

(HI,xn γ) [1994Ca04](#),[1978Fo09](#),[1976To02](#)

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Ota and E. A. Mccutchan	NDS 203,1 (2025)	1-Apr-2025

[1994Ca04](#): $^{10}\text{B}(^{40}\text{Ca},\text{n}2\text{p}\gamma)$ reaction with $E(^{40}\text{Ca})=150$ MeV. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coincidences, angular anisotropies using Daresbury 0° recoil separator and 19 HPGe detectors (4 rings at 40° , 101° , 117° , and 143° to the beam direction).

[1973BI11](#): $^{40}\text{Ca}(^{10}\text{B},\text{n}2\text{p}\gamma)$ with $E(^{10}\text{B})=25$ MeV. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coincidences and $\gamma(\theta)$, $\theta=0^\circ-90^\circ$, in 30° steps. Deduced $T_{1/2}$ using RDM and DSAM. Authors also report data from $^{47}\text{Ti}(\text{p},\text{n}\gamma)$, see that dataset for details. Also, same data are presented in [1973SiXO](#).

[1976To02](#): $^{31}\text{P}(^{19}\text{F},\text{p}2\text{n}\gamma)$ with $E(^{19}\text{F})=47$ MeV. Measured $T_{1/2}$ using plunger device and Recoil Distance Method (RDM).

[1978Fo09](#): $^{24}\text{Mg}(^{32}\text{S},2\alpha\text{p}\gamma)$ with $E(^{32}\text{S})=110$ MeV. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coincidences, $\gamma(\theta)$, and γ -excitation function.

 ^{47}V Levels

$E(\text{level})^\dagger$	J^π	$T_{1/2}^\ddagger$	Comments
0.0 ^a	$3/2^-$		
87.7 ^a 4	$5/2^-$	0.85 [@] ns 11	
145.8 ^a 4	$7/2^-$	0.44 [@] ns 9	
259.5 ^b 4	$3/2^+$	62 ps 9	
660.2 ^b 4	$5/2^+$	2.8 ps 19	J^π : $\gamma(\theta)(660\gamma)$ excludes $J=1/2, 3/2$ (1973BI11).
1138.1 ^b 4	$7/2^+$	1.7 ps 14	J^π : $\gamma(\theta)(1050\gamma)$ excludes $3/2$. $\gamma(\theta)(879\gamma)$ and feeding of state suggests $J=7/2$ (1973BI11).
1272 ^a	$9/2^-$		
1294.1 ^a 6	$11/2^-$	1.4 ps 7	
1747 ^b	$9/2^+$		
2416 ^b	$11/2^+$		
2558 ^a	$13/2^-$		
2614.1 ^a 7	$15/2^-$	<1.4 ^{&} ps	
3272 ^b	$13/2^+$		
3955 ^b	$15/2^+$		
4132.0 ^a 9	$19/2^-$		
5001 ^b	$17/2^+$		
5886 ^b	$(19/2^+)$		
5905.5 ^a 11	$(23/2^-)$		
6392.5? 24			
6871 ^b	$21/2^+$		
7400 ^a	$25/2^-$		
7884 ^a	$27/2^-$		
10003 ^a	$31/2^-$		

[†] From least-squares fit to $E\gamma$ ($\Delta E_\gamma=1$ assumed where not given), by evaluators.

[‡] From RDM (not corrected for feeding times) ([1973BI11](#)), except as noted.

As proposed by [1994Ca04](#) based on $\gamma\gamma(\theta)$ and band assignments.

@ From RDM ([1976To02](#)). $T_{1/2}$ (88-keV state) corrected for feeding by the 58 γ . Uncertainties include deorientation effects; maximum $\Delta T_{1/2}$ from these effects ranged from 2% to 5%.

& From comparison of DSA(1320 γ) with that for the 1149 γ from 1295-keV state ([1973BI11](#)).

^a Band(A): Ground state band.

^b Band(B): Positive-parity side band ([1994Ca04](#)).

(HI,xn γ) **1994Ca04,1978Fo09,1976To02** (continued)

$\gamma(^{47}\text{V})$							Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^{\dagger\ddagger}$	E_f	J_f^π	Mult. [#]	
87.7	5/2 ⁻	87.7 5	100	0.0	3/2 ⁻		Mult.: A=1.44 2 (1994Ca04).
145.8	7/2 ⁻	57.9 5	99.8 5	87.7	5/2 ⁻	D	I_γ : only the unshifted peak was analyzed by 1976To02 due to the presence of another strong line near the shifted peak.
		146.0 5	0.2 5	0.0	3/2 ⁻	Q	Mult.: A=1.4 2 (1994Ca04).
259.5	3/2 ⁺	172.2 6	11 1	87.7	5/2 ⁻		
		259.4 5	89 1	0.0	3/2 ⁻	D	Mult.: A=1.0 1 (1994Ca04).
660.2	5/2 ⁺	400.8 5	29.8 @ 8	259.5	3/2 ⁺	D	Mult.: A=0.85 2 (1994Ca04).
		514	19	145.8	7/2 ⁻		I_γ : from $I_\gamma(514\gamma)/I_\gamma(660\gamma)=0.50$ and $I_\gamma(660\gamma)=48\%$.
		572.5 5	12.1 @ 12	87.7	5/2 ⁻		Mult.: A=1.48 9 (1994Ca04), $\Delta J=0$ transition.
		660.1 5	38.7 @ 8	0.0	3/2 ⁻	D	Mult.: A=0.98 4 (1994Ca04).
1138.1	7/2 ⁺	478.0 5	30 & 3	660.2	5/2 ⁺	D	Mult.: A=0.82 2 (1994Ca04).
		878.6 5	33 & 4	259.5	3/2 ⁺		Mult.: A=1.09 3 (1994Ca04).
		992	5	145.8	7/2 ⁻	D+Q	I_γ : from $I_\gamma(992\gamma)/I_\gamma(1050\gamma)=0.14$ and $I_\gamma(1050\gamma)=33\%$.
							Mult.: A=1.9 4 (1994Ca04), $\Delta J=0$ transition.
		1050.0 7	31 & 5	87.7	5/2 ⁻	D	Mult.: A=0.95 3 (1994Ca04).
1272	9/2 ⁻	1126	83	145.8	7/2 ⁻	D	Mult.: A=1.15 4 (1994Ca04).
		1184	17	87.7	5/2 ⁻		
1294.1	11/2 ⁻	1148.6 5	100	145.8	7/2 ⁻	Q	Mult.: A ₂ =0.47 11, A ₄ =-0.18 12.
		1207 ^{ac}	<3	87.7	5/2 ⁻		
1747	9/2 ⁺	609	11	1138.1	7/2 ⁺		
		1087	44	660.2	5/2 ⁺	Q	Mult.: A=1.08 4 (1994Ca04).
		1601	44	145.8	7/2 ⁻	D	Mult.: A=0.92 3 (1994Ca04).
2416	11/2 ⁺	668	11	1747	9/2 ⁺	D	Mult.: A=0.70 4 (1994Ca04).
		1145	3	1272	9/2 ⁻		
		1277	86	1138.1	7/2 ⁺	Q	Mult.: A=1.3 1 (1994Ca04).
2558	13/2 ⁻	1264	38	1294.1	11/2 ⁻		Mult.: A=1.5 2 (1994Ca04), inconsistent with $\Delta J=1$ from J^π assignments.
							Mult.: A=1.4 2 (1994Ca04).
2614.1	15/2 ⁻	1286	62	1272	9/2 ⁻	Q	
		56	≈ 2	2558	13/2 ⁻		
		1320.1 5	98	1294.1	11/2 ⁻	Q	Mult.: A ₂ =0.31 13, A ₄ =-0.10 16 (1978Fo09).
							Mult.: A=1.21 1 (1994Ca04).
		1343 ^{ac}	<3	1272	9/2 ⁻		
3272	13/2 ⁺	856	15	2416	11/2 ⁺		
		1524	79	1747	9/2 ⁺	Q	Mult.: A=1.39 4 (1994Ca04).
		1978 ^b	6 ^b	1294.1	11/2 ⁻		
3955	15/2 ⁺	683	8	3272	13/2 ⁺		
		1539	92	2416	11/2 ⁺	Q	Mult.: A=1.52 5 (1994Ca04).
4132.0	19/2 ⁻	1518.0 5	100	2614.1	15/2 ⁻	Q	Mult.: A ₂ =0.18 18, A ₄ =-0.13 22 (1978Fo09).
							Mult.: A=1.39 2 (1994Ca04).
5001	17/2 ⁺	1729	77	3272	13/2 ⁺	Q	Mult.: A=1.40 9 (1994Ca04).
		2387	33	2614.1	15/2 ⁻		
5886?	(19/2 ⁺)	1931 ^c	100	3955	15/2 ⁺	Q	Mult.: A=1.33 6 (1994Ca04).
5905.5	(23/2 ⁻)	1774.0 10	100	4132.0	19/2 ⁻	Q	I_γ : not reported by 1978Fo09 since line was obscured by a ^{28}Si 1779 γ .
							Mult.: A=1.39 2 (1994Ca04).
6392.5?		486.0 ^c 20		5905.5	(23/2 ⁻)		May correspond to 484 γ placed from 7883 state by 1994Ca04.
6871	21/2 ⁺	966	6	5905.5	(23/2 ⁻)		
		1869	94	5001	17/2 ⁺	Q	Mult.: A=1.32 6 (1994Ca04).
7400	25/2 ⁻	1495	100	5905.5	(23/2 ⁻)	D	Mult.: A=0.82 2 (1994Ca04).

Continued on next page (footnotes at end of table)

(HI,xn γ) [1994Ca04](#),[1978Fo09](#),[1976To02](#) (continued) $\gamma(^{47}\text{V})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^{\dagger\ddagger}$	E_f	J_f^π	Mult. [#]	Comments
7884	27/2 ⁻	484	44	7400	25/2 ⁻	D	Mult.: A=1.0 <i>I</i> (1994Ca04).
		1978 ^b	56 ^b	5905.5	(23/2 ⁻)	Q	Mult.: A=1.8 <i>3</i> (1994Ca04).
10003	31/2 ⁻	2119	100	7884	27/2 ⁻	Q	Mult.: A=1.39 <i>8</i> (1994Ca04).

[†] E_γ and I_γ without uncertainties are from [1994Ca04](#) (I_γ converted from relative I_γ normalized to ΣI_γ (to g.s., 88, 146)=100 to % photon branching ratios from each state by evaluators). Others are from [1973B111](#) for $E(\text{level}) < 4000$ keV and [1978Fo09](#) for $E(\text{level}) > 4000$ keV, except as noted.

[‡] % photon branching ratios from each state.

[#] From $\gamma\gamma(\theta)$ measurements in [1994Ca04](#), except where noted.

@ Renormalized by evaluators for inclusion of 514 γ .

& Renormalized by evaluator for inclusion of 992 γ .

^a Not reported by [1994Ca04](#).

^b Multiply placed with intensity suitably divided.

^c Placement of transition in the level scheme is uncertain.

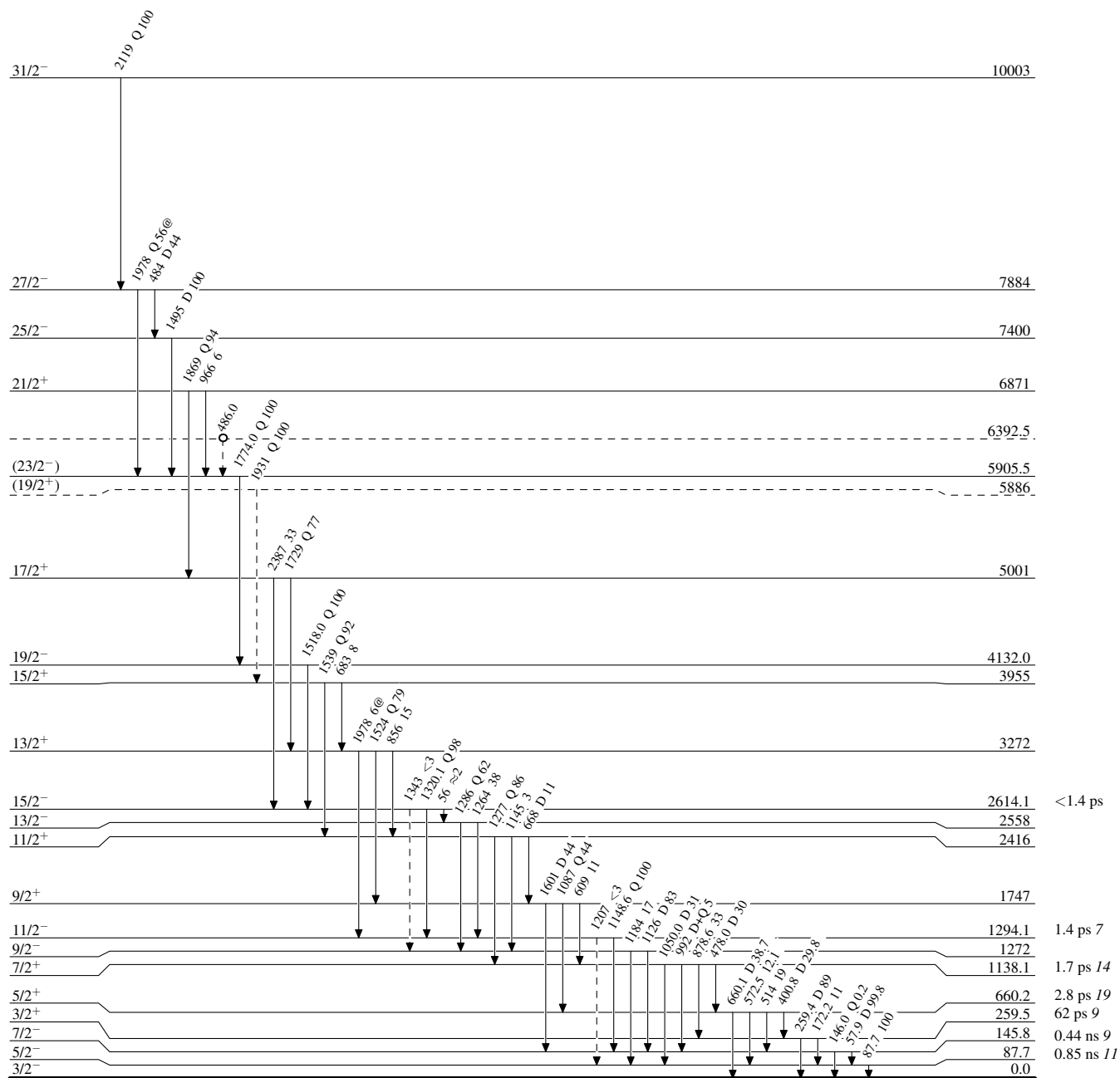
(HI,xn γ) 1994Ca04,1978Fo09,1976To02

Legend

Level Scheme

Intensities: % photon branching from each level
 @ Multiply placed: intensity suitably divided

-----► γ Decay (Uncertain)
 ● Coincidence
 ○ Coincidence (Uncertain)



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