^{181}Ta(^{20}Ne,6nγ) 2012Pa18,1996Cl01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong and Kang Mengxiao	NDS 121, 395 (2014)	1-Mar-2014

1996Cl01: E=123 MeV. Measured Eγ, Iγ, $\gamma\gamma\gamma$ with EUROGAM array (36 Compton suppressed detectors). Deduced SD band.
2012Pa18: ^{20}Ne beam at E=130 MeV from the K130 cyclotron. Target=14.5 mg/cm^2 ^{181}Ta. Gamma rays were detected by the INGA array consisting of eight clover HPGe detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma(\theta)$, DCO, $\gamma\gamma$(lin pol). Deduced levels J, π, configurations, bands, multipolarity. Comparison with total Routhian surfaces (TRS) using the Woods-Saxon potential. Systematics of level energies in odd-odd Bi nuclei and even-even Pb nuclei.

^{195}Bi Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[a]	Comments
0.0	(9/2$^-$)		J$^\pi$: from Adopted Levels.
886.70[@] *10*	13/2$^+$	32 ns *2*	
1230.39[@] *14*	15/2$^+$[#]		
1537.8 *4*	17/2$^{(+)}$[#]		
1621.83[@] *22*	17/2$^+$[#]		
2043.59[@] *22*	19/2$^+$[#]		
2194.3 *3*	23/2$^+$[#]	80 ns *10*	
2309.2 *5*	25/2$^{(-)}$[#]		
2395.5? *5*	29/2$^{(-)}$		T$_{1/2}$: this level may correspond to 750 ns *50* isomer listed at 2311.4+x in Adopted level.
2465.20[@] *24*	(21/2$^+$)[#]		
2922.6[@] *7*	(23/2$^+$)[#]		
y[&]	J		
261.5+y[&] *5*	J+2		
562.9+y[&] *7*	J+4		
904.8+y[&] *9*	J+6		
1285.5+y[&] *10*	J+8		
1706.1+y[&] *12*	J+10		
2164.0+y[&] *13*	J+12		
2659.0+y[&] *16*	J+14		

[†] From least-squares fit to Eγ data.
[‡] From least-squares fit to transition Eγ's with SD band by using rotational model, except as noted.
[#] From $\gamma(\theta)$ and or band structure.
[@] Band(A): $\pi i_{13/2}$ g.s. band (2012Pa18).
[&] Band(B): SD band (1996Cl01). Percent population ≤0.7 (1996Cl01) relative to 888γ (g.s. transition from 13/2$^+$). Band is expected to be band on favored (α=−1/2) signature of quasi-proton orbital [651]1/2(i11/2) (1996Cl01).
[a] From Adopted Levels.

γ(^{195}Bi)

DCO values are for gate on 886.7, ΔJ=2, M2 transition unless otherwise specified. Expected DCO values are: 1.84 for ΔJ=1, dipole when gated by ΔJ=2, quadrupole transition.

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^{181}Ta(^{20}Ne,6nγ) 2012Pa18,1996Cl01 (continued)

$\gamma(^{195}Bi)$ (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	Comments
86.3 *2*	9.3 *15*	2395.5?	$29/2^{(-)}$	2309.2	$25/2^{(-)}$	E2	12.61 *23*	α(L)=9.36 *17*; α(M)=2.49 *5*; α(N)=0.632 *12*; α(O)=0.1162 *21* DCO=1.04 *20*
114.9 *3*	9.7 *11*	2309.2	$25/2^{(-)}$	2194.3	$23/2^+$	E1	0.316	α(K)=0.251 *4*; α(L)=0.0496 *8*; α(M)=0.01173 *19*; α(N)=0.00295 *5* DCO=1.4 *3*
150.7 *2*	10.8 *9*	2194.3	$23/2^+$	2043.59	$19/2^+$	E2	1.269	α(K)=0.304 *5*; α(L)=0.717 *11*; α(M)=0.190 *3*; α(N)=0.0483 *8* DCO=1.08 *20*
261.5[‡] *5*	1.04[‡] *10*	261.5+y	J+2	y	J			
301.4[‡] *5*	0.93[‡] *10*	562.9+y	J+4	261.5+y	J+2			
307.4 *3*	9.6 *11*	1537.8	$17/2^{(+)}$	1230.39	$15/2^+$	(M1+E2)	0.27 *17*	α(K)=0.21 *15*; α(L)=0.049 *12*; α(M)=0.0120 *24*; α(N)=0.0031 *7* DCO=1.6 *3*
341.9[‡] *5*	1.04[‡] *10*	904.8+y	J+6	562.9+y	J+4			
343.7 *1*	48 *4*	1230.39	$15/2^+$	886.70	$13/2^+$	M1+E2	0.20 *12*	α(K)=0.15 *11*; α(L)=0.035 *11*; α(M)=0.0084 *22*; α(N)=0.0022 *6* DCO=1.24 *7* POL=−0.09 *3*.
380.7[‡] *5*	1.00[‡] *10*	1285.5+y	J+8	904.8+y	J+6			
391.3 *2*	38 *3*	1621.83	$17/2^+$	1230.39	$15/2^+$	M1+E2	0.14 *9*	α(K)=0.11 *8*; α(L)=0.024 *8*; α(M)=0.0057 *18*; α(N)=0.0015 *5* DCO=1.46 *12* POL=−0.08 *3*.
420.6[‡] *5*	0.96[‡] *10*	1706.1+y	J+10	1285.5+y	J+8			
421.6 *1*	6.1 *8*	2465.20	$(21/2^+)$	2043.59	$19/2^+$	(M1+E2)	0.12 *7*	α(K)=0.09 *6*; α(L)=0.019 *7*; α(M)=0.0046 *15*; α(N)=0.0012 *4* DCO=1.33 *18* I_γ: uncertainty of 8.0 in table I of 2012Pa18 seems a misprint.
421.7 *1*	37 *8*	2043.59	$19/2^+$	1621.83	$17/2^+$	M1+E2	0.12 *7*	α(K)=0.09 *6*; α(L)=0.019 *7*; α(M)=0.0046 *15*; α(N)=0.0012 *4* DCO=1.35 *19* POL=−0.13 *4*.
457.4 *6*	8.5 *15*	2922.6	$(23/2^+)$	2465.20	$(21/2^+)$	M1+E2	0.09 *6*	α(K)=0.07 *5*; α(L)=0.015 *6*; α(M)=0.0036 *13*; α(N)=0.0009 *4* DCO=1.6 *4*
457.9[‡] *5*	0.84[‡] *10*	2164.0+y	J+12	1706.1+y	J+10			
495[‡] *1*	0.33[‡] *8*	2659.0+y	J+14	2164.0+y	J+12			
734.7 *6*	6.7 *13*	1621.83	$17/2^+$	886.70	$13/2^+$	(E2)	0.01301	α(K)=0.00993 *14*; α(L)=0.00234 *4*; α(M)=0.000568 *8*; α(N)=0.0001450 *21*
813.6 *3*	5.7 *10*	2043.59	$19/2^+$	1230.39	$15/2^+$	(E2)	0.01054	α(K)=0.00817 *12*; α(L)=0.00180 *3*; α(M)=0.000436 *7*; α(N)=0.0001112 *16*
843.6 *4*	4.4 *13*	2465.20	$(21/2^+)$	1621.83	$17/2^+$	(E2)	0.00980	α(K)=0.00763 *11*; α(L)=0.001648 *24*; α(M)=0.000398 *6*; α(N)=0.0001015 *15*
886.7 *1*	100 *6*	886.70	$13/2^+$	0.0	$(9/2^-)$	M2	0.0648	α(K)=0.0518 *8*; α(L)=0.00991 *14*; α(M)=0.00236 *4*; α(N)=0.000606 *9* DCO=0.61 *7* POL=−0.08 *3*.

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^{181}Ta(^{20}Ne,6nγ) 2012Pa18,1996Cl01 (continued)

γ(^{195}Bi) (continued)

† From 2012Pa18, except as noted.
‡ From 1996Cl01, relative transition intensity within the band.
# 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

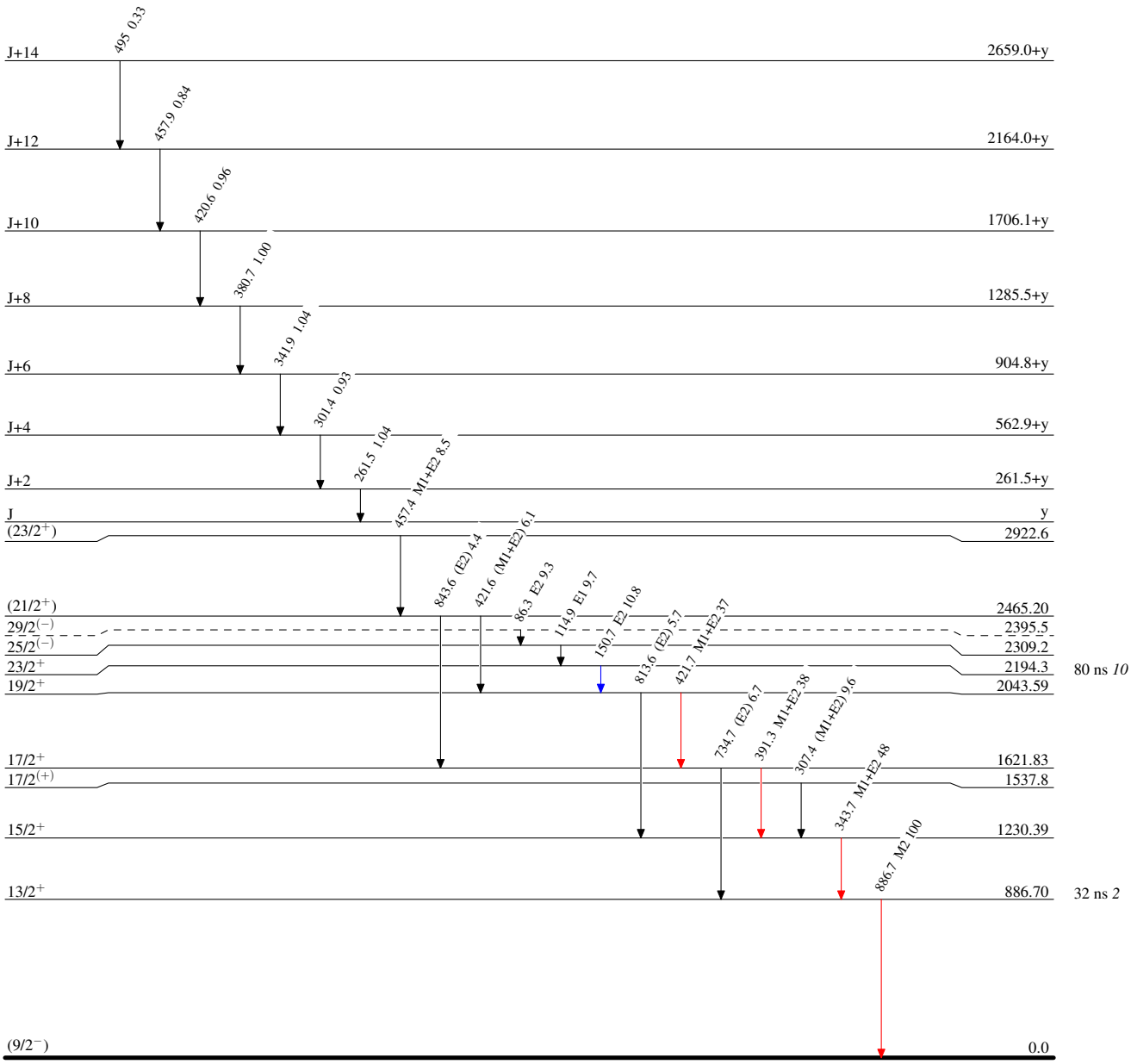
Intensities: Relative I_γ

Legend

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

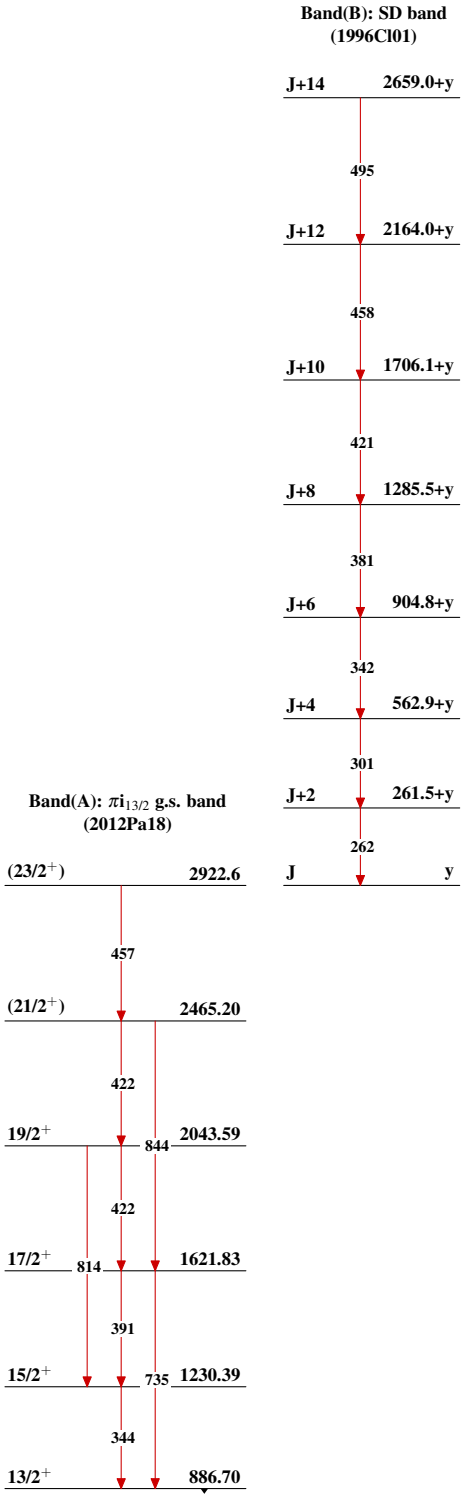
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{195}_{83}Bi_{112}$

^{181}Ta(^{20}Ne,6nγ) 2012Pa18,1996Cl01



$^{195}_{83}Bi_{112}$