^{58}Ni(^{16}O,2pnγ) 1989Ra13,1984EbZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 188,1 (2023)	17-Jan-2023

1989Ra13 (also 1987ZhZX, 1987ZhZT): E(^{16}O)=41-64 MeV, recoil mass spectrometer; Measured Eγ, Iγ, nγ, n$\gamma(\theta)$, n$\gamma\gamma$-coin, (recoils)(γ)-coin, (recoils)(n)γ- and (recoils)(p)γ-coin. The experiments were done at Rochester and Cologne, the latter in collaboration with the group who presented some results (1984EbZZ) at a conference.

1984EbZZ (also brief mention about ^{71}Se in 1988Wi02,1984Eb01): ^{58}Ni(^{16}O,2pnγ) E=65 MeV. Measured Eγ, n$\gamma\gamma$-coin, lifetimes by DSAM using OSIRIS spectrometer. This work reports almost the same level scheme as 1989Ra13.

The level scheme is from 1989Ra13 and 1984EbZZ; these are almost identical (possibly a collaborative work), except for the unfavored $g_{9/2}$ band which is given in 1989Ra13 and 1988Wi02.

Complete details of the studies quoted above are not available.

^{71}Se Levels

An 834-keV level with J=7/2 is listed in figure 3 of 1988Wi02 but no other reference given above mentions this level, thus it is omitted here.

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[#]	Comments
0.0	(5/2$^-$)		
48.7 *4*	(1/2$^-$)	5.6 μs *7*	%IT=100 T$_{1/2}$: from the Adopted Levels.
260.5[@] *5*	(9/2$^+$)	19.0 μs *5*	%IT=100 T$_{1/2}$: from the Adopted Levels.
282.2 *3*	(3/2$^-$)		
756.9 *4*			
1041.1[b] *4*	(7/2$^-$)	1.0 ps *7*	
1154.3[&] *10*	(11/2$^+$)		
1298.1[@] *7*	(13/2$^+$)	0.90 ps *28*	
1493.5[a] *7*	(13/2$^+$)		This level is replaced by 1233 level as the 1233.0γ is now placed from 1233 level to g.s. in the Adopted Levels.
1639.3 *7*	(13/2$^+$)		This level is replaced by 1379 level as the 1378.8γ is now placed from 1379 level to g.s. in the Adopted Levels.
1681.0[b] *6*	(11/2$^-$)	1.7 ps *7*	
2326.9[a] *7*	(17/2$^+$)		This level is replaced by 2066 level as the 687.6γ is now placed from 2066 level to 1378 level and the 833.4γ is placed from 1233 level in the Adopted Levels.
2418.1[&] *9*	(15/2$^+$)		
2448.6[@] *8*	(17/2$^+$)	0.53 ps *21*	
2481.7[b] *8*	(15/2$^-$)	0.53 ps *28*	
3236.7[a] *9*	(21/2$^+$)		This level is replaced by 2976 level as the 909.8γ is now placed from 2976 level to 2066 level in the Adopted Levels.
3427.1[b] *10*	(19/2$^-$)	<0.7 ps	
3451.9[&] *10*	(19/2$^+$)		
3635.2[@] *10*	(21/2$^+$)	0.40 ps *28*	
4300.9[a] *10*			This level is replaced by 4039 level as the 1064.2γ is now placed from 4039 level to 2976 level in the Adopted Levels.
4497.1[&] *12*	(23/2$^+$)		
4504.6[b] *11*			
4834.4[@] *11*	(25/2$^+$)		
6035.5[@] *12*			

Continued on next page (footnotes at end of table)

^{58}Ni(^{16}O,2pnγ) 1989Ra13,1984EbZZ (continued)

^{71}Se Levels (continued)

† From a least-squares fit to Eγ data, assuming $\Delta E\gamma$=0.5 keV for Eγ quoted to tenth keV and $\Delta E\gamma$=1 keV for Eγ quoted to keV.
‡ As proposed by 1989Ra13 and 1984EbZZ from their $\gamma(\theta)$ data and band structures. Details of $\gamma(\theta)$ data, however, are not available, thus all assignments are given under parentheses by the evaluators.
# From DSAM (1984EbZZ).
@ Band(A): $\nu g_{9/2}$ band, α=+1/2. Interpreted as an oblate deformed because of the negative sign of Q_0 deduced from sign(δ)=sign((g_K-g_R)/Q_0) for the transition $11/2^+$ to $9/2^+$ deduced from δ=+1.3 (1988Wi02).
& Band(a): $\nu g_{9/2}$ band, α=−1/2.
a Band(B): γ cascade based on $(13/2^+)$.
b Band(C): γ cascade based on $(7/2^-)$.

$\gamma(^{71}Se)$

Eγ	Iγ	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	δ	Comments
48.8		48.7	$(1/2^-)$	0.0	$(5/2^-)$			
233.6	9†	282.2	$(3/2^-)$	48.7	$(1/2^-)$			
260.5		260.5	$(9/2^+)$	0.0	$(5/2^-)$			
282.4	3.8	282.2	$(3/2^-)$	0.0	$(5/2^-)$			
474.6	6†	756.9		282.2	$(3/2^-)$			
639.9	32.9	1681.0	$(11/2^-)$	1041.1	$(7/2^-)$			
687.6	12.0	2326.9	$(17/2^+)$	1639.3	$(13/2^+)$			In the Adopted dataset, this γ is assigned from 2066 level to 1378 level.
757.0	9	756.9		0.0	$(5/2^-)$			
759.3	13	1041.1	$(7/2^-)$	282.2	$(3/2^-)$			
800.7	30.8	2481.7	$(15/2^-)$	1681.0	$(11/2^-)$			
833.4	15	2326.9	$(17/2^+)$	1493.5	$(13/2^+)$			In the Adopted dataset, this γ is assigned from 2066 level to 1233 level.
862	8	4497.1	$(23/2^+)$	3635.2	$(21/2^+)$			
894	55.9	1154.3	$(11/2^+)$	260.5	$(9/2^+)$	(D+Q)	+1.6 *3*	δ: from 1988Wi02. Other: +0.5 *1* (1987ZhZX).
909.8	16.5	3236.7	$(21/2^+)$	2326.9	$(17/2^+)$			Eγ: from 1984EbZZ. Eγ=900.8 in 1989Ra13 is a misprint. In the Adopted dataset, this γ is assigned from 2976 level to 2066 level. Eγ=900.8 in figure 4 of 1989Ra13 (and in level scheme figure of 1987ZhZX is a misprint).
945.4	27.3	3427.1	$(19/2^-)$	2481.7	$(15/2^-)$			
1003	4	3451.9	$(19/2^+)$	2448.6	$(17/2^+)$			
1034	10	3451.9	$(19/2^+)$	2418.1	$(15/2^+)$			
1037.5	100	1298.1	$(13/2^+)$	260.5	$(9/2^+)$			
1040.6	16	1041.1	$(7/2^-)$	0.0	$(5/2^-)$			
1045	13	4497.1	$(23/2^+)$	3451.9	$(19/2^+)$			
1064.2	12	4300.9		3236.7	$(21/2^+)$			In the Adopted dataset, this γ is assigned from 4039 level to 2976 level.
1077.5	23	4504.6		3427.1	$(19/2^-)$			
1120	14	2418.1	$(15/2^+)$	1298.1	$(13/2^+)$			
1150.5	73.8	2448.6	$(17/2^+)$	1298.1	$(13/2^+)$			
1186.6	53.4	3635.2	$(21/2^+)$	2448.6	$(17/2^+)$			
1199.2	35.6	4834.4	$(25/2^+)$	3635.2	$(21/2^+)$			
1201.1	27	6035.5		4834.4	$(25/2^+)$			
1233.0	27.5	1493.5	$(13/2^+)$	260.5	$(9/2^+)$			In the Adopted dataset, this γ is assigned from a 1233 level to g.s.
1264	15	2418.1	$(15/2^+)$	1154.3	$(11/2^+)$			
1378.8	19.0	1639.3	$(13/2^+)$	260.5	$(9/2^+)$			In the Adopted dataset, this γ is assigned from a 1378 level to g.s.

† From 1987ZhZX.

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Level Scheme

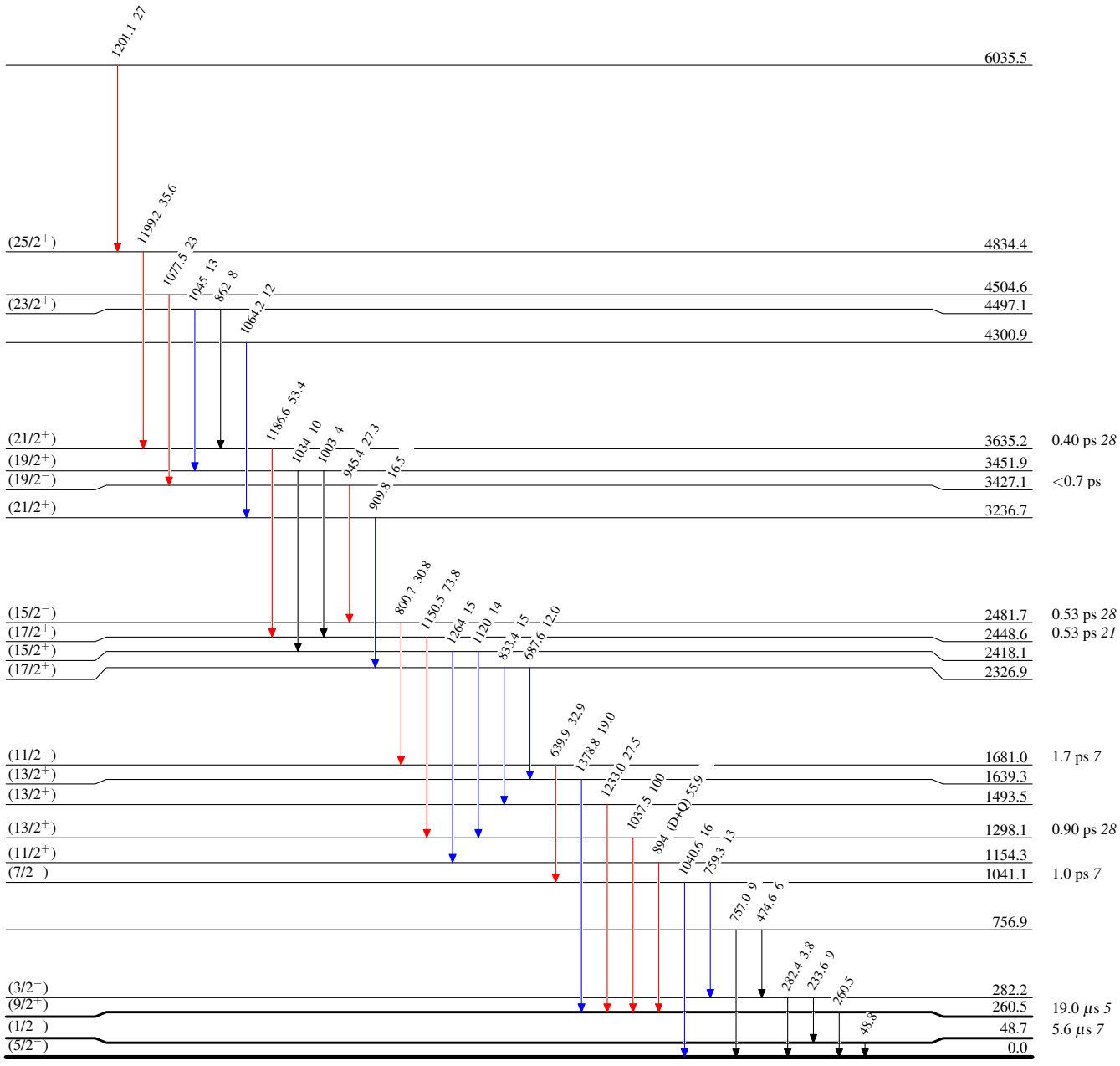
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{71}_{34}Se_{37}$

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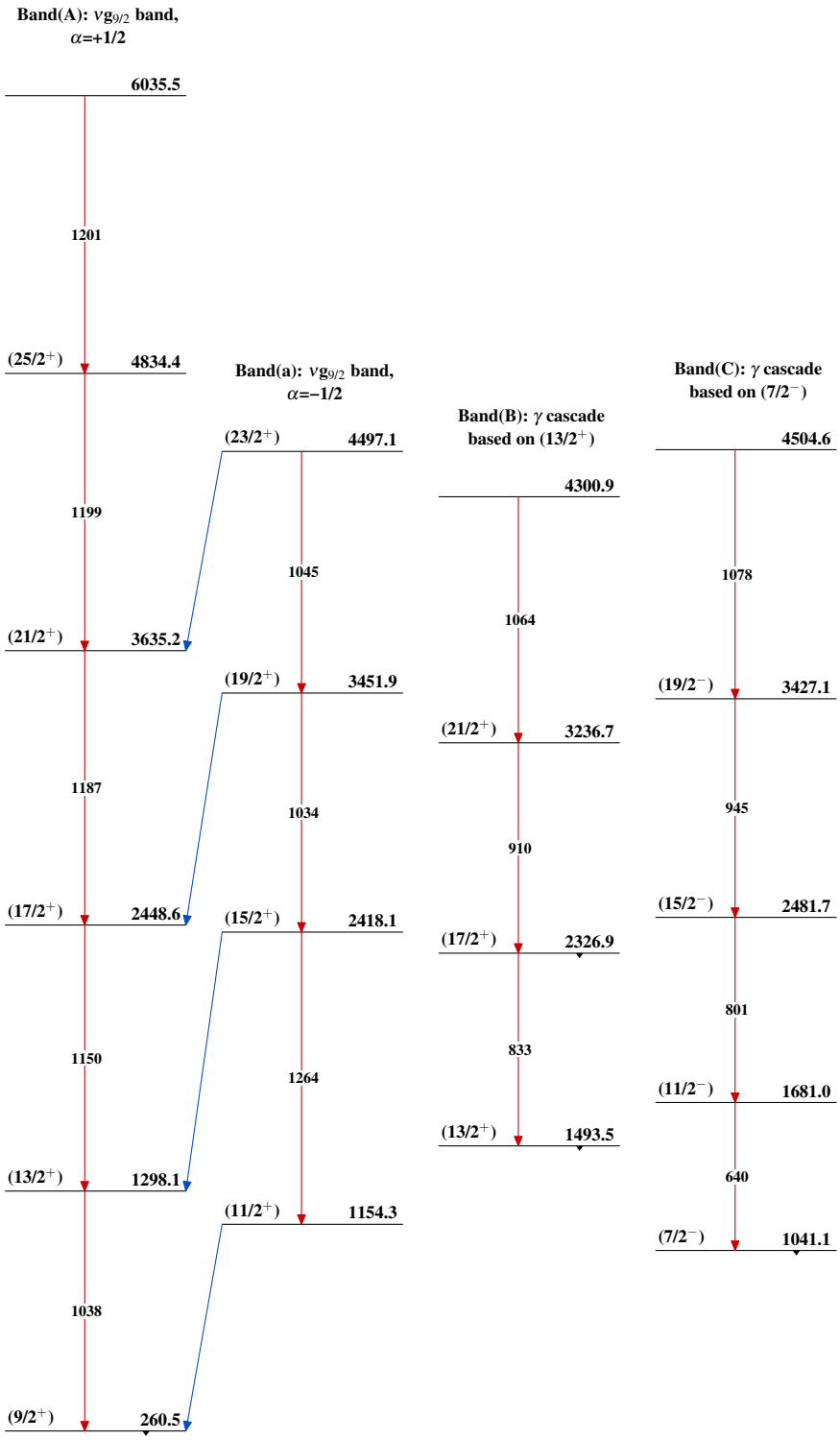

$^{71}_{34}Se_{37}$