^{113}In(p,3nγ) 1997Ka40,1987Vi09

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111, 1471 (2010)	1-May-2009

1997Ka40: ^{113}In(p,3nγ) E=30 MeV. Preliminary report was given in 1995KaZV.

1987Vi09: ^{113}In(p,3nγ) E=30 MeV.

Measured: γ, $\gamma\gamma$, $\gamma\gamma$(t), $\gamma(\theta)$.

The energy gap between the $15/2^-$ and $11/2^-$ states is approximately equal to the energies of the first 2^+ states in adjacent even Sn nuclides. The authors suggest the presence of a multiplet formed by a quasiparticle in the h11/2 neutron state and collective core excitation.

The 1908, 1953, 1947, 1936, and 1782 levels could be members of this multiplet.

The levels around 2650 with two $19/2^-$ states could be also members of another multiplet formed by coupling of the (ν h11/2) with two-phonon core excitations.

^{113}Sn Levels

E(level)‡	J$^\pi$†	E(level)‡	J$^\pi$†	E(level)‡	J$^\pi$†
0	$1/2^+$	1745.33 *22*	$5/2^+$	2448.6 *3*	$5/2^+$
77.7 *3*	$7/2^+$	1781.6 *4*	$9/2^-$	2538.6 *3*	
410.39 *18*	$3/2^+$	1867.4 *4*	$5/2^+$	2583.1 *4*	$(15/2^-)$
498.21 *18*	$3/2^+$	1907.6 *4*	$15/2^-$	2617.3 *4*	
739.3 *3*	$11/2^-$	1909.9 *3*	$5/2^+$	2662.9 *4*	$(3/2^+,5/2^+)$
1018.37 *20*	$3/2^+,5/2^+$	1936.3 *4*	$(9/2^-,11/2^-,13/2^-)$	2750.6 *5*	$(15/2^-)$
1284.23 *19*	$5/2^+$	1946.2 *4*		2778.7 *3*	
1313.94 *21*	$3/2^+,5/2^+$	1952.8 *4*	$(9/2^-,13/2^-)$	2807.7 *5*	$19/2^-$
1356.0 *3*	$3/2^+$	2045.9 *3*	$3/2^+$	2975.9 *5*	$(17/2^-)$
1472.8 *3*	$3/2^+,5/2^+$	2176.8 *3*	$(5/2^+,7/2^+)$	3092.7 *5*	$19/2^-$
1539.4 *3*	$5/2^+,7/2^+$	2200.8 *4*	$(3/2^+,5/2^+)$	3130.2 *6*	$21/2^-$
1540.8 *4*	$(13/2^-)$	2258.8 *4*			
1557.0 *3*	$3/2^+$	2337.6 *4*	$11/2^-$		

† From $\gamma(\theta)$ taken at six angles (13°,90°,120°,130°,140°,150°).

‡ From least-squares fit to γ energies.

$\gamma(^{113}$Sn)

E$_\gamma$†	I$_\gamma$†	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
77.7‡ *3*		77.7	$7/2^+$	0	$1/2^+$
206.0 *3*		1745.33	$5/2^+$	1539.4	$5/2^+,7/2^+$
225.3 *3*	1.8 *3*	2975.9	$(17/2^-)$	2750.6	$(15/2^-)$
322.5 *3*	12 *1*	3130.2	$21/2^-$	2807.7	$19/2^-$
332.6 *3*	14 *1*	410.39	$3/2^+$	77.7	$7/2^+$
498.1 *3*	10 *1*	498.21	$3/2^+$	0	$1/2^+$
583.2 *3*	5.6 *7*	1867.4	$5/2^+$	1284.23	$5/2^+$
608.0 *3*		1018.37	$3/2^+,5/2^+$	410.39	$3/2^+$
661.5 *3*	100 *5*	739.3	$11/2^-$	77.7	$7/2^+$
786.0# *3*	2.5# *2*	1284.23	$5/2^+$	498.21	$3/2^+$
786.0# *3*	2.5# *2*	2258.8		1472.8	$3/2^+,5/2^+$
797.8 *3*	3.0 *3*	2750.6	$(15/2^-)$	1952.8	$(9/2^-,13/2^-)$
801.5 *3*	2.1 *2*	1540.8	$(13/2^-)$	739.3	$11/2^-$
892.6 *3*	2.2 *2*	2176.8	$(5/2^+,7/2^+)$	1284.23	$5/2^+$
900.1 *3*	14 *2*	2807.7	$19/2^-$	1907.6	$15/2^-$
940.6 *3*	3.5 *4*	1018.37	$3/2^+,5/2^+$	77.7	$7/2^+$

Continued on next page (footnotes at end of table)

^{113}In(p,3nγ) 1997Ka40,1987Vi09 (continued)

$\gamma(^{113}Sn)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
1018.3 *3*	0.9 *3*	1018.37	$3/2^+,5/2^+$	0	$1/2^+$
1042.3 *3*	3.8 *4*	1781.6	$9/2^-$	739.3	$11/2^-$
1068.3 *3*	2.0 *2*	2975.9	$(17/2^-)$	1907.6	$15/2^-$
1129.0 *3*	2.1 *2*	1539.4	$5/2^+,7/2^+$	410.39	$3/2^+$
1164.3 *3*	4.9 *4*	2448.6	$5/2^+$	1284.23	$5/2^+$
1168.3 *3*	35 *2*	1907.6	$15/2^-$	739.3	$11/2^-$
1185.1 *3*	2.5 *2*	3092.7	$19/2^-$	1907.6	$15/2^-$
1197.0 *3*	3.5 *4*	1936.3	$(9/2^-,11/2^-,13/2^-)$	739.3	$11/2^-$
1206.9 *3*	2.6 *2*	1946.2		739.3	$11/2^-$
1213.6 *3*	8.4 *7*	1952.8	$(9/2^-,13/2^-)$	739.3	$11/2^-$
1284.2 *3*	16 *1*	1284.23	$5/2^+$	0	$1/2^+$
1314.0 *3*	4.9 *4*	1313.94	$3/2^+,5/2^+$	0	$1/2^+$
1334.9 *3*	3.1 *3*	1745.33	$5/2^+$	410.39	$3/2^+$
1356.0 *3*	2.9 *2*	1356.0	$3/2^+$	0	$1/2^+$
1411.7 *3*	2.2 *2*	1909.9	$5/2^+$	498.21	$3/2^+$
1472.8 *3*	15 *1*	1472.8	$3/2^+,5/2^+$	0	$1/2^+$
1499.5 *3*	2.5 *2*	1909.9	$5/2^+$	410.39	$3/2^+$
[x]1546.8 *3*	2.3 *3*				
1547.7[#] *3*	2.3[#] *3*	2045.9	$3/2^+$	498.21	$3/2^+$
1557.0 *3*	1.0 *1*	1557.0	$3/2^+$	0	$1/2^+$
1598.3 *3*	2.7 *2*	2337.6	$11/2^-$	739.3	$11/2^-$
1635.5 *3*		2045.9	$3/2^+$	410.39	$3/2^+$
1702.6 *3*	2.0 *2*	2200.8	$(3/2^+,5/2^+)$	498.21	$3/2^+$
1766.3 *3*		2176.8	$(5/2^+,7/2^+)$	410.39	$3/2^+$
1843.8 *3*	3.4 *2*	2583.1	$(15/2^-)$	739.3	$11/2^-$
2039.5 *3*	1.4 *2*	2778.7		739.3	$11/2^-$
2040.3 *3*	1.0 *3*	2538.6		498.21	$3/2^+$
2164.7 *3*	0.9 *1*	2662.9	$(3/2^+,5/2^+)$	498.21	$3/2^+$
2206.9 *3*	2.2 *2*	2617.3		410.39	$3/2^+$

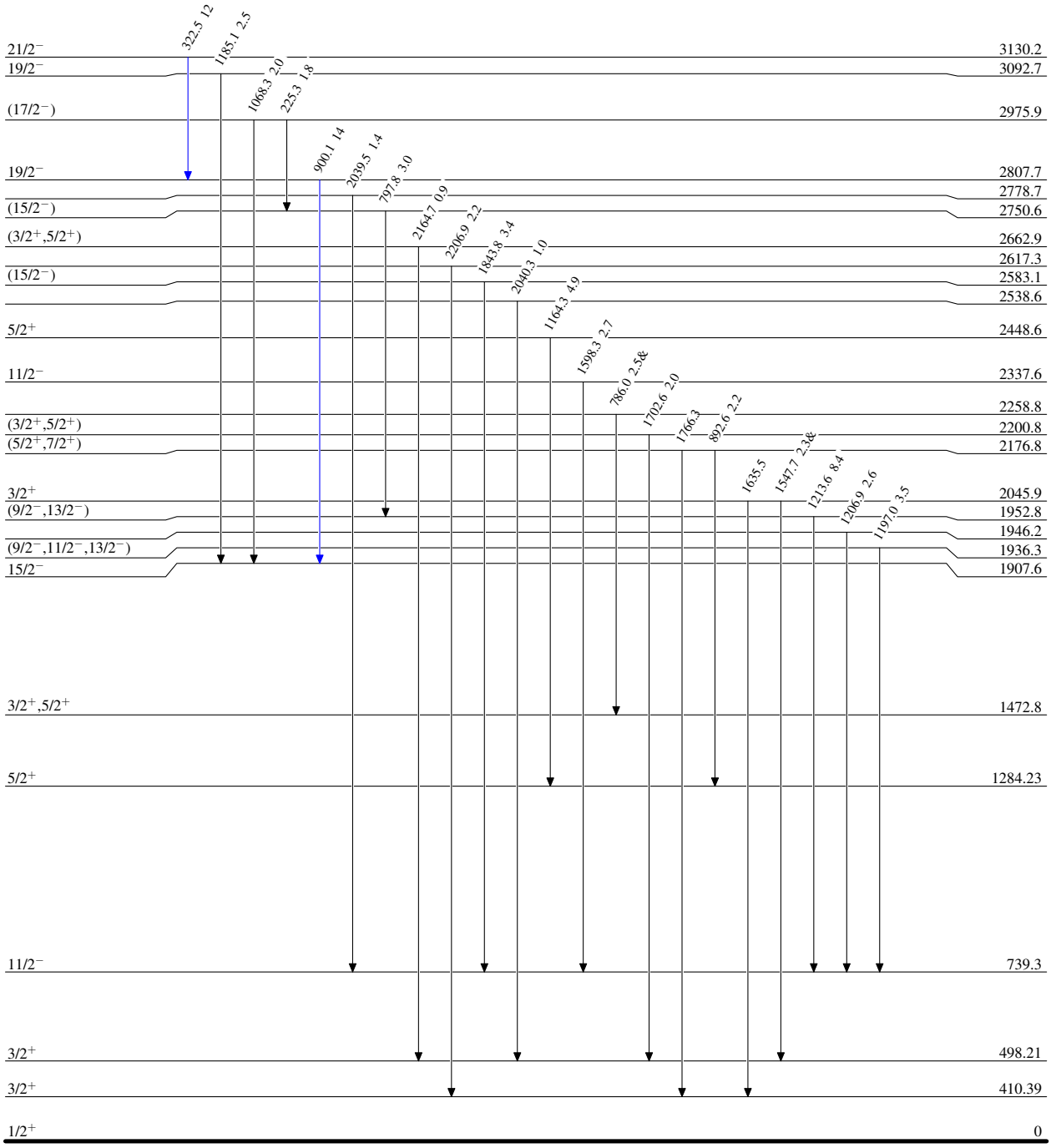
[†] From 1997Ka40, $\Delta E\gamma$=0.3 keV estimated by evaluator, average of $\Delta E\gamma$=0.1-0.4 keV (1997Ka40).
[‡] From Adopted Levels, gammas.
[#] Multiply placed with undivided intensity.
[x] γ ray not placed in level scheme.

^{113}In(p,3nγ) 1997Ka40,1987Vi09

Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

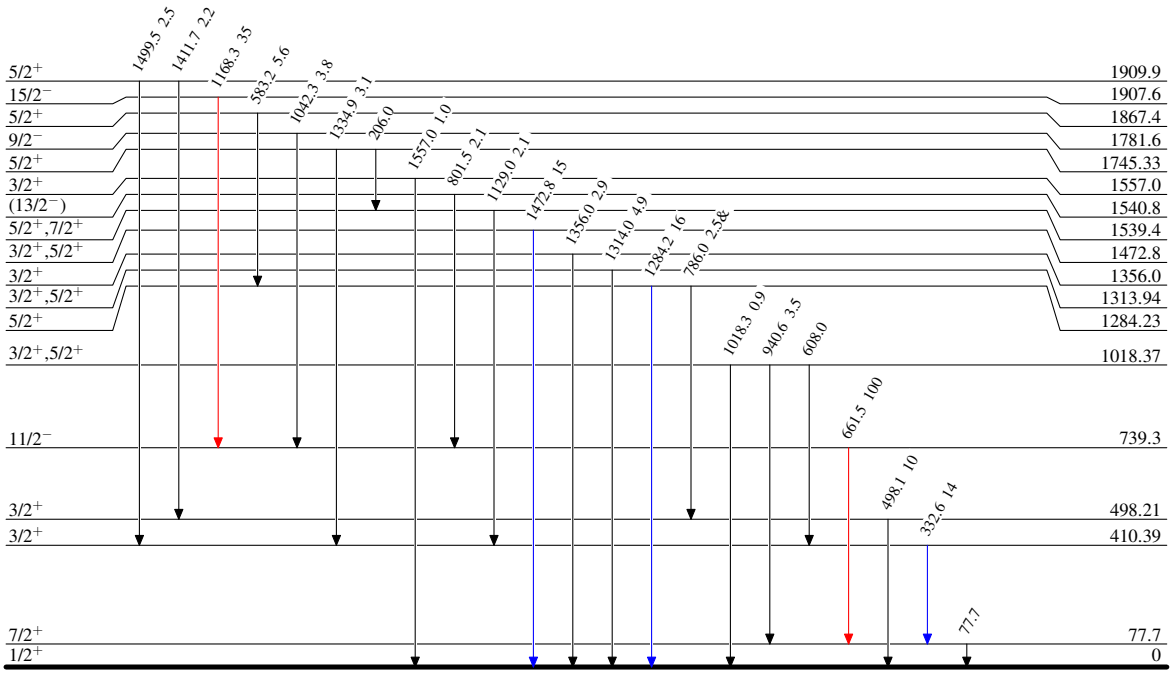


$^{113}_{50}Sn_{63}$

^{113}In(p,3nγ) 1997Ka40,1987Vi09

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



$^{113}_{50}Sn_{63}$