(HI,xnγ)   1981Kr20,2006Zh22

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev, S. Juutinen, D. J. Hartley	NDS 150, 1 (2018)	1-Feb-2018

1981Kr20: ^{169}Tm(^{24}Mg,5nγ) E=115-135 MeV. Measured γ, γγ, γ(t), γ(θ), x rays. Isotopic assignment based on excitation function data, cross bombardments, intensity balances with daughter activities (Hg isotopes) and TL K x ray intensities.

2006Zh22 (2006Ma39): ^{157}Gd(^{35}Cl,4nγ), E=170 MeV. Target 2.0 mg/cm^2 on 6.5 mg/cm^2 Pb backing. Measured Eγ, γγ, Xγ, Iγ, and γγ(θ) using GEMINI detector array composed of 13 HPGe detectors with BGO anti-Compton shields, and 3 LOAX detectors. Detectors were placed at 90° (2), ±72° (6), and ±35° (8) relative to the beam axis.

^{188}Tl Levels

E(level)[†]	J^π[‡]	T$_{1/2}$	Comments
35 31	7$^+$	71.5 s 14	Additional information 1. T$_{1/2}$: From Adopted Levels.
303.80 20	9$^-$	41 ms 4	T$_{1/2}$: From γ(t) in 1981Kr20.
337.4[#] 5	10$^-$		
610.2[@] 5	11$^-$		
912.0[#] 5	12$^-$		
1061.7[&] 5	(12$^-$)		
1283.7[@] 6	13$^-$		
1309.7[&] 6	(13$^-$)		
1623.4[#] 6	14$^-$		
1625.0[&] 7			
1684.5 7	(14)		
1853.8[&] 8			
2010.3[@] 6	(15$^-$)		
2303.0[#] 6			

[†] From least-squares fit to Eγ and relative to E(7$^+$)=35 keV 31.

[‡] From Adopted Levels.

[#] Band(A): $\pi h_{9/2} \otimes \nu i_{13/2}$ oblate band, α=0.

[@] Band(a): $\pi h_{9/2} \otimes \nu i_{13/2}$ oblate band, α=1.

[&] Band(B): γ cascade.

γ(^{188}Tl)

E$_γ$[†]	I$_γ$[‡]	E$_i$(level)	J$_i^π$	E$_f$	J$_f^π$	Mult.[#]	Comments
33.6 4		337.4	10$^-$	303.80	9$^-$	M1	E$_γ$,Mult.: From Adopted gammas.
228.8 3	4.0 8	1853.8		1625.0			
248.0 3	23 5	1309.7	(13$^-$)	1061.7	(12$^-$)	M1(+E2)	Mult.: R=0.56 17.
268.8 2		303.80	9$^-$	35	7$^+$	M2	Mult.: α(K)exp=1.5 2 (from K x ray) in 1981Kr20.
272.5 3	100 20	610.2	11$^-$	337.4	10$^-$	M1(+E2)	Mult.: R=0.74 7.
292.3 3	≤3	2303.0		2010.3	(15$^-$)		
301.9 3	32 6	912.0	12$^-$	610.2	11$^-$	M1(+E2)	Mult.: R=0.72 10.
315.3 3	13 3	1625.0		1309.7	(13$^-$)		
339.8 3	12.0 24	1623.4	14$^-$	1283.7	13$^-$	M1(+E2)	Mult.: R=0.71 15.
371.6 3	19 4	1283.7	13$^-$	912.0	12$^-$	M1(+E2)	Mult.: R=0.73 12.
374.8 3	8.0 16	1684.5	(14)	1309.7	(13$^-$)	D	Mult.: R=0.59 20.
386.8 3	5 1	2010.3	(15$^-$)	1623.4	14$^-$		
451.3 3	51 10	1061.7	(12$^-$)	610.2	11$^-$	(M1+E2)	Mult.: R=1.12 11.

(HI,xnγ)   1981Kr20,2006Zh22 (continued)

γ(^{188}Tl) (continued)

E$_\gamma$[†]	I$_\gamma$[‡]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[#]	Comments
574.7 *3*	12.0 *24*	912.0	12$^-$	337.4	10$^-$	E2	Mult.: R=1.00 *20*.
673.3 *3*	11.0 *24*	1283.7	13$^-$	610.2	11$^-$	E2	Mult.: R=1.14 *16*.
680.1 *3*	7.0 *14*	2303.0		1623.4	14$^-$		
711.6 *3*	15 *3*	1623.4	14$^-$	912.0	12$^-$	E2	Mult.: R=1.26 *18*.
724.5 *3*	38 *8*	1061.7	(12$^-$)	337.4	10$^-$	(E2)	Mult.: R=1.34 *9*.
726.3 *3*	6.0 *12*	2010.3	(15$^-$)	1283.7	13$^-$		

[†] ΔEγ=0.1 to 0.5 keV stated by 2006Zh22, the evaluators assign 0.3 keV.
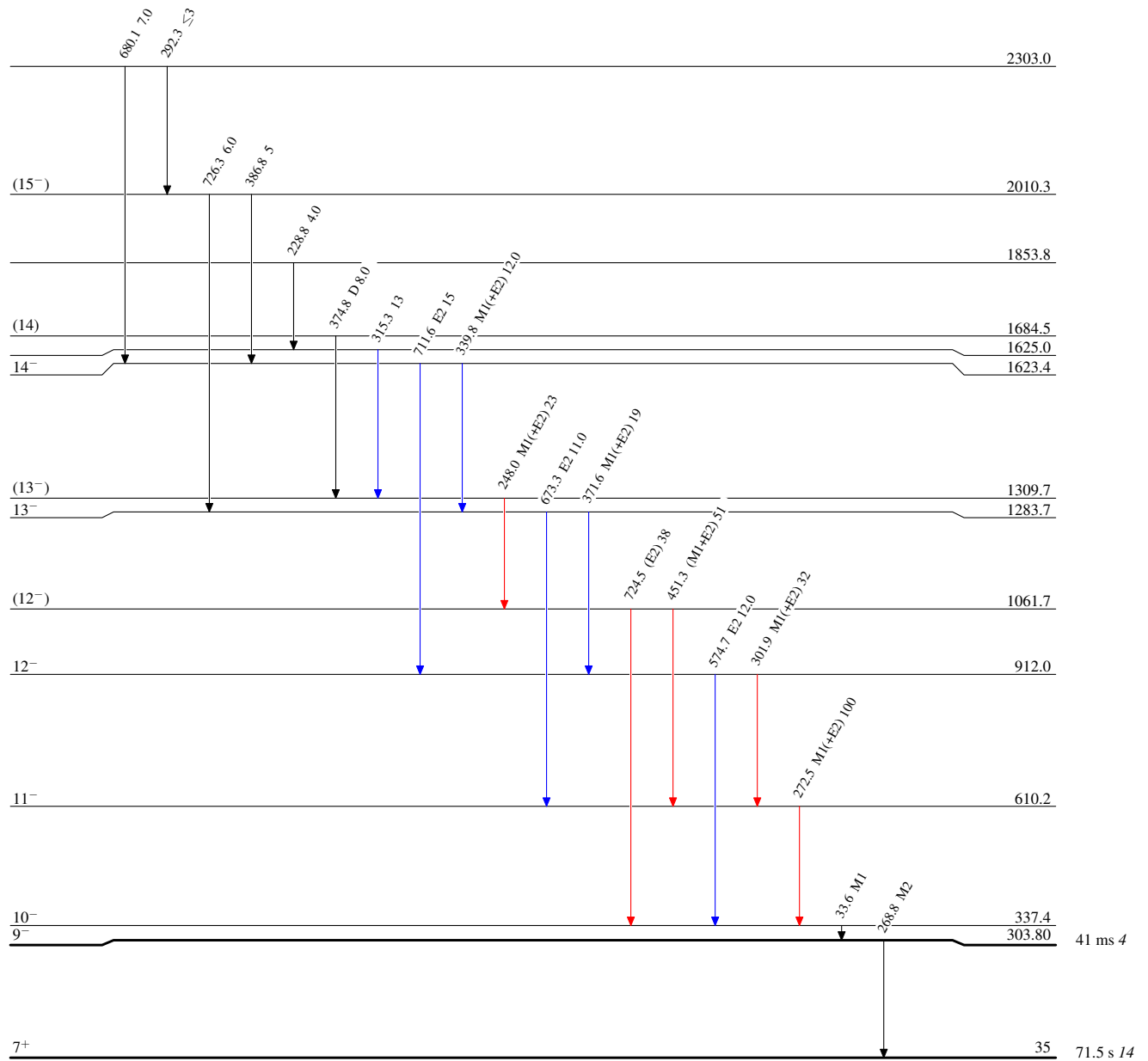
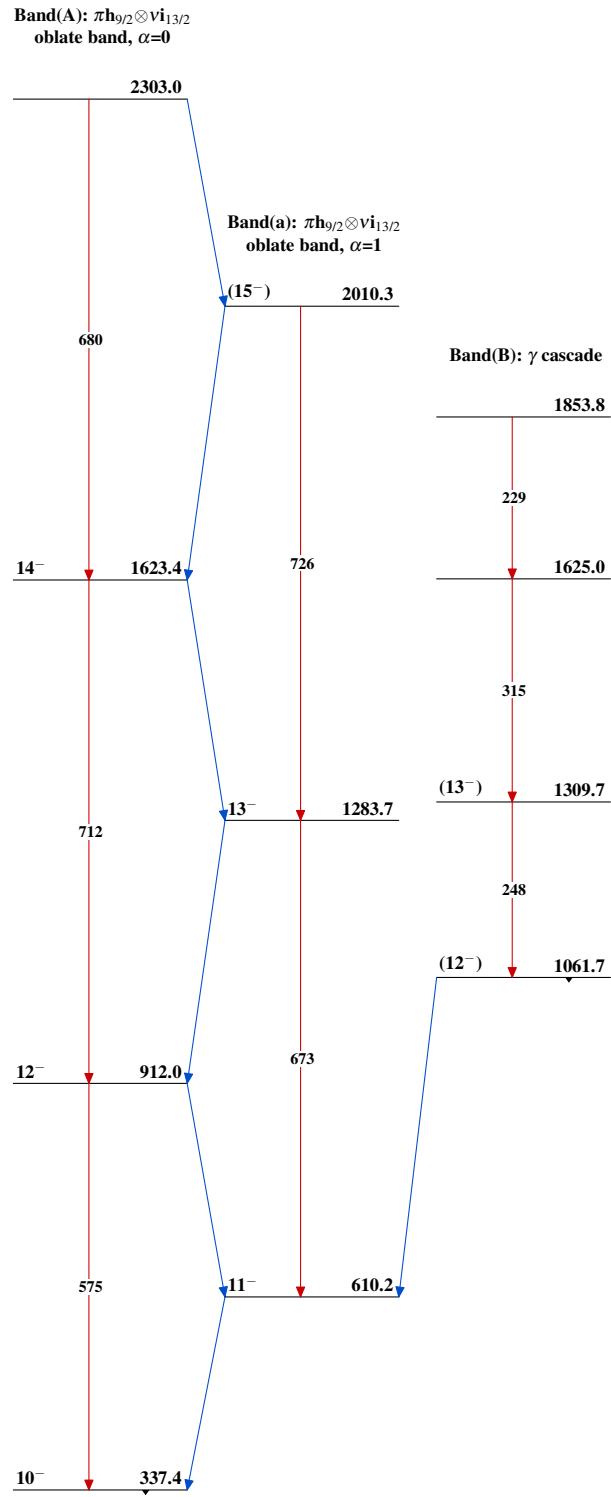[‡] Uncertainties of 10-30% stated by 2006Zh22, evaluators assign 20%.

[#] From angular distribution ratios R=I$_\gamma$(35°)/I$_\gamma$(90°) and apparent band structures. Values of 0.7 and 1.3 are expected for stretched (ΔJ=1) dipole and quadrupole (ΔJ=2) transitions, respectively.

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Legend

Level Scheme

Intensities: Relative I_γ

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

680.1 7.0
292.3 ≤3
726.3 6.0
386.8 5
228.8 4.0
374.8 D 8.0
315.3 13
711.6 E2 15
339.8 M1(+E2) 12.0
248.0 M1(+E2) 23
673.3 E2 11.0
371.6 M1(+E2) 19
724.5 (E2) 38
451.3 (M1+E2) 51
574.7 E2 12.0
301.9 M1(+E2) 32
272.5 M1(+E2) 100
33.6 M1
268.8 M2

2303.0
(15⁻)   2010.3
1853.8
(14)   1684.5
1625.0
14⁻   1623.4
(13⁻)   1309.7
13⁻   1283.7
(12⁻)   1061.7
12⁻   912.0
11⁻   610.2
10⁻   337.4
9⁻   303.80   41 ms 4
7⁺   35   71.5 s 14

$^{188}_{81}Tl_{107}$

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Band(A): $\pi h_{9/2} \otimes \nu i_{13/2}$
oblate band, $\alpha=0$

2303.0

Band(a): $\pi h_{9/2} \otimes \nu i_{13/2}$
oblate band, $\alpha=1$

(15⁻)   2010.3

680

Band(B): γ cascade

1853.8

229

1625.0

14⁻   1623.4

726

315

712

(13⁻)   1309.7

13⁻   1283.7

248

(12⁻)   1061.7

12⁻   912.0

673

575

11⁻   610.2

10⁻   337.4

$^{188}_{81}Tl_{107}$