

¹¹²Sn(⁶⁰Ni,pnγ) 2007Ha45

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	C. M. Baglin ¹ , E. A. Mccutchan ² , S. Basunia ¹		NDS 153, 1 (2018)	1-Oct-2018

E=266 MeV beam from Yyvaaskylaa K130 cyclotron; 93% enriched, self-supporting target; JUROGAM spectrometer (43 EUROGAM type Compton-suppressed HPGe detectors) for prompt-γ detection; fusion-evaporation products selected using RITU gas-filled recoil separator and GREAT spectrometer (2 double-sided Si strip detectors, a multiwire proportional avalanche counter and an array of 28 Si PIN diode detectors); Ge detector near RITU focal plane to detect isomeric γ decay; measured E_γ, I_γ, E_α, α-γ coin, γγ coin, α-recoil correlated γγ coin, isomer T_{1/2}. Inadequate statistics for determination of multipolarity from γ(θ).

¹⁷⁰Ir Levels

E(level) [†]	Jπ [‡]	T _{1/2}	Comments
0.0+x		811 ms 18	T _{1/2} : authors' recommended value based on the following α(t) data: 802 ms +30-28 (6007α), 826 ms +30-28 (6053α), 830 ms +58-53 (5951α), 801 ms +63-57 (6121α).
152.14+x 15			
190.3+x 4			
370.19+x 10			
501.69+x @ 23	(9 ⁻)		J ^π : based on plot of aligned angular momentum for band containing this level compared with that for 11/2[505] band in ¹⁷¹ Ir and the apparent blocking of the i _{13/2} ² band crossing seen for the ¹⁷¹ Ir 11/2[505] band, 2007Ha45 suggest a configuration with a deformation-aligned (π 11/2[505]) coupled to a rotationally-aligned (ν 1/2[660]). J=9 is the closest integer to their predicted spin for such a coupling.
768.91+x # 24	(10 ⁻)		
1041.52+x @ 25	(11 ⁻)		
1382.5+x # 3	(12 ⁻)		
1717.3+x @ 4	(13 ⁻)		
2087.4+x # 4	(14 ⁻)		

[†] From least-squares fit to E_γ.

[‡] Authors' suggested values; based on deduced band structure.

Band(A): Possible (π 11/2[505])+(ν 1/2[660]) α=0 band. Tentative configuration assignment supported by band's rotational properties (energy staggering, intraband B(M1)/B(E2) ratios, comparison of aligned momentum with that for 11/2[505] band in ¹⁷¹Ir, apparent blocking of (ν i_{13/2}²) band crossing seen in ¹⁷¹Ir 11/2[505] band). Total Routhian surface (TRS) calculations indicate γ-soft triaxial shapes with β₂≈0.15 and γ≈15° for low-lying yrast states in the energetically most favored configurations (2007Ha45).

@ Band(a): Possible (π 11/2[505])+(ν 1/2[660]) α=1 band. See comment on signature partner band.

γ(¹⁷⁰Ir)

E _γ [†]	I _γ [†]	E _i (level)	J _i ^π	E _f	Mult.	α [‡]	Comments
131.5 2	50 6	501.69+x	(9 ⁻)	370.19+x	[M1,E2]	2.2 7	Mult.: not E1 from intensity balance At the 502+x level (α(exp)>1.5 assuming intraband 267.3γ is M1).
^x 142.9 3	≤8						
152.5 2	56 6	152.14+x		0.0+x			
^x 160.4 3	≤5						
^x 174.9 3	≤5						
^x 180.9 4	14 4						
190.3 4	32 5	190.3+x		0.0+x			E _γ : placement implied in text of 2007Ha45 but not shown in partial level scheme drawing.
218.4 2	61 7	370.19+x		152.14+x			
^x 232.7 2	≤7						

Continued on next page (footnotes at end of table)

$^{112}\text{Sn}(^{60}\text{Ni},\text{pn}\gamma)$ **2007Ha45** (continued) $\gamma(^{170}\text{Ir})$ (continued)

E_γ^\dagger	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	α^\ddagger	Comments
$^{x}244.0$ 3	22 5							
$^{x}252.7$ 3	12 4							
$^{x}259.8$ 8	≤ 6							
267.3 1	80 7	768.91+x	(10 ⁻)	501.69+x	(9 ⁻)	[M1]	0.385	
272.7 1	66 6	1041.52+x	(11 ⁻)	768.91+x	(10 ⁻)			
$^{x}279.9$ 2	11 4							
$^{x}287.8$ 2	11 4							
$^{x}306.2$ 4	≤ 5							
$^{x}317.6$ 4	26 6							
$^{x}323.2$ 2	12 5							
335.0 [#] 2	≈ 29 [#]	1717.3+x	(13 ⁻)	1382.5+x	(12 ⁻)			E_γ, I_γ : labeled As a doublet by 2007Ha45 but only one component has been placed on the level scheme. $I_\gamma=55$ 7 for doublet; authors estimate from coincidence relationships that 52% of the doublet intensity belongs with this placement leaving $I_\gamma=26$ unplaced.
$^{x}335.0$ [#] 2	≈ 26 [#]							I_γ : see comment on 335 γ from 1717+x level.
340.9 2	43 6	1382.5+x	(12 ⁻)	1041.52+x	(11 ⁻)			
$^{x}354.5$ 2	14 4							
$^{x}360.8$ 7	24 6							
370.1 [#] 1	≈ 74 [#]	370.19+x		0.0+x				I_γ : see comment on 370 γ from 2087+x level.
370.1 [#] 1	≈ 26 [#]	2087.4+x	(14 ⁻)	1717.3+x	(13 ⁻)			I_γ : $I_\gamma=100$ 8 for doubly-placed γ ; authors estimate from coincidence relationships that 26% of intensity belongs with this placement leaving $I_\gamma=74$ for the other placement.
$^{x}388.0$ 9	14 4							
$^{x}398.4$ 4	≤ 5							
$^{x}407.6$ 3	≤ 9							
$^{x}411.4$ 3	22 6							
539.5 2	16 5	1041.52+x	(11 ⁻)	501.69+x	(9 ⁻)			
$^{x}565.9$ 3	21 7							
$^{x}573.7$ 3	15 7							
$^{x}584.8$ 3	20 7							
$^{x}594.9$ 2	24 6							
$^{x}600.3$ 3	15 5							
613.6 8	18 6	1382.5+x	(12 ⁻)	768.91+x	(10 ⁻)			
$^{x}636.2$ 8	≤ 8							
$^{x}665.8$ 3	12 7							
675.9 3	21 7	1717.3+x	(13 ⁻)	1041.52+x	(11 ⁻)			
704.5 3	14 6	2087.4+x	(14 ⁻)	1382.5+x	(12 ⁻)			
$^{x}716.7$ 3	34 7							
$^{x}723.5$ 3	12 6							
$^{x}744.9$ 3	14 6							
$^{x}753.5$ 7	≤ 10							
$^{x}782.0$ 3	14 6							

[†] From **2007Ha45**.

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (**2008Ki07**) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

[#] Multiply placed with intensity suitably divided.

^x γ ray not placed in level scheme.

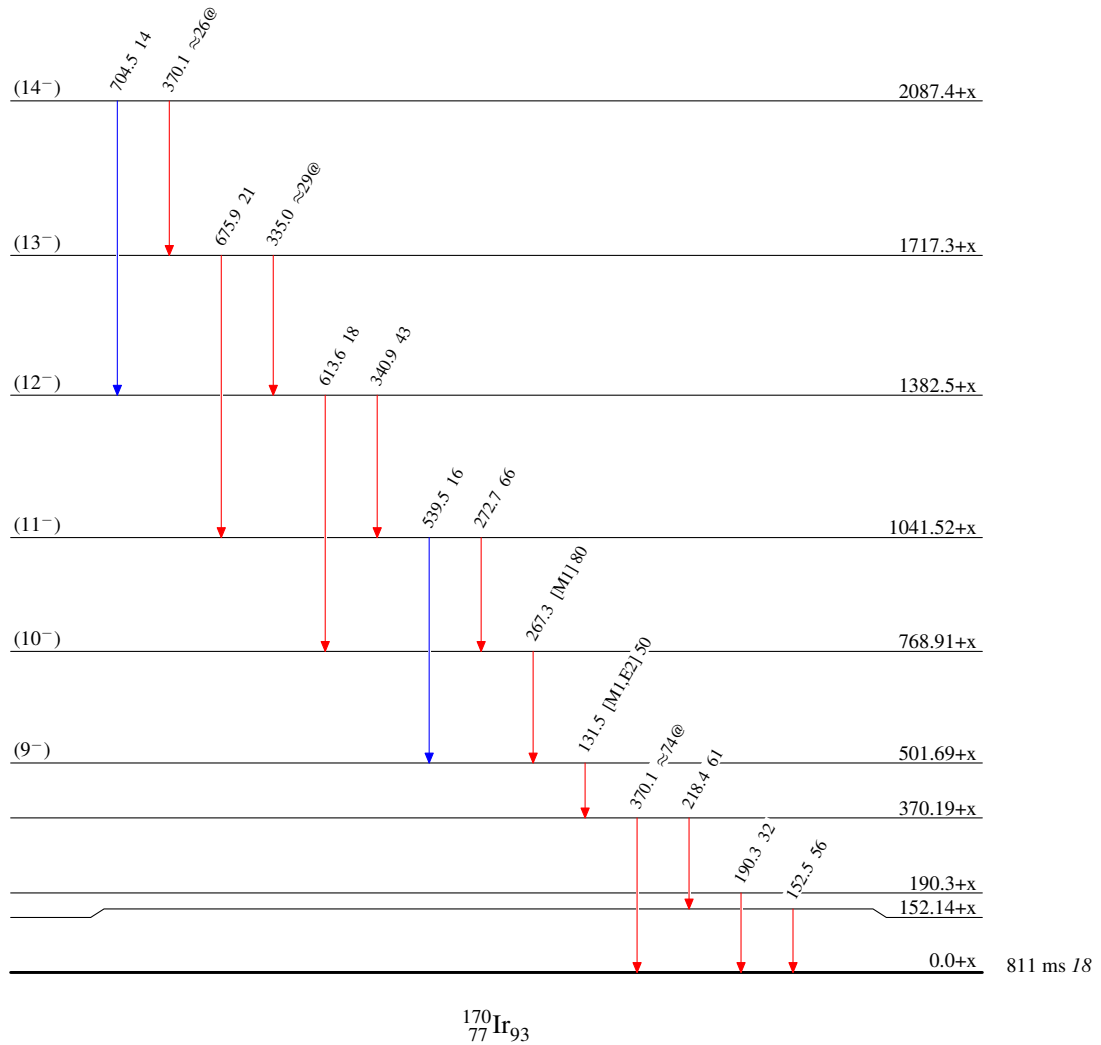
$^{112}\text{Sn}(^{60}\text{Ni,pn}\gamma)$ 2007Ha45

Level Scheme

Intensities: Relative I_γ
 @ Multiply placed: intensity suitably divided

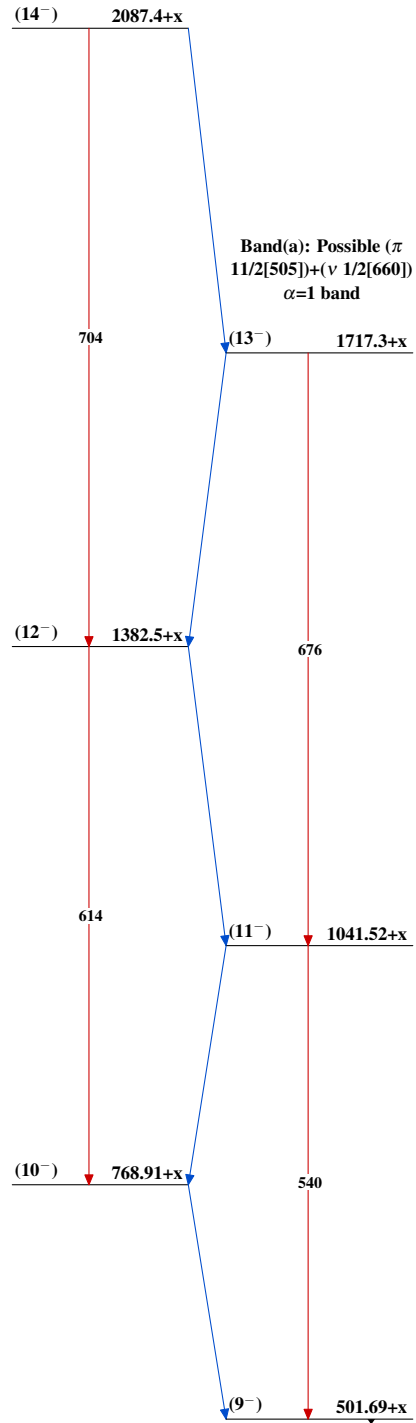
Legend

- \longrightarrow $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
 \longrightarrow $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
 \longrightarrow $I_\gamma > 10\% \times I_\gamma^{\text{max}}$



$^{112}\text{Sn}(^{60}\text{Ni},\text{pn}\gamma)$ 2007Ha45

Band(A): Possible (π
11/2[505])+(ν 1/2[660])
 $\alpha=0$ band

 $^{170}_{77}\text{Ir}_{93}$