^{144}Sm(^{16}O,4nγ) 2008Li23,1981Li09

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 113, 2537 (2012)	1-Mar-2012

Additional information 1.

Unless noted otherwise, the data are from 2008Li23. These are more extensive than the earlier data from 1981Li09, but are generally consistent with them where they overlap.

2009Hu19: By the same authors as 2008Li23. A shortened version of 2008Li23, presenting primarily the conclusions from that study.

2008Li23: ^{144}Sm(^{16}O,4nγ), E(^{16}O)=102 MeV, value chosen to enhance production of ^{156}Yb relative to the neighboring nuclides. 1.2 mg/cm^2 target, enrichment not given. Reaction products recoiled into vacuum. γ radiation detected in an array of 12 HPGe detectors with BGO anti-Compton suppression and two planar HPGe detectors. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO). Level scheme discussed in terms of Cranked Woods-Saxon-Strutinsky calculations by means of total-Routhian-surface methods.

1981Li09: ^{144}Sm(^{16}O,4nγ), E(^{16}O)=80-120 MeV. Enriched (>96%) target. Measured γ singles, $\gamma\gamma$ coincidences, γ linear polarization, $\gamma(\theta)$ using Ge detectors. γ's assigned and placed from x-γ coincidences and excitation functions. Assignments confirmed from a study of the ^{113}In(^{46}Ti,p2nγ) reaction with E(^{46}Ti)=150-210 MeV (target enrichment not given).

1981Su07: Same data as 1981Li09.

^{156}Yb Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$	Comments
0.0[#]	0$^+$		
536.0[#]	2$^+$		
1143.2[#]	4$^+$		
1728.0[#]	6$^+$		
2271.8[#]	8$^+$		
2955.5[#]	10$^+$		
3027.3[@]	11$^-$	6.0 ns *5*	Probable conf is $((\nu\, i_{13/2})(\nu\, h_{9/2}))_{11-}$. T$_{1/2}$: From time distribution of γ's detected using a Ge detector following beam bursts (1981Li09).
3570.1[#]	12$^+$		
3815.1[@]	13$^-$		
4090.4[#]	14$^+$		
4474.2[@]	15$^-$		
4732.3[#]	16$^+$		
4789.2			
4974.2[@]	17$^-$		
5284.8			
5464.2[#]	18$^+$		
5574.8[@]	19$^-$		
6197.5[#]	(20$^+$)		
6221.6[@]	21$^-$		
6844.3			
7028.4[@]	23$^-$		
7403.8[@]	25$^-$		
7774.2			
8028.3			
8369.0			
8697.3			
8774.3			
8930.5			

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^{144}Sm(^{16}O,4nγ) 2008Li23,1981Li09 (continued)

^{156}Yb Levels (continued)

E(level)[†]
9245.8
9306.8
10231.9

[†] Computed by the evaluator from the listed Eγ values. No uncertainties were given for these values. Equal uncertainties were assumed in the calculation. No uncertainties are given here for the computed level energies.
[‡] From adopted values.
[#] Band(A): $K^\pi=0^+$ g.s. band.
[@] Band(B): Odd-spin, negative-parity band. Possible conf is $((\nu\ f^2_{7/2})(\pi\ h^2_{11/2}))\otimes((\nu\ i_{13/2})\ (\nu\ h_{9/2}))_{11-}$.

$\gamma(^{156}Yb)$

The DCO ratios are measured at 90° and 40° gated on ΔJ=2 transitions. DCO values >1 were generally taken to indicate stretched quadrupole transitions and values <0.8 were taken to be stretched dipole.

Eγ	Iγ	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[†]	α[‡]	Comments
71.8	21 *1*	3027.3	11$^-$	2955.5	10$^+$	E1(+M2)	0.809	I$_\gamma$: From intensity balance at the 3027.3 level. δ: From $\gamma(\theta)$ and intensity balance, 1981Li09 deduce δ=−0.07 *4*. However, the implied B(M2)(W.u.) value exceeds RUL for M2 transitions. From RUL, the magnitude of δ should be <0.004. α: Value for a pure E1 transition.
156.2	2.4 *1*	8930.5		8774.3				DCO=0.47 *9*.
184.1		7028.4	23$^-$	6844.3				
185.0		4974.2	17$^-$	4789.2				
290.0	3.3 *1*	5574.8	19$^-$	5284.8				
310.6	3.7 *2*	5284.8		4974.2	17$^-$	E2		
315.0		4789.2		4474.2	15$^-$			
315.3		9245.8		8930.5				
370.4	1.5 *3*	7774.2		7403.8	25$^-$			DCO=1.4 *7*.
375.4	15.4 *20*	7403.8	25$^-$	7028.4	23$^-$	E2		DCO=0.84 *6*.
405.3	3.5 *3*	8774.3		8369.0				DCO=0.8 *4*.
500.0	27.1 *7*	4974.2	17$^-$	4474.2	15$^-$	E2		DCO=1.06 *6*.
520.3	7.4 *2*	4090.4	14$^+$	3570.1	12$^+$			DCO=0.83 *15*.
536.0	100	536.0	2$^+$	0.0	0$^+$	E2		DCO=1.42 *12*.
543.8	70.9 *19*	2271.8	8$^+$	1728.0	6$^+$	E2		DCO=2.22 *15*.
584.8	89 *3*	1728.0	6$^+$	1143.2	4$^+$	E2		DCO=2.37 *11*.
600.6	24.1 *7*	5574.8	19$^-$	4974.2	17$^-$	E2		DCO=1.20 *22*.
607.2	95 *4*	1143.2	4$^+$	536.0	2$^+$	E2		DCO=1.86 *11*.
614.6	20.3 *4*	3570.1	12$^+$	2955.5	10$^+$			DCO=1.40 *18*.
622.7		6844.3		6221.6	21$^-$			
624.5	6.2 *14*	8028.3		7403.8	25$^-$	D		
641.9	5.3 *2*	4732.3	16$^+$	4090.4	14$^+$			DCO=0.85 *16*.
646.8	23.2 *9*	6221.6	21$^-$	5574.8	19$^-$	E2		DCO=1.85 *8*.
659.1	34.6 *6*	4474.2	15$^-$	3815.1	13$^-$	E2		DCO=1.17 *6*.
683.7	62 *6*	2955.5	10$^+$	2271.8	8$^+$	E2		DCO=1.83 *10*.
731.9	1.4 *1*	5464.2	18$^+$	4732.3	16$^+$			DCO=0.9 *7*.
733.3		6197.5	(20$^+$)	5464.2	18$^+$			
787.8	37.1 *9*	3815.1	13$^-$	3027.3	11$^-$	E2		DCO=1.37 *12* 1981Li09 list mult=(E2).
806.8	18.1 *3*	7028.4	23$^-$	6221.6	21$^-$	E2		DCO=0.97 *23*.

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^{144}Sm(^{16}O,4nγ) 2008Li23,1981Li09 (continued)

$\gamma(^{156}Yb)$ (continued)

E_γ	I_γ	E_i(level)	E_f	J^π_f
923.1		8697.3	7774.2	
925.1		10231.9	9306.8	
965.2	5.7 *5*	8369.0	7403.8	25^-
1278.5	2.8 *3*	9306.8	8028.3	

† From $\gamma(\theta)$ and linear polarization data of 1981Li09.

‡ 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.

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Level Scheme

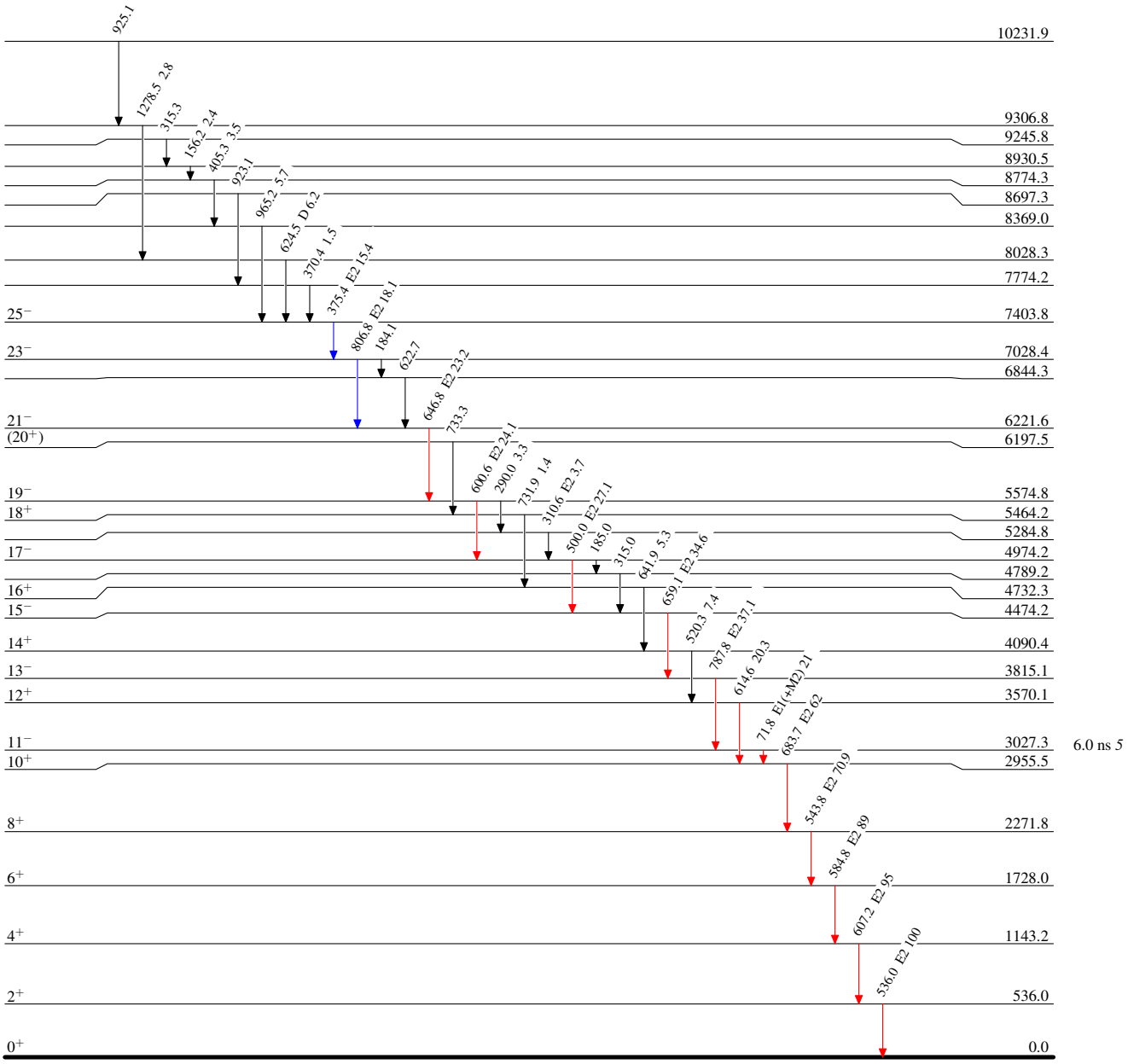
Intensities: Relative I_γ

Legend

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

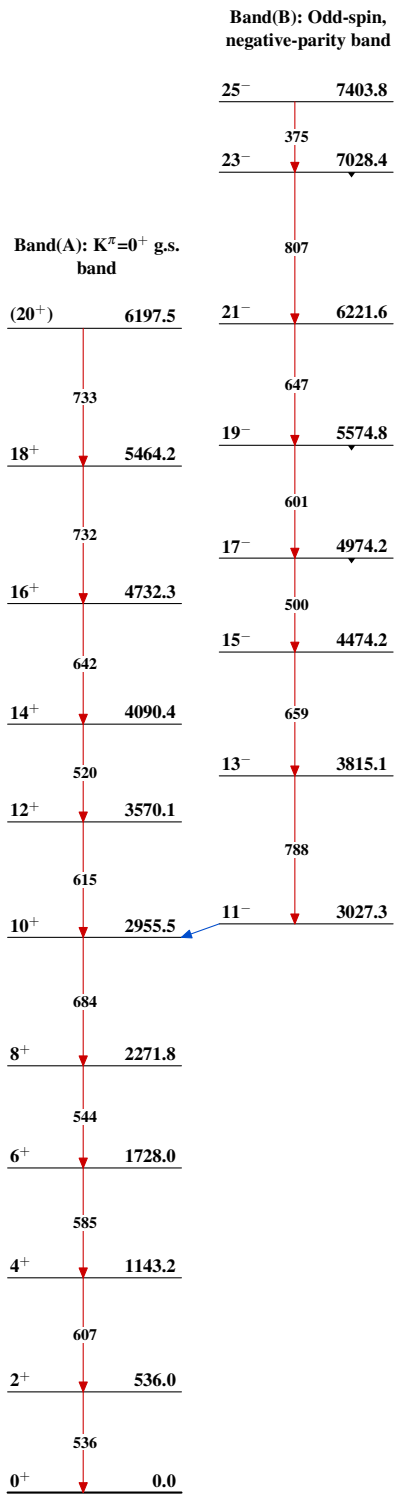
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{156}_{70}Yb_{86}$

$^{144}Sm(^{16}O,4n\gamma)$ 2008Li23,1981Li09



$^{156}_{70}Yb_{86}$