

$^{112}\text{Sn}(^{40}\text{Ar},\text{p}3\text{n}\gamma)$ 2010Ko12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117,1 (2014)	1-Oct-2013

Includes $^{114}\text{Sn}(^{40}\text{Ar},\text{p}5\text{n}\gamma)$.

$E(^{40}\text{Ar})=200, 206, 232$ MeV. Measured $E\gamma$, $I\gamma$, ce , $\gamma\gamma$, $\gamma(\theta)$, $(\text{ce})\gamma$ coin, $\gamma(t)$, $\gamma\gamma(t)$ in the in-beam and beam-off modes using the OSIRIS-II array consisting of 12 Compton suppressed HPGe detectors at the Heavy Ion Laboratory (HIL), University of Warsaw cyclotron. The conversion electrons were detected with six Si(Li) detectors located inside the chamber, in which the combination of two magnetic fields was generated to separate e^+ from e^- .

 ^{148}Ho Levels

$E(\text{level})^\dagger$	$J^\pi^\ddagger$	$T_{1/2}$	Comments
0+x	5^-	9.59 s 15	J^π : 2010Ko12 state that 6^- , as suggested in ε decay of this isomer to ^{148}Dy , is not ruled out. $T_{1/2}$: from Adopted Levels. Configuration= $\pi h_{11/2} \otimes \nu s_{1/2}^{-1}$. Configuration= $\pi h_{11/2} \otimes \nu d_{3/2}^{-1}$. Configuration= $\pi h_{11/2} \otimes \nu d_{3/2}^{-1}$. Configuration= $\pi h_{11/2} \otimes \nu (d_{3/2}^{-1} d_{5/2}^{-1})$. Configuration= $\pi h_{11/2} \otimes \nu h_{11/2}^{-1}$. $T_{1/2}$: from weighted average of 2.97 ms 49 from $108\gamma(t)$, 2.68 ms 19 from $180\gamma(t)$, 2.58 ms 21 from $321\gamma(t)$, and 2.60 ms 15 from $373\gamma(t)$ (2010Ko12).
33.0+x 8	(5^-)		
141.0+x 7	(6^-)		
321.0+x 8	7^-		
694.0+x 13	10^+	2.62 ms 18	
1645.8+x @ 13	(11)		If 11^- , configuration= $\pi h_{11/2}^3 (27/2) \otimes \nu d_{5/2}^{-1}$. 2010Ko12 list (11 ⁺) in table III, but comparison with shell-model predictions seems to suggest 11^- with above configuration.
2191.0+x # @ 14	(12)		In table V, configuration= $\pi h_{11/2}^3 27/2 \otimes \nu d_{3/2}^{-1}$, but in text on page 10, it seems that neutron hole is in $d_{5/2}$; possibly a misprint in table V.
2735.3+x # @ 14	(13)		
2885.3+x # @ 14	(14)		
3040.1+x 15	(15)		
3068.2+x # @ 15	(15)		
3168.5+x # 15	(15)		
3363.4+x @ 15	(17)		
3379.4+x 15	(16)		
3789.4+x @ 15	(18)		

† From $E\gamma$'s, assuming 0.3 keV uncertainty when $E\gamma$ stated to tenths of keV, 1 keV otherwise.

‡ From 2010Ko12.

If positive parity, then possible member of configuration= $(\pi h_{11/2}^3)_{27/2} \otimes \nu d_{5/2}^{-1}$.

@ Band(A): γ sequence based on (11).

 $\gamma(^{148}\text{Ho})$

Ratio $R=W(25^\circ)/W(90^\circ)$, angular distribution ratio; Mean uncertainty of R does not exceed 15%. The expected values are: 1.4 for the $\Delta J=2$, quadrupole transition, and 0.8 for $\Delta J=1$, dipole.

$E_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π
33	33.0+x	(5^-)	0+x	5^-
108	141.0+x	(6^-)	33.0+x	(5^-)
141	141.0+x	(6^-)	0+x	5^-

Continued on next page (footnotes at end of table)

$^{112}\text{Sn}(^{40}\text{Ar},\text{p}3\text{n}\gamma)$ **2010Ko12 (continued)** $\gamma(^{148}\text{Ho})$ (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	Comments
150.0	100 10	2885.3+x	(14)	2735.3+x	(13)	D	R=0.7.
154.8	90 9	3040.1+x	(15)	2885.3+x	(14)		
180		321.0+x	7 ⁻	141.0+x	(6 ⁻)		
182.9	82 8	3068.2+x	(15)	2885.3+x	(14)	M1+E2	R=1.0.
283.2	34 4	3168.5+x	(15)	2885.3+x	(14)	M1+E2	R=1.0.
288 [#]	≤0.74	321.0+x	7 ⁻	33.0+x	(5 ⁻)		E_γ : γ not seen, only an upper limit given.
295.2	74 8	3363.4+x	(17)	3068.2+x	(15)	Q	Mult.: E2 in 2010Ko12.
							R=1.6.
321		321.0+x	7 ⁻	0+x	5 ⁻	E2	$\alpha(\text{K})\text{exp}=0.043$ 8, $\alpha(\text{L})\text{exp} + \alpha(\text{M})\text{exp}=0.013$ 5. $\text{K}/(\text{L}+\text{M}+)=3.1$ 7.
339.3	68 7	3379.4+x	(16)	3040.1+x	(15)		
373		694.0+x	10 ⁺	321.0+x	7 ⁻	E3	$\alpha(\text{K})\text{exp}=0.065$ 10, $\alpha(\text{L})\text{exp} + \alpha(\text{M})\text{exp}=0.046$ 8. $\text{K}/(\text{L}+\text{M}+)=1.8$ 5.
426.0	34 4	3789.4+x	(18)	3363.4+x	(17)		
544.3	296 [‡] 30	2735.3+x	(13)	2191.0+x	(12)	D	R=0.8 for 544.3+545.2 doublet.
545.2	296 [‡] 30	2191.0+x	(12)	1645.8+x	(11)	D	R=0.8 for 544.3+545.2 doublet.
951.8	123 13	1645.8+x	(11)	694.0+x	10 ⁺	D,Q	R=1.2.

[†] At $E(^{40}\text{Ar})=206$ MeV.[‡] Combined intensity for 544.3+545.2 doublet.[#] Placement of transition in the level scheme is uncertain.

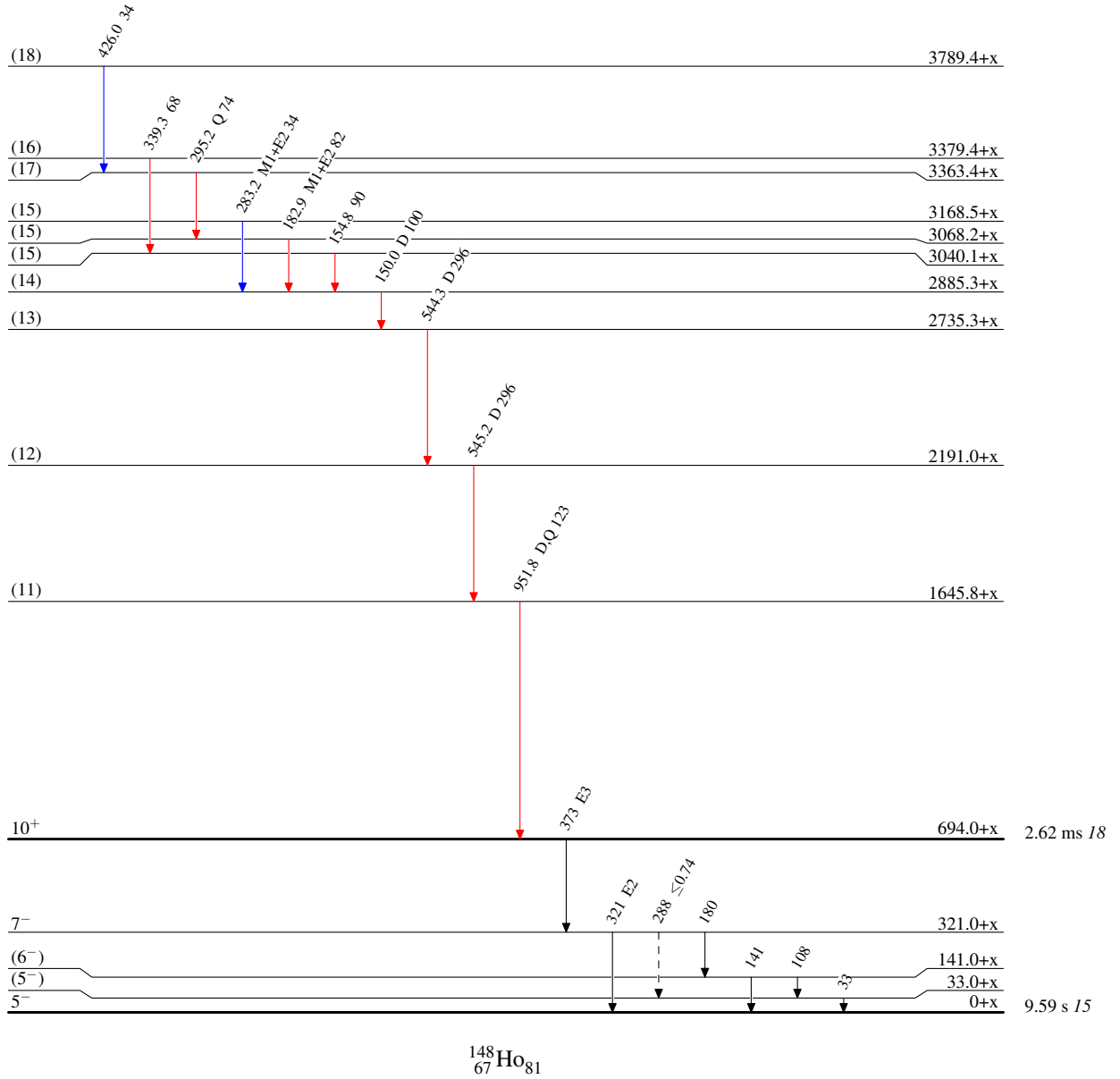
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Legend

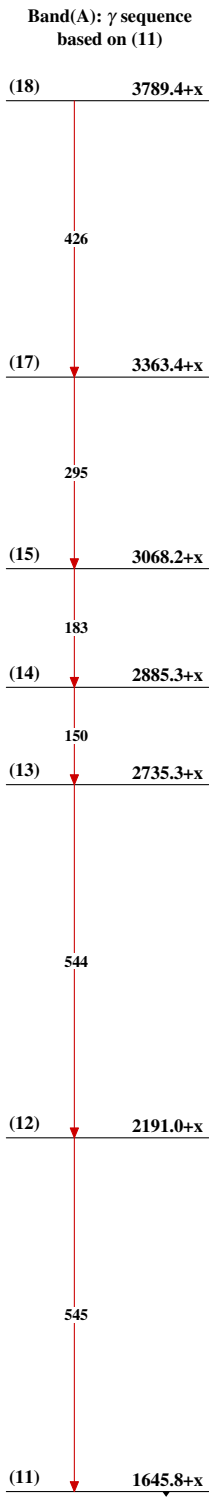
Level Scheme

Intensities: Relative I_γ

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
 $-\cdots-\cdots\longrightarrow$ γ Decay (Uncertain)



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$^{148}_{67}\text{Ho}_{81}$