† *17*	(43/2$^+$)	A			

† Band(A): π3/2[422], $g_{7/2}$ orbital. First backbend at $\hbar\omega\approx$0.35 MeV is due to alignment of pair of $h_{11/2}$ neutrons, and the second backbend at $\hbar\omega\approx$0.45 MeV is due to alignment of a pair of $h_{11/2}$ protons. This configuration is in contrast to $\pi h_{11/2}$ proposed in 2003YuZW and 1998GrZT.

‡ Band(B): π1/2[420], $d_{5/2}$ orbital First backbend at $\hbar\omega\approx$0.35 MeV is due to alignment of pair of $h_{11/2}$ neutrons, and the second backbend at $\hbar\omega\approx$0.45 MeV is due to alignment of a pair of $h_{11/2}$ protons.

$\gamma(^{113}Cs)$

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.†	α‡
74.1	(5/2$^+$)	74.1 *3*	100	0.0	(3/2$^+$)	(M1)	2.13 *4*
165.1	(7/2$^+$)	91.0 *2*	100	74.1	(5/2$^+$)	(M1)	1.179
166.30	(5/2$^+$)	92#		74.1	(5/2$^+$)		
		166.3 *2*	100 *20*	0.0	(3/2$^+$)	(M1)	0.216
549.0	(11/2$^+$)	383.9 *2*	100	165.1	(7/2$^+$)	Q	
677.0	(9/2$^+$)	510.7 *3*	100	166.30	(5/2$^+$)	Q	
1145.2	(15/2$^+$)	596.2 *2*	100	549.0	(11/2$^+$)	Q	
1287.0	(13/2$^+$)	610.0 *4*	100	677.0	(9/2$^+$)	Q	
1882.3	(19/2$^+$)	737.1 *4*	100	1145.2	(15/2$^+$)	Q	
2005.7	(17/2$^+$)	718.7 *4*	100	1287.0	(13/2$^+$)	(Q)	
2696.0	(23/2$^+$)	813.7 *5*	100	1882.3	(19/2$^+$)	Q	
2816.9	(21/2$^+$)	811.2 *4*	100	2005.7	(17/2$^+$)	Q	
3204.0	(27/2$^+$)	508.0 *5*	100	2696.0	(23/2$^+$)	(Q)	
3475.3	(25/2$^+$)	658.4 *4*	100	2816.9	(21/2$^+$)	Q	
3820.0	(31/2$^+$)	616.0 *4*	100	3204.0	(27/2$^+$)	Q	
4093.2	(29/2$^+$)	617.9 *6*	100	3475.3	(25/2$^+$)	Q	
4564.8	(35/2$^+$)	744.8 *5*	100	3820.0	(31/2$^+$)	(Q)	
4828.3	(33/2$^+$)	735.1 *6*	100	4093.2	(29/2$^+$)	(Q)	
5384.0	(39/2$^+$)	819.2 *9*	100	4564.8	(35/2$^+$)		
5621.6	(37/2$^+$)	793.3 *7*	100	4828.3	(33/2$^+$)	Q	
6281.9	(43/2$^+$)	897.9 *8*	100	5384.0	(39/2$^+$)	(Q)	
6473.9	(41/2$^+$)	852.3 *8*	100	5621.6	(37/2$^+$)	Q	
7239.9	(47/2$^+$)	958 *1*	100	6281.9	(43/2$^+$)	Q	
7425	(45/2$^+$)	951 *2*	100	6473.9	(41/2$^+$)		
8290	(51/2$^+$)	1050 *2*	100	7239.9	(47/2$^+$)		

† From ^{58}Ni(^{58}Ni,2pnγ).

‡ 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.

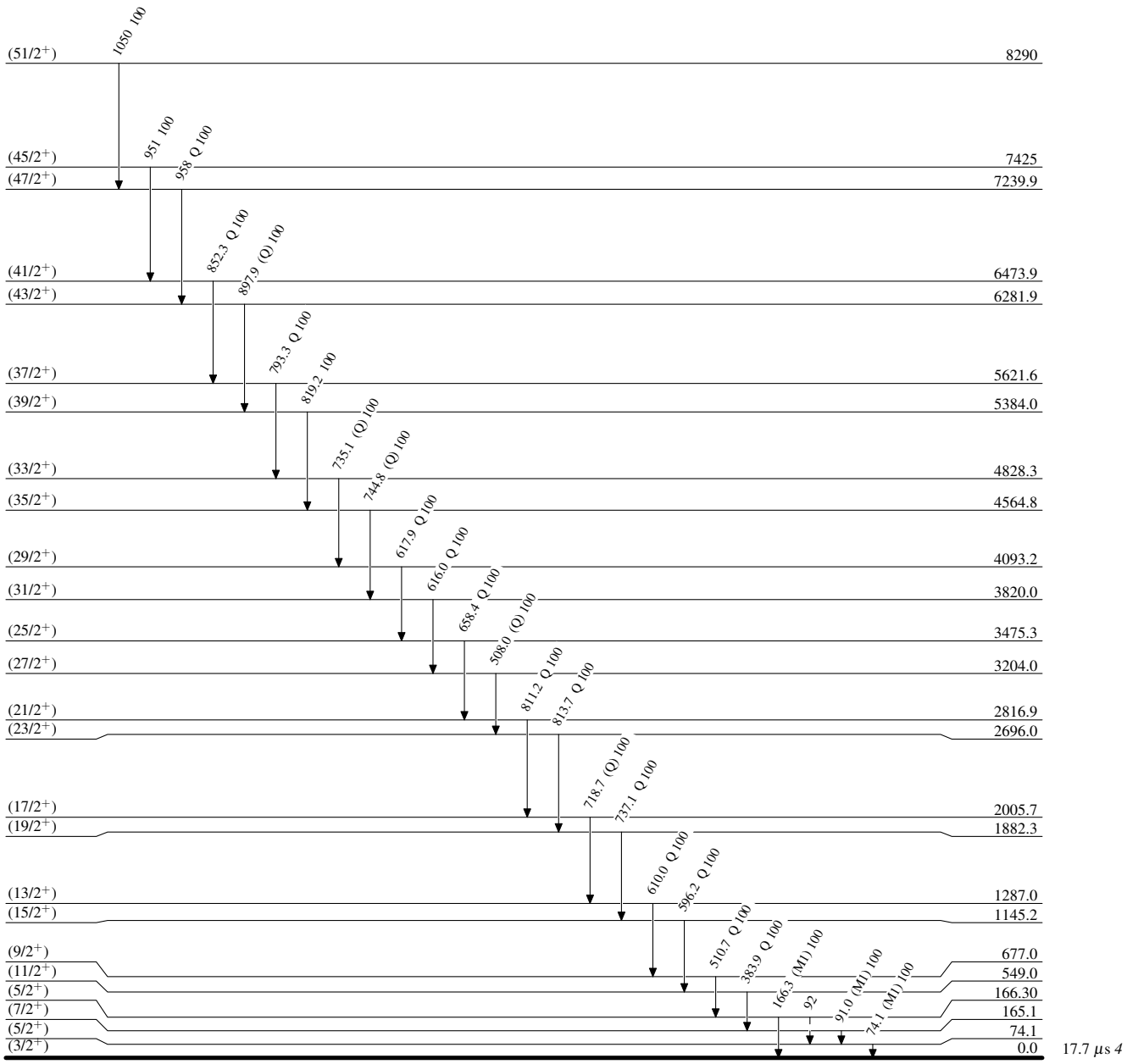
Adopted Levels, Gammas

Legend

Level Scheme

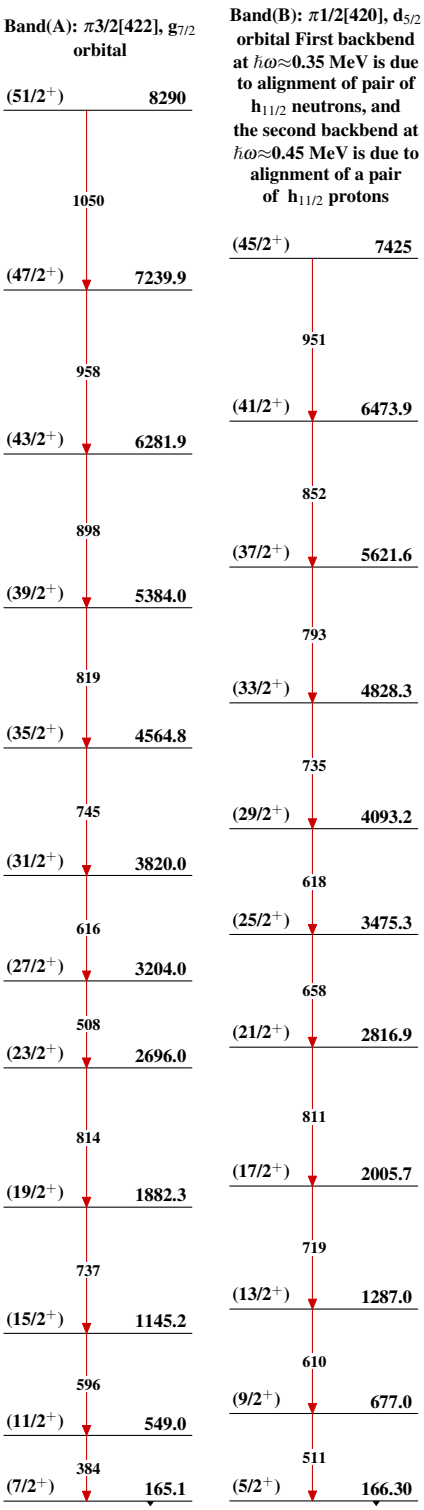
Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{113}_{55}Cs_{58}$

Adopted Levels, Gammas



$^{113}_{55}Cs_{58}$