

¹²⁴Sn(²⁴Mg,α3nγ) 2011Bh01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

Includes ¹³⁰Te(¹⁶O,5nγ).

2011Bh01: E(²⁴Mg)=107 MeV, Measured Eγ, Iγ, γγ, γγ(θ)(DCO) using INGA array (18 Compton-shielded clover detectors); E(¹⁶O)=80-85 MeV, measured Eγ, Iγ, γγ, γγ(θ)(DCO) using GDA array (9 Compton-shielded Ge detectors, 1 clover, 14 BGO).

2003LiZU: ¹³⁰Te(¹⁶O,5nγ) E(¹⁶O)=85 MeV; only give level scheme that generally confirms that of **2011Bh01**.

All the data are from **2011Bh01**.

¹⁴¹Nd Levels

E(level) [†]	J ^{π‡}	T _{1/2} [#]	Comments
0.0	3/2 ⁺	2.49 h 3	%ε+%β ⁺ =100
756.51 5	11/2 ⁻	62.0 s 8	%IT GE 99.95 %EC+%B+ LT 0.05 (from Adopted Levels).
2049.69 14	13/2 ⁻		Evaluator's note: There is an intensity imbalance of -15 4 at this level.
2209.40 18	15/2 ⁻		Evaluator's note: There is an intensity imbalance of -10 1 at this level.
2327.48 22	(15/2 ⁻)		
2537.49 16	15/2 ⁻		
2541.57 22	(17/2 ⁻)		
2805.48 21	17/2 ⁻		Evaluator's note: There is an intensity imbalance of -15 3 at this level.
2829.51 17	15/2 ⁻		
2886.46 17	17/2 ⁻		Evaluator's note: There is an intensity imbalance of -16 9 at this level. Imbalance may be due to missing intensity of 57-keV gamma ray.
3136.34 25	19/2 ⁻		
3223.77 24	19/2 ⁻		
3355.58 23	21/2 ⁻		
3509.7 3	23/2 ⁻		
3919.4 @ 3	21/2 ⁻		
4377.4 3	25/2 ⁻		
4493.5 3	23/2 ⁻		
4660.0 @ 4	25/2 ⁻		
5151.9 @ 4	29/2 ⁻		
5587.0 4	29/2 ⁻		
5647.7 4	27/2 ⁻		
5836.1 @ 5	33/2 ⁻		
5994.9 & 4	29/2 ⁻		
5996.1 4			
6138.9 & 5	31/2 ⁻		
6309.6 & 5	33/2 ⁻		
6559.7 & 6	35/2 ⁻		
6577.7 ^a 5	33/2 ⁻		
6767.5 ^a 6	35/2 ⁻		
6794.4 @ 5	37/2 ⁻		
7013.3 ^a 6	(37/2 ⁻)		
7039.8 & 6	37/2 ⁻		
7448.1 @ 6	41/2 ⁻		
7497.6 & 6	39/2 ⁻		
7909.7 & 7	41/2 ⁻		
8236.2 @ 6	45/2 ⁻		
8262.4 & 7	(43/2 ⁻)		

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$^{124}\text{Sn}(^{24}\text{Mg},\alpha 3n\gamma)$ **2011Bh01 (continued)**

^{141}Nd Levels (continued)

E(level) [†]	J ^π [‡]	Comments
8646.6 6		
9365.3 @ 6	49/2 ⁻	J ^π : From Table I of 2011Bh01 , not listed in authors' Fig. 1.

[†] From least-squares fit to E_γ data.

[‡] J^π values are from [2011Bh01](#) – they can differ from those in Adopted Levels, Gammas dataset.

From Adopted Levels.

@ Band(A): Band based on 21/2⁻.

& Band(B): Possible 5-qp band based on 29/2⁻. Proposed ([2011Bh01](#)) configuration= $\nu h_{11/2}^{-1} \otimes \pi (d_{5/2} g_{7/2})_6^{-2} (h_{11/2})_{10}^2$.

^a Band(C): Band based on 33/2⁻.

$\gamma(^{141}\text{Nd})$

DCO ratios correspond to angles of 99° and 153° with gates on stretched quadrupoles and dipoles. Expected values are 1.0 for stretched quadrupoles and 0.5 for stretched dipoles when gating on quadrupoles. Expected values are 2.0 for stretched quadrupoles and 1.0 for stretched dipoles when gating on dipoles. Mixed transitions will have ratios in between these values.

E _γ [†]	I _γ	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [‡]	α ^{&}	Comments
(57)		2886.46	17/2 ⁻	2829.51	15/2 ⁻			
81.0 2	7.4 8	2886.46	17/2 ⁻	2805.48	17/2 ⁻	[M1]	2.59	
116.1 2	10.7 7	4493.5	23/2 ⁻	4377.4	25/2 ⁻	M1 [#]	0.925	DCO=1.10 21
131.9 2	31.5 18	3355.58	21/2 ⁻	3223.77	19/2 ⁻	M1+E2 [#]	0.73 9	DCO=0.68 14
144.0 2	35.5 21	6138.9	31/2 ⁻	5994.9	29/2 ⁻	M1 [@]	0.504	DCO=0.56 12
154.1 2	16.4 11	3509.7	23/2 ⁻	3355.58	21/2 ⁻	M1 [@]	0.417	DCO=0.45 15
170.7 2	21.4 14	6309.6	33/2 ⁻	6138.9	31/2 ⁻	M1 [@]	0.314	DCO=0.48 15
189.8 2	11.2 8	6767.5	35/2 ⁻	6577.7	33/2 ⁻	M1+E2 [#]	0.234	DCO=0.83 16
214.1 2	9.6 6	2541.57	(17/2 ⁻)	2327.48	(15/2 ⁻)	(M1) [#]	0.1687	DCO=0.91 22
245.8 2	9.5 6	7013.3	(37/2 ⁻)	6767.5	35/2 ⁻	(M1+E2) [#]	0.108 9	DCO=0.83 24
249.9 2	89 4	3136.34	19/2 ⁻	2886.46	17/2 ⁻	M1 [@]	0.1111	DCO=0.53 8
250.1 2	20.2 16	6559.7	35/2 ⁻	6309.6	33/2 ⁻	M1+E2 [#]	0.102 9	DCO=0.85 13
277.8 2	12.1 9	2327.48	(15/2 ⁻)	2049.69	13/2 ⁻	(M1+E2) [#]	0.075 9	DCO=0.83 21
337.4 2	46.3 25	3223.77	19/2 ⁻	2886.46	17/2 ⁻	M1 [@]	0.0502	DCO=0.48 12
344.9 2	8.5 7	2886.46	17/2 ⁻	2541.57	(17/2 ⁻)			
347.2 2	67 3	5994.9	29/2 ⁻	5647.7	27/2 ⁻	M1 [#]	0.0466	DCO=0.91 14
348.9 2	88 5	2886.46	17/2 ⁻	2537.49	15/2 ⁻	M1 [@]	0.0460	DCO=0.49 8
^x 349.2	23.7 24							
352.7 2	11.7 9	8262.4	(43/2 ⁻)	7909.7	41/2 ⁻	(M1) [#]	0.0447	DCO=1.09 22
409.1 2	9.3 8	5996.1		5587.0	29/2 ⁻			
412.1 2	13.5 9	7909.7	41/2 ⁻	7497.6	39/2 ⁻	M1 [#]	0.0299	DCO=1.12 17
438.8 2	12.8 8	6577.7	33/2 ⁻	6138.9	31/2 ⁻	M1 [#]	0.026	DCO=1.01 16
457.8 2	14.6 8	7497.6	39/2 ⁻	7039.8	37/2 ⁻	M1 [#]	0.0229	DCO=0.96 17
469.0 2	7.1 7	3355.58	21/2 ⁻	2886.46	17/2 ⁻			
480.1 2	16.1 10	7039.8	37/2 ⁻	6559.7	35/2 ⁻	M1 [#]	0.0203	DCO=1.11 15
487.7 2	19.4 12	2537.49	15/2 ⁻	2049.69	13/2 ⁻	M1 [#]	0.0195	DCO=1.09 14
491.9 2	13.4 10	5151.9	29/2 ⁻	4660.0	25/2 ⁻	E2 [@]	0.01230	DCO=0.99 15
596.1 2	11.5 9	2805.48	17/2 ⁻	2209.40	15/2 ⁻	M1 [#]	0.01180	DCO=1.25 16
653.7 2	9.3 9	7448.1	41/2 ⁻	6794.4	37/2 ⁻	E2 [@]		DCO=1.14 15

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$^{124}\text{Sn}(^{24}\text{Mg},\alpha 3n\gamma)$ **2011Bh01 (continued)** $\gamma(^{141}\text{Nd})$ (continued)

E_γ^\dagger	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
684.2 2	11.4 8	5836.1	33/2 ⁻	5151.9	29/2 ⁻	E2 [@]	DCO=1.05 14
740.6 2	16.1 8	4660.0	25/2 ⁻	3919.4	21/2 ⁻	E2 [@]	DCO=1.09 14
756.51 5		756.51	11/2 ⁻	0.0	3/2 ⁺	M4	$E_\gamma, \text{Mult.}$: from Adopted Gammas.
779.8 2	18.6 12	2829.51	15/2 ⁻	2049.69	13/2 ⁻	M1+E2 [@]	DCO=0.63 13
788.1 2	8.6 8	8236.2	45/2 ⁻	7448.1	41/2 ⁻	E2 [@]	DCO=1.10 16 DCO=1.1 16 in Table I of 2011Bh01 appears to be a misprint.
836.8 2	29.1 17	2886.46	17/2 ⁻	2049.69	13/2 ⁻	E2 [#]	DCO=1.75 16
867.7 2	10.7 21	4377.4	25/2 ⁻	3509.7	23/2 ⁻	M1 [@]	DCO=0.48 15
958.3 2	9.8 9	6794.4	37/2 ⁻	5836.1	33/2 ⁻	E2 [@]	DCO=0.99 16
1021.8 2	16.1 20	4377.4	25/2 ⁻	3355.58	21/2 ⁻	E2 [#]	DCO=1.92 16
1032.9 2	17.8 13	3919.4	21/2 ⁻	2886.46	17/2 ⁻	E2 [@]	DCO=1.03 15
1129.1 2	7.0 8	9365.3	49/2 ⁻	8236.2	45/2 ⁻	E2 [@]	DCO=1.18 20
1154.2 2	71 4	5647.7	27/2 ⁻	4493.5	23/2 ⁻	E2 [@]	DCO=0.97 11
1209.6 2	12.3 7	5587.0	29/2 ⁻	4377.4	25/2 ⁻	E2 [#]	DCO=1.61 15
1293.1 2	65 3	2049.69	13/2 ⁻	756.51	11/2 ⁻	M1+E2 [#]	DCO=1.33 12
1357.2 2	82 4	4493.5	23/2 ⁻	3136.34	19/2 ⁻	E2 [@]	DCO=1.03 10
1452.9 2	1.38 10	2209.40	15/2 ⁻	756.51	11/2 ⁻		
1781.0 2	100 5	2537.49	15/2 ⁻	756.51	11/2 ⁻	E2 [@]	DCO=1.00 8
2073.0 2	24.9 15	2829.51	15/2 ⁻	756.51	11/2 ⁻	E2 [#]	DCO=2.00 14
2086.9 2	7.5 9	8646.6		6559.7	35/2 ⁻		

[†] Uncertainty of 0.2 keV is assigned on the basis of a general comment in 2011Bh01 that the uncertainty in energy is less than 0.15 keV.

[‡] From 2011Bh01 based on DCO measurements by assuming that dipole transitions are M1's, quadrupole transitions are E2's, and the D+Q are M1+E2 (only those transitions having appreciable E2 components were given). There are no E1 assignments. All transitions are stretched. These assignments can differ from those in Adopted Levels, Gammas dataset.

[#] DCO for gate on stretched dipole.

[@] DCO for gate on stretched quadrupole.

[&] 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.

^x γ ray not placed in level scheme.

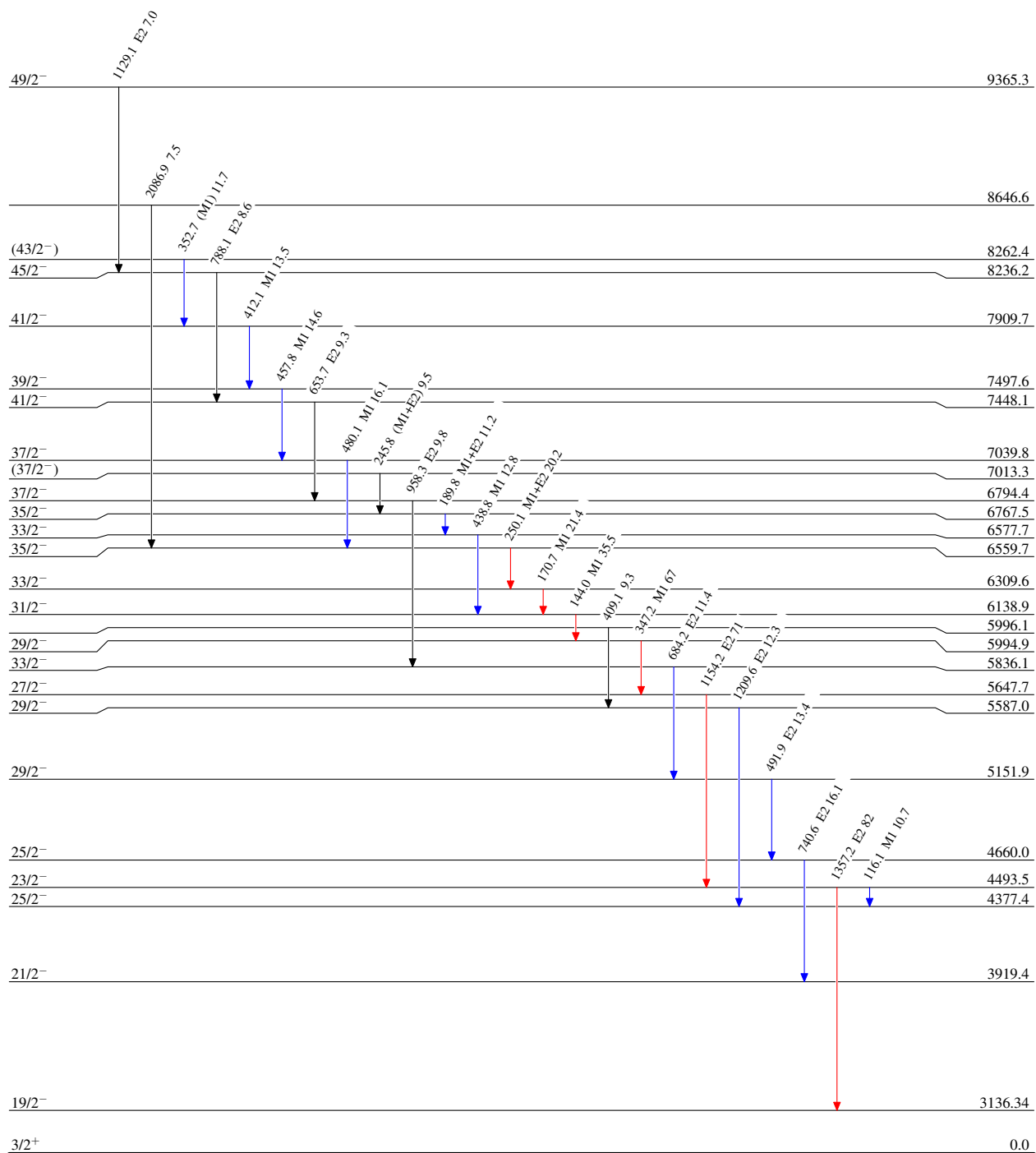
$^{124}\text{Sn}(^{24}\text{Mg},\alpha 3n\gamma)$ 2011Bh01

Level Scheme

Intensities: Relative I_γ

Legend

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



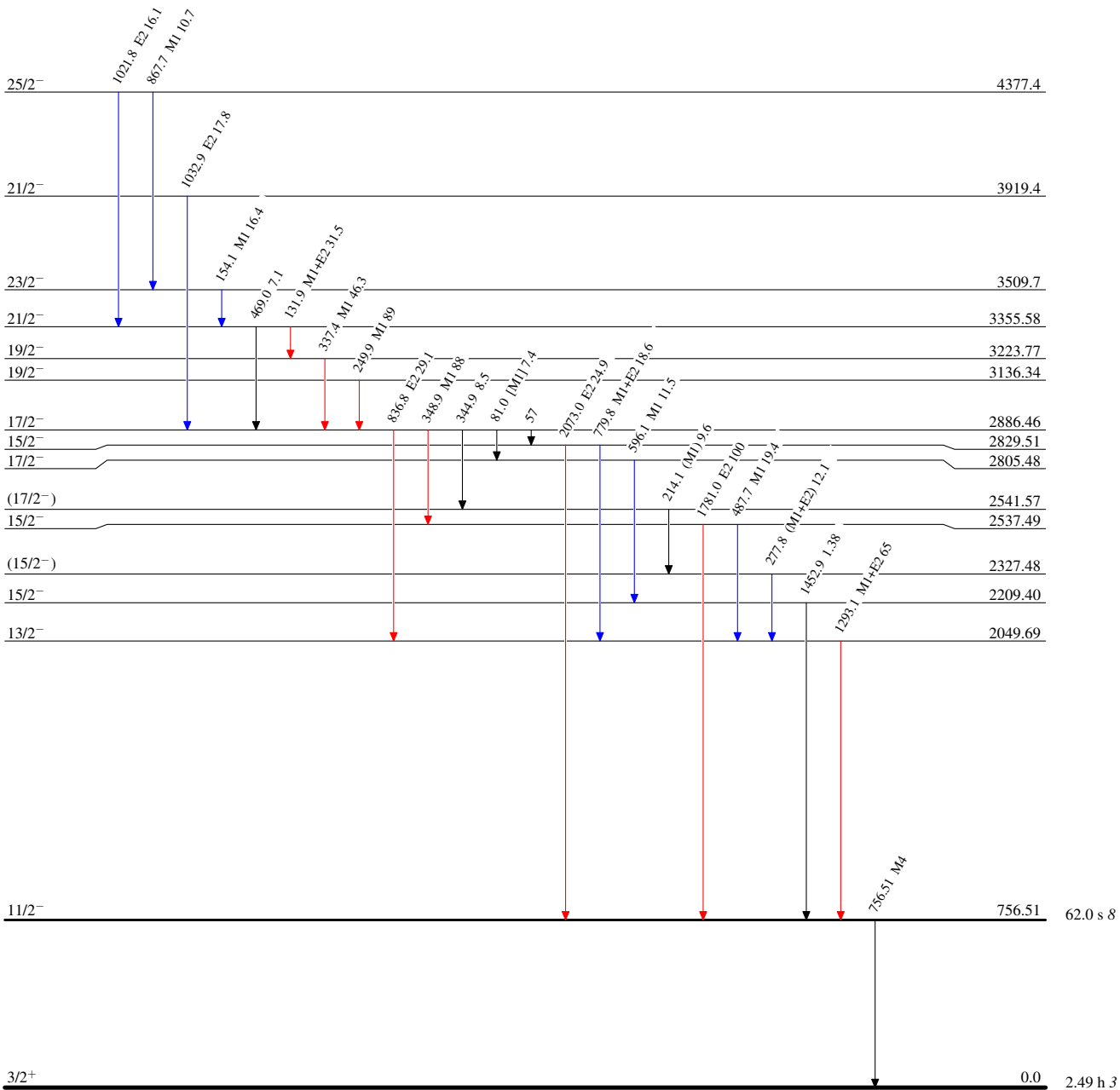
$^{124}\text{Sn}(^{24}\text{Mg},\alpha 3n\gamma)$ 2011Bh01

Level Scheme (continued)

Intensities: Relative I_γ

Legend

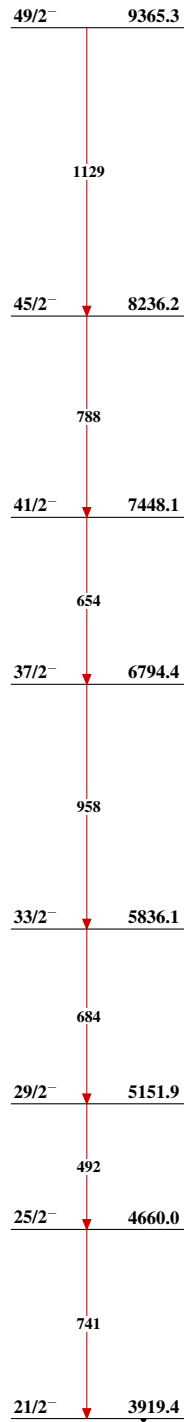
- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
- - - γ Decay (Uncertain)



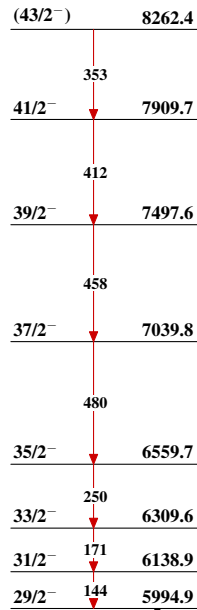
$^{141}\text{Nd}_{81}$

$^{124}\text{Sn}(^{24}\text{Mg},\alpha 3n\gamma)$ 2011Bh01

Band(A): Band based on
 $21/2^-$



Band(B): Possible 5-qp
band based on $29/2^-$



Band(C): Band based on
 $33/2^-$

