

¹²⁰Sn(⁶Li,3n γ) **1982Sh20**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

1982Sh20: E=32 MeV ⁶Li beam was produced from the Stony Brook FN tandem Van de Graaff accelerator. Target was isotopically enriched ¹²⁰Sn. γ rays were detected with Ge(Li) detectors. Measured E γ , I γ , $\gamma\gamma$ -coin, $\gamma(\theta)$, $\gamma(t)$. Deduced levels, J, π , isomer T_{1/2}, band structures, γ -ray multiplicities, mixing ratios, branching ratios. Systematics of neighboring nuclei. Comparisons with theoretical calculations. See also **1977Fo03** and **1977Go04** of the same laboratory. All data are from **1982Sh20**, unless otherwise noted.

¹²³I Levels

E(level) [†]	J π [‡]	E(level) [†]	J π [‡]	T _{1/2}
0.0 [@]	5/2 ⁺	1453.8 ^a 11	15/2 ⁻	
138.37 ^b 19	7/2 ⁺	1576.7 ^b 5	15/2 ⁽⁺⁾	
474.3 ^{&} 3	7/2 ⁺	1690.7 ^c 4	15/2 ⁺	
552.36 [@] 21	9/2 ⁺	1791.8 ^{&} 6	(15/2 ⁺)	
641.39 ^c 24	9/2 ⁺	1871.9 [@] 5	17/2 ⁺	
671.08 22	9/2 ⁺	2040.6 ^a 11	19/2 ⁻	
794.2 ^b 3	11/2 ⁺	2082.3 ^c 4	17/2 ⁽⁺⁾	
943.8 ^a 3	11/2 ⁻	2361.9 5	(19/2 ⁺)	
972.6 ^c 4	11/2 ⁺	2614.7 ^a 12	23/2 ⁻	
1080.5 ^{&} 5	11/2 ⁽⁺⁾	2660.1 6	(21/2 ⁺)	26.3 [#] ns 21
1156.5 [@] 3	13/2 ⁺	2712.5 [@] 6	21/2 ⁽⁺⁾	
1315.7 ^c 4	13/2 ⁺	3513.0 ^a 12	(27/2 ⁻)	

[†] From a least-squares fit to γ -ray energies.

[‡] From Adopted Levels. The assignments by **1982Sh20** based on $\gamma(\theta)$ are the same except that some assignments are placed inside parentheses when considered in Adopted Levels due to lack of firm evidence.

[#] From mean lifetime=38 ns 3 from 298.2 $\gamma(t)$, 671.2 $\gamma(t)$ and 503.1 $\gamma(t)$ in **1982Sh20**. Note apparent error in the value of T_{1/2}=24.3 ns 20 quoted in figure 3 (**1982Sh20**).

[@] Band(A): 2d_{5/2} band (decoupled).

[&] Band(B): 2d_{5/2} band (nonaligned).

^a Band(C): 1h_{11/2} band.

^b Band(D): 1g_{7/2} band.

^c Band(E): 9/2[404] Nilsson state.

$\gamma(^{123}\text{I})$

E γ [†]	I γ [†]	E _i (level)	J π _i	E _f	J π _f	Mult. [‡]	δ [‡]	Comments
138.4 3	102 10	138.37	7/2 ⁺	0.0	5/2 ⁺	D+Q	-0.15 5	A ₂ =-0.25 2.
272.6 3	100 10	943.8	11/2 ⁻	671.08	9/2 ⁺	D		A ₂ =-0.16 3, A ₄ =-0.03 3.
298.2 3	11 1	2660.1	(21/2 ⁺)	2361.9	(19/2 ⁺)	(D,Q)		A ₂ =+0.24 12, A ₄ =+0.06 16. Mult.: not given in 1982Sh20 , proposed by the evaluator from $\gamma(\theta)$.
331.2 3	117 12	972.6	11/2 ⁺	641.39	9/2 ⁺	D+Q	+0.25 4	A ₂ =+0.12 4, A ₄ =-0.01 4.
343.2 3	45 5	1315.7	13/2 ⁺	972.6	11/2 ⁺	D+Q	+0.20 3	A ₂ =+0.06 3, A ₄ =0.00 3.
362.3 3	10 1	1156.5	13/2 ⁺	794.2	11/2 ⁺	D+Q	-0.43 10	A ₂ =-0.73 9, A ₄ =-0.03 12.
375.0 3	47 5	1690.7	15/2 ⁺	1315.7	13/2 ⁺	D+Q	+0.15 3	A ₂ =0.0 4, A ₄ =+0.06 4.
391.5 [@] 3	28 [@] 7	943.8	11/2 ⁻	552.36	9/2 ⁺			A ₂ =-0.08 3, A ₄ =+0.01 4 for doublet.

Continued on next page (footnotes at end of table)

$^{120}\text{Sn}(^6\text{Li},3n\gamma)$ **1982Sh20** (continued) $\gamma(^{123}\text{I})$ (continued)

E_γ^\dagger	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	δ^\ddagger	Comments
391.5 [@] 3	38 [@] 17	2082.3	17/2 ⁽⁺⁾	1690.7	15/2 ⁺			$A_2=-0.08$ 3, $A_4=+0.01$ 4 for doublet.
414.0 3	89 9	552.36	9/2 ⁺	138.37	7/2 ⁺	D+Q	-0.40 10	$A_2=-0.49$ 3, $A_4=-0.03$ 3.
474.3 3	59 6	474.3	7/2 ⁺	0.0	5/2 ⁺	D+Q	-0.9 4	$A_2=-0.50$ 3, $A_4=-0.03$ 3.
503.1 3	64 6	641.39	9/2 ⁺	138.37	7/2 ⁺	D+Q	-0.33 10	$A_2=-0.46$ 6, $A_4=0.00$ 7.
510 1		1453.8	15/2 ⁻	943.8	11/2 ⁻			
532.6 3	31 3	671.08	9/2 ⁺	138.37	7/2 ⁺	D		$A_2=-0.25$ 4, $A_4=+0.09$ 5.
552.4 3	51 5	552.36	9/2 ⁺	0.0	5/2 ⁺	Q		$A_2=0.33$ 5, $A_4=-0.05$ 6.
574.1 3	41 4	2614.7	23/2 ⁻	2040.6	19/2 ⁻	Q		$A_2=+0.28$ 8, $A_4=-0.06$ 10.
586.8 3	63 7	2040.6	19/2 ⁻	1453.8	15/2 ⁻	Q		$A_2=+0.34$ 4, $A_4=-0.06$ 5.
604.1 3	86 9	1156.5	13/2 ⁺	552.36	9/2 ⁺	Q		$A_2=+0.30$ 5, $A_4=-0.02$ 5.
606.2 3	36 4	1080.5	11/2 ⁽⁺⁾	474.3	7/2 ⁺	Q		$A_2=+0.24$ 4, $A_4=-0.03$ 5.
641.3 3	57 6	641.39	9/2 ⁺	0.0	5/2 ⁺	Q		$A_2=+0.28$ 6, $A_4=-0.05$ 6.
655.9 3	69 7	794.2	11/2 ⁺	138.37	7/2 ⁺	Q		$A_2=+0.32$ 3, $A_4=-0.04$ 4.
671.1 [#] 3	104 25	671.08	9/2 ⁺	0.0	5/2 ⁺	Q		$A_2=+0.16$ 4, $A_4=-0.03$ 4.
671.2 3	126 13	2361.9	(19/2 ⁺)	1690.7	15/2 ⁺			$A_2=+0.16$ 4, $A_4=-0.03$ 4 for doublet.
674.3 3	17 2	1315.7	13/2 ⁺	641.39	9/2 ⁺	Q		$A_2=+0.16$ 10, $A_4=-0.03$ 13.
711.3 3	25 3	1791.8	(15/2 ⁺)	1080.5	11/2 ⁽⁺⁾	(Q)		$A_2=+0.38$ 5, $A_4=-0.04$ 7.
715.4 [#] 3	65 7	1871.9	17/2 ⁺	1156.5	13/2 ⁺	Q		$A_2=+0.34$ 4, $A_4=-0.07$ 4.
718.1 3	12 1	1690.7	15/2 ⁺	972.6	11/2 ⁺	Q		$A_2=+0.28$ 10, $A_4=+0.03$ 13.
766.6 3	5.0 5	2082.3	17/2 ⁽⁺⁾	1315.7	13/2 ⁺	(Q)		$A_2=+0.37$ 6, $A_4=-0.10$ 8.
782.5 3	38 4	1576.7	15/2 ⁽⁺⁾	794.2	11/2 ⁺	Q		$A_2=+0.29$ 44, $A_4=-0.10$ 5.
840.6 3	35 4	2712.5	21/2 ⁽⁺⁾	1871.9	17/2 ⁺	(Q)		$A_2=+0.24$ 5, $A_4=-0.09$ 6.
898.3 3	14 1	3513.0	(27/2 ⁻)	2614.7	23/2 ⁻	Q		$A_2=+0.18$ 12, $A_4=-0.14$ 12.

[†] From 1982Sh20. Intensities are normalized to $I(272.6\gamma)=100$.

[‡] From $\gamma(\theta)$ in 1982Sh20, unless noted otherwise.

[#] Doublet, evidence and I_γ from $\gamma\gamma$.

[@] Multiply placed with intensity suitably divided.

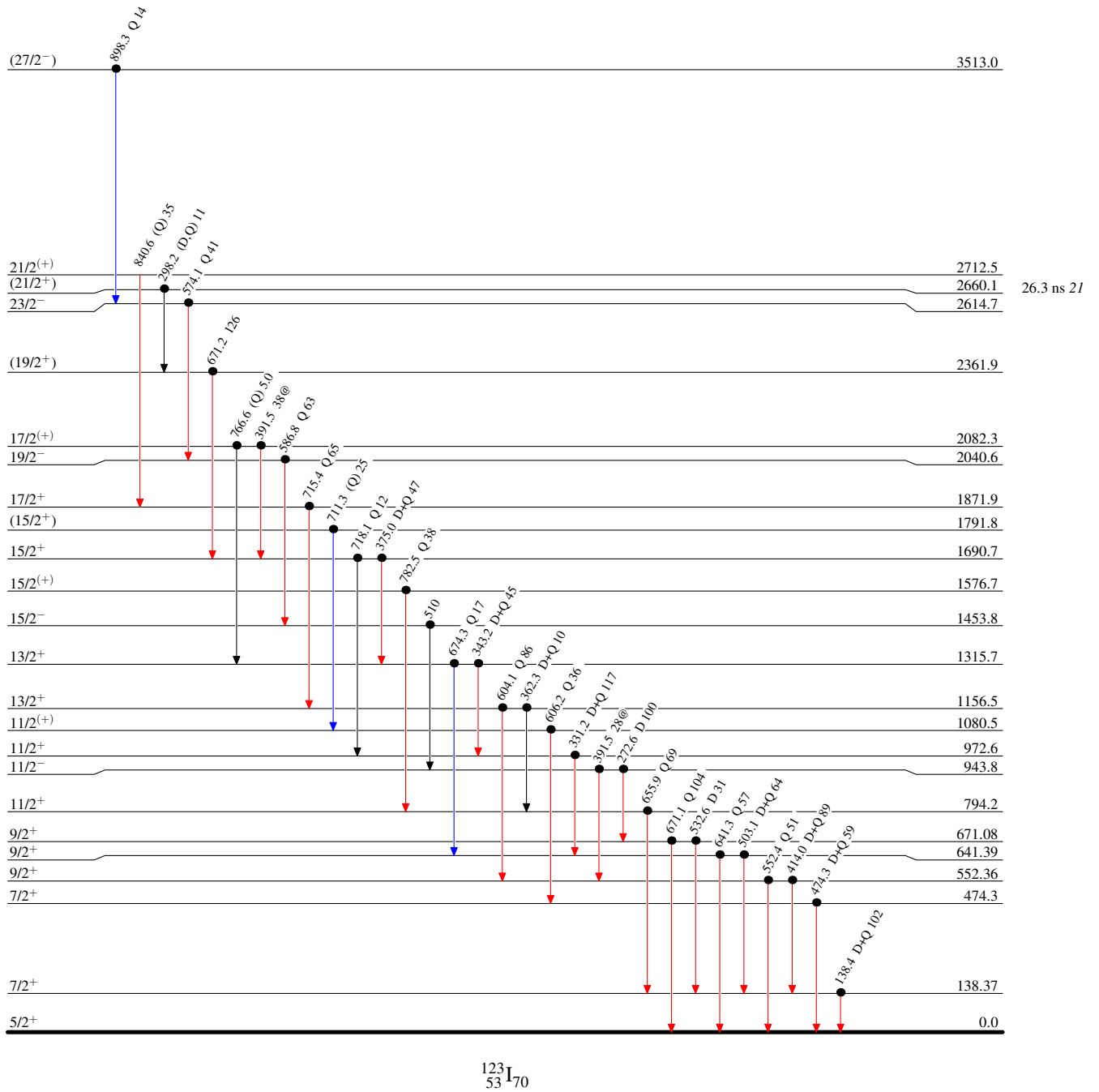
$^{120}\text{Sn}(^6\text{Li},3n\gamma)$ 1982Sh20

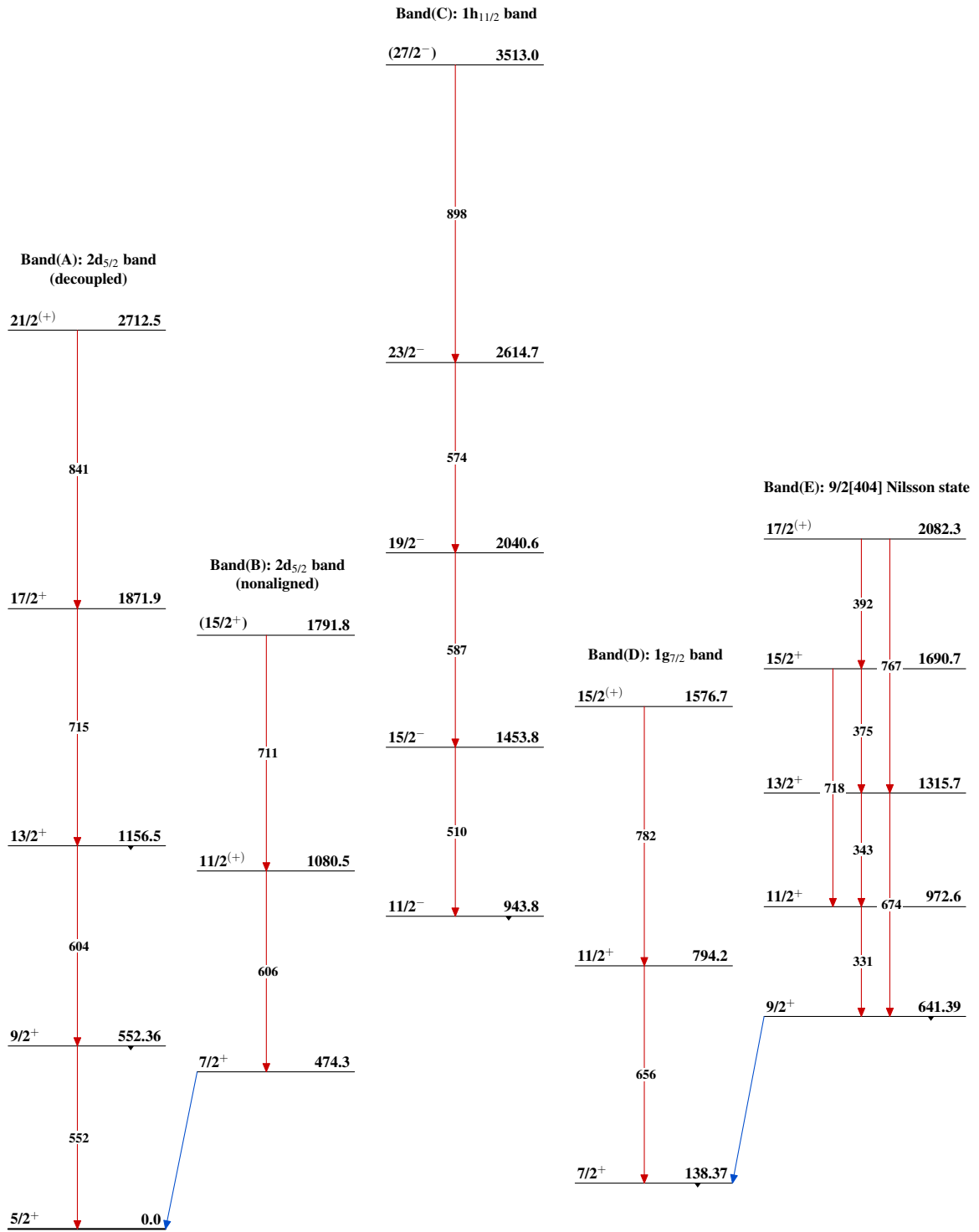
Level Scheme

Intensities: Relative I_γ
 @ Multiply placed: intensity suitably divided

Legend

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



$^{120}\text{Sn}(^6\text{Li},3n\gamma)$ 1982Sh20 $^{123}_{53}\text{I}_{70}$