(HI,xnγ) 2004Ek01,2007De14,2007Ks01

TypeAuthorCitationLiterature Cutoff DateFull EvaluationJun Chen, John Cameron and Balraj SinghNDS 112,2715 (2011)20-Oct-2011

2004Ek01,2005Ek01: ¹⁶O(²⁴Mg,p $\alpha\gamma$) E=60 MeV ²⁴Mg beam produced at the Legnaro National Laboratory. Target: a 0.5 mg/cm² enriched ⁴⁰Ca target with a 7 mg/cm² tantalum backing and with oxygen inside. Detectors: the GASP array of Ge detectors, the ISIS charged- particle array of 40 Δ E-E Si telescopes and a neutron detector in place of six of 80 BGO detectors. Measured E γ , I γ , $\gamma\gamma$, γ (particle)(n) coin. Deduced levels, J^{π} from measured asymmetry ratios R($\gamma(\theta)$).

- 2007De14: ²⁴Mg(¹⁶O,p $\alpha\gamma$) E=70 MeV ¹⁶O beam produced from the XTU-Tandem accelerator at Legnaro National Laboratory. Target: a 400 μ g/cm² self-supporting target of ²⁴Mg. Detectors: the GASP spectrometer of 40 Compton-suppressed HPGe detectors and a multiplicity filter of 80 BGO scintillators, in conjunction with the 4 π charged- particle detector ISIS and a neutron ring of 6 BC501A scintillators. Measured E γ , I γ , $\gamma\gamma$, $\gamma(\theta)$, γ p-coin. Deduced high-spin levels, J^{π} from the ADO ratios.
- 2007Ks01: ¹²C(²⁸Si, $p\alpha\gamma$), two different experiments: one at E=70 MeV at BARC-TIFR facility and the second at E=88 MeV at NSC facility, both using a target of about 50 μ g/cm² ¹²C on a about 10.5 mg/cm² gold backing and almost identical (INGA) arrays eight Compton-suppressed 'Clover' HPGe detectors. Measured E γ , I γ , $\gamma\gamma$, $\gamma\gamma(\theta)$ (DCO) and $\gamma\gamma($ lin pol). Deduced levels, J^{π} , mixing ratios, half-lives using Doppler Shift Attenuation Method (DSAM). Comparisons with large-scale shell-model calculations.
- 1974Va13: ²⁴Mg(¹⁶O,p $\alpha\gamma$) E=36 MeV ¹⁶O beam of 20-40 nA produced at Fysisch laboratorium in the Netherlands. Targets of 100 and 300 μ g/cm² Mg on 1 μ m Ni backings. A 125 cm³ Ge(Li) detector for detecting γ -rays. Measured E γ , I γ . Deduced half life for the level of 3.16 MeV using Recoil Distance Method (RDM).
- 1976Ke02: ²⁵Mg(¹⁶O,pn $\alpha\gamma$) E=43 and 50 MeV ¹⁶O beam produced at the Institut fur Kernphysik in Germany. A 150 μ g/cm² enriched enriched ²⁵Mg target (99.2%) evaporated onto a Au backing. Two true coaxial Ge(Li) detectors of 45 cm³ for detecting γ -rays. Measured E γ , I γ . Deduced T_{1/2} for the level of 3162 keV.
- 1976Wa11: (HI,xn γ) various reactions, E=20-60 MeV ¹⁴N beam produced at the Brookhaven National Laboratory. ²⁴Mg, ²⁶Mg, ²⁷Al targets. Ge(Li) detectors. Measured E γ , I γ , $\gamma(\theta)$, $\gamma\gamma$ -coin. Deduced levels, J^{π} , half-life using Recoil Distance Method (RDM) for ³⁵Cl and other nuclei.
- 1976Va24: ²⁴Mg(¹⁶O,p $\alpha\gamma$) E=38 and 45 MeV ¹⁶O beam of 40-100 nA produced at Fysisch laboratorium in the Netherlands. Targets of 300 μ g/cm² ²⁴Mg enriched to 99.94% evaporated onto 30 μ m Au backings. A three-crystal Ge(Li) detector for detecting γ -rays. Measured E γ , I γ , $\gamma(\theta)$, $\gamma\gamma$ -coin. Deduced levels, mixing ratios.

1982Ra25: ²⁴Mg(¹⁶O,p $\alpha\gamma$) E=40-51 MeV ¹⁶O beam produced at the Argonne National Laboratory. A target of 50 μ g/cm² layer of ²⁴Mg (>99.9%) evaporated onto a 50 μ g Au backing. A Ge(Li) detector for detecting γ -rays. Measured σ (E). Deduced levels.

1982Le04: ²⁸Si(¹²C,X) ¹²C (E_{cm}=23-35 MeV) beam produced from the University of Washington FN Tandem Van de Graaff. A target of 100 μ g/cm² ²⁸Si on a thick tantalum backing. A Ge(Li) detector. Measured σ (E), E γ . Deduced levels.

1991Ja11: ²⁷Al(¹⁶O,2 $\alpha\gamma$) E=60 MeV ¹⁶O beam produced from the 14 UD-Pelletron at TIFR. A target of 350 μ g/cm² Al evaporated onto a 1.8 mg/cm² thick Ta backing. Ge(Li) detector. Measured E γ . Deduced T_{1/2} for the levels of 3162 and 8844 keV.

³⁵Cl Levels

Others: 1979Ta03, 1985Kr21, 1986Br26, 1989De02, 1991Ra10, 2001Pi10.

E(level) [†]	Jπ&	T _{1/2} <i>ab</i>	E(level) [†]	Jπ&	T _{1/2} <i>ab</i>
0	3/2+		6119.2? [@] 13	$(11/2^{-})$	
1219.0 10			6380.8 [‡] 8		
1763.04 9	$5/2^{+}$		7873.3 <mark>8</mark> <i>3</i>	$13/2^{+}$	
2645.79 10	7/2+	<0.90 ps	8319.8 [#] <i>f</i> 5	$15/2^{-}$	<0.07 ps
3002.5 7	$5/2^{+}$		8324.4? [@] 13	$(13/2^{-})$	<0.07 ps
3162.83 9	$7/2^{-}$	30.9 [°] ps 6	8481.4? [@] 11	$(15/2^{-})$	<0.07 ps
3942.6 [@] 6	9/2+	<0.35 ps	8487.4 [#] 5	$15/2^{-}$	
4347.85 16	9/2-	0.91 ps 19	8558.3? [@] 14	$(13/2^{-})$	<0.14 ps
5407.15 ^f 18	$11/2^{-}$	<0.76 ps	8788.7 <mark>8</mark> 5	$15/2^{+}$	<0.28 ps
5926.9 <i>3</i>	$11/2^{-}$	<0.28 ps	8844.6 ⁸ 4	$17/2^{+}$	5.9 ^e ps 11
6087.41 20	$13/2^{-}$	5.3 ^d ps 10	10181.1 ^{<i>f</i>} 4	19/2-	<0.14 ps

Continued on next page (footnotes at end of table)

(HI,xnγ) 2004Ek01,2007De14,2007Ks01 (continued)

³⁵Cl Levels (continued)

E(level) [†]	J ^{π &}	$T_{1/2}^{ab}$
10222.5 11	$17/2^{-}$	<0.28 ps
10859.1 <mark>8</mark> 8	$19/2^{+}$	<0.28 ps
11459.1 ^{#g} 6	$21/2^+$	
12572.2 ^{#f} 6	$23/2^{-}$	

[†] From least-squares fit to $E\gamma's$.

[‡] From 1976Va24.

[#] From 2007De14.

[@] From 2007Ks01.

& From measured asymmetry ratios $R(\gamma(\theta))$ in 2004Ek01 and/or the transition multipolarities deduced from measured ADO ratios in 2007De14 and/or measured DCO ratios in 2007Ks01.

^a From measurements using Recoil Distance Method (RDM) or Doppler Shift Attenuation Method (DSAM).

^b Mostly from 2007Ks01, unless otherwise noted.

^c Weighted average of 29.1 ps 14 (1974Va13), 28.9 ps 14 (1976Ke02), 29.0 ps 13 (1976Wa11) and 31.4 ps 4 (1991Ja11).

^d From 1976Wa11.

^e Weighted average of 5.5 ps 14 (1976Wa11) and 6.1 ps 11 (1991Ja11).

^{*f*} Band(A): Band based on $f_{7/2}$ orbital. Band from 2007De14.

^g Band(B): Band based on 13/2⁺. Band from 2007De14.

$\gamma(^{35}\text{Cl})$

DCO values are for angles: 90° and 120° for E=70 MeV experiment at TIFR; and 80° and 136° for E=88 MeV experiment at NSC (2007Ks01) Expected ratios are ≈ 1 for $\Delta J=2$, quadrupole and ≈ 0.5 for $\Delta J=1$, dipole, when gated by $\Delta J=2$, quadrupole transition. Ratios are ≈ 2 for $\Delta J=2$, quadrupole and ≈ 1 for $\Delta J=1$, dipole, when gated on $\Delta J=1$, dipole transition.

 Δ_{IPDCO} corresponds to integrated polarization asymmetry measurement at E=70 MeV at TIFR facility. The values are from e-mail reply of Dec 1, 2006 from one of the authors (M. Saha Sarkar) of 2007Ks01.

 $R_{ADO} = [I\gamma(34^\circ) + I\gamma(146^\circ)]/2I\gamma(90^\circ)$. Expected values for this geometry are: ≈ 1.3 for $\Delta J = 2$, quadrupole and ≈ 0.8 for $\Delta J = 1$, dipole transitions (2007De14).

 $R(\gamma(\theta))$ =Asymmetry ratio measured at 35° and 81° with respect to the beam axis. Value of ≈ 1.2 for stretched quadrupole and ≈ 0.7 for stretched dipole (ΔJ =1) (2004Ek01,2005Ek01).

γ(³⁵ Cl)		L)	from ${}^{12}C({}^{28}Si,p\alpha\gamma)$							
Εγ	Iγ		Mult	δ	Ei	J^{π}	E _f			
1763	100		E2+M1		1763.1	5/2 ⁺	0.0	3/2+		
882	8.7	6			2645.1	7/2+	1763.1	5/2+		
2645	100	5	E2		2645.1	7/2+	0.0	3/2+		
3003	100				3003.1	5/2+	0.0	3/2+		
160	1.1	3			3163.2	$7/2^{-}$	3003.1	5/2+		
518	9.2	5	D		3163.2	$7/2^{-}$	2645.1	$7/2^{+}$		
1400	1	LT			3163.2	$7/2^{-}$	1763.1	5/2+		
3163	100	5	M2+E3	+0.16 1	3163.2	7/2-	0.0	3/2+		
779 ?	15	LT			3942.2	9/2+	3163.2	$7/2^{-}$		
1297	6	3			3942.2	9/2+	2645.1	7/2+		
2179	100	11	E2+M3		3942.2	9/2+	1763.1	5/2+		
1184	100	4	M1+E2	-0.3 1	4347.2	9/2-	3163.2	7/2-		
1702	46	3	E1+M2	+0.5 +5-3	4347.2	9/2-	2645.1	$7/2^{+}$		
4347	4	LT			4347.2	9/2-	0.0	3/2+		
1060	12	1	M1+E2	+0.2 1	5407.2	$11/2^{-}$	4347.2	9/2-		
2244	100	3	E2		5407.2	$11/2^{-}$	3163.2	$7/2^{-}$		
1580	100	11	(M1+E2)	-0.2 1	5927.2	$11/2^{-}$	4347.2	9/2-		
1985	11	2			5927.2	$11/2^{-}$	3942.2	9/2+		
680	100	3	M1(+E2)	+0.1 1	6087.3	$13/2^{-}$	5407.2	$11/2^{-}$		

2

 J^{π}

3

1740 712 ? 1786 1946 2466 2917 ? 2394 ? 3074 ? 2631 ? 914 ? 971 1337 ? 1378 ? 2017 ?		5.3 6 100 L7 3.2 18 15 5 100 9 100 100 100 21 100 23 100 17 100 14 	I I I I I I I I I I I I I I I I I I I	52 0 (+Q) 51+M2 51+M2 0 (+Q) 0 (+Q) 0 (+Q) 0 (+Q) 0 (+Q) 52 0 (+Q) 0 (+Q)	-0 +0 -0 +0 +0 -0 -0 -0 -0	.6 6 .2 1 .25 10 .1 +3-2 .2 +3-2 .2 +2-5 .2 2 .2 2	6087.3 6119.2 7873.3 7873.3 8324.4 8481.4 8481.4 8558.3 8787.3 8844.3 10181.3 10222.4 10861.4	$\begin{array}{c} 13/2^-\\ (11/2^-)\\ 13/2^+\\ 13/2^+\\ (13/2^-)\\ (15/2^-)\\ (15/2^-)\\ (15/2^-)\\ (15/2^+)\\ 17/2^+\\ (19/2^+)\\ (19/2^+)\\ (19/2^+)\\ \end{array}$	4347.2 5407.2 6087.3 5927.2 5407.2 5407.2 6087.3 5407.2 5407.2 5407.2 5407.2 5407.2 5407.2 844.3 8844.3 8844.3 8844.3	9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁺ 13/2 ⁺ 13/2 ⁺ 17/2 ⁺ 17/2 ⁺ 17/2 ⁺
	γ((³⁵ Cl)		from ¹⁶ C	(²⁴ M	g,p αγ)				
Εγ 		γ		E _i			/*	E _f		
1763.1 882.9 2645.5 517.7	2 1 4 1	100 15.2 100 14.3	2 6 5 8 8	1763 2645 2645 3163	.09 .67 .67 .67	5/2 ⁺ 7/2 ⁺ 7/2 ⁺ 7/2 ⁻	0.0 1763.09 0.0 2645.67	$3/2^+ 9 5/2^+ 3/2^+ 7 7/2^+ $		
1399.6	1	0.3	3	3163	.03	7/2-	1763.09	9 5/2+		
3162.7	4 2	100	5 1 T	3163	03	$7/2^{-}$		$3/2^+$		
1702.0	2 3	40	5	4347	95	9/2 9/2 ⁻	2645.62	7 7/2 ⁺		
1059.3	2	17	LT	5407	3	$11/2^{-1}$	4347.9	$5 9/2^{-1}$		
2244.2	3	100	3	5407	3	$11/2^{-}$	3163.03	3 7/2-		
680.4	1	100	11	6087	.7	13/2-	5407.3	$11/2^{-}$		
		25								
	γ((³⁵ Cl)		from ²⁴ M	g(¹⁶	0,pαγ)				
 Εγ	γ(³³ C1) Ιγ		from ²⁴ M Mult	g(¹⁶	0,pαγ) δ	 E _i	<i>J^π</i>	E _f	
Εγ 1763.3	γ(2	³³ Cl) Ιγ 100	4	from ²⁴ M Mult D+Q	ig(¹⁶	0,pαγ) δ 6 4	E _i 1763.29	J^{π} 5/2 ⁺	E _f	3/2+
Eγ 1763.3 882.9	γ(2 5	²³⁵ Cl) Iγ 100 11.1	4 3	from ²⁴ M Mult D+Q	ig(¹⁶	0,pαγ) δ 6 4	E _i 1763.29 2645.9	J^{π} 5/2 ⁺ 7/2 ⁺	E _f 0.0 1763.29	3/2 ⁺ 5/2 ⁺
Eγ 1763.3 882.9 2645.7 161	γ(2 5 5 1	Iγ 100 11.1 100	4 3 1	from ²⁴ M Mult D+Q	g(¹⁶ +2.0	0,pαγ) δ 6 4	E _i 1763.29 2645.9 2645.9 3163 0	J^{π} 5/2 ⁺ 7/2 ⁺ 7/2 ⁺ 7/2 ⁻	E _f 0.0 1763.29 0.0 3002 0	3/2+ 5/2+ 3/2+
Eγ 1763.3 882.9 2645.7 161 517.4	γ (2 5 5 1 5	$I\gamma$ 100 11.1 100 11.1	4 3 1 13	from ²⁴ M Mul1 D+Q	g(¹⁶ 	0,pαγ) δ 6 4	E _i 1763.29 2645.9 2645.9 3163.0 3163.0	J^{π} 5/2+ 7/2+ 7/2+ 7/2- 7/2- 7/2-	E _f 0.0 1763.29 0.0 3002.0 2645.9	3/2+ 5/2+ 3/2+ 7/2+
$E\gamma$ 1763.3 882.9 2645.7 161 517.4 1399.9	γ (2 5 5 1 5 7 7		4 3 1 13 2	from ²⁴ M Mult D+Q	ig(¹⁶ +2.0	0,pαγ) δ 6 4	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0	J ^π 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻	E _f 0.0 1763.29 0.0 3002.0 2645.9 1763.29	3/2+ 5/2+ 3/2+ 7/2+ 5/2+
$E\gamma$ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7	γ (2 5 5 1 5 7 4		4 3 1 13 2 6	from ²⁴ M Mult D+Q Q+0	-0.	0, pαγ) δ 6 4 18 7	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0	J ^π 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻	E _f 0.0 1763.29 0.0 3002.0 2645.9 1763.29 0.0	3/2+ 5/2+ 3/2+ 7/2+ 5/2+ 3/2+
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180	γ (2 5 5 1 5 7 4 1	Iγ Iγ I00 I1.1 100 I1.1 0.5 100.0 100	4 3 1 13 2 6	from ²⁴ M Mul1 D+Q Q+0	- 0 .	0, pαγ) δ 6 4 18 7	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3163.0 3943.4	J ^π 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻	E _f 0.0 1763.29 0.0 3002.0 2645.9 1763.29 0.0 1763.29	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 7/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9	γ (2 5 5 1 5 7 4 1 4 5	I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ $I_{0.0}$	4 3 1 13 2 6 4	from ²⁴ M Mul1 D+Q Q+0 D+Q	-0.1 +0.0	0, $p\alpha\gamma$) δ 6 4 18 7 65 30	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8	J^{π} 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻	E _f 0.0 1763.29 0.0 3002.0 2645.9 1763.29 0.0 1763.29 3163.0 2645.0	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 7/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 7/2 ⁻ 7/2 ⁺
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059 5	$\gamma($	I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ $I_{0.0}$ $I_{0.0}$ I_{00}	4 3 1 13 2 6 4 14 5	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q	-0. +0.0	0, $p\alpha\gamma$) δ 6 4 18 7 65 30 12 3	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8	J^{π} $5/2^{+}$ $7/2^{+}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $9/2^{-}$ $9/2^{-}$ $11/2^{-}$	E _f 0.0 1763.29 0.0 3002.0 2645.9 1763.29 0.0 1763.29 3163.0 2645.9 4347.8	3/2+ 5/2+ 3/2+ 7/2+ 5/2+ 3/2+ 5/2+ 5/2+ 7/2- 7/2+ 9/2-
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2	$\gamma($	I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ $I_{0.0}$ $I_{0.0}$ $I_{0.0}$ $I_{0.0}$ $I_{0.0}$ $I_{0.0}$ $I_{0.2}$ $I_{0.0}$	4 3 1 13 2 6 4 14 5 1	from ²⁴ M Mul1 D+Q Q+O D+Q D+Q D+Q 0+O	-0 +0.(+0.	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5407.3	<i>J^π</i> 7/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻	E _f 0.0 1763.29 0.0 2645.9 1763.29 0.0 1763.29 3163.0 2645.9 4347.8 3163.0	3/2+ 5/2+ 3/2+ 7/2+ 5/2+ 3/2+ 5/2+ 7/2- 7/2+ 9/2- 7/2-
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9	$\gamma($	I_{γ} I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ $I_{00.0}$ I_{00}	4 3 1 13 2 6 4 14 5 1 4	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0. +0.0 +0.1	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5926.9	<i>J</i> ^π 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻	E _f 0.0 1763.29 0.0 3002.0 2645.9 1763.29 0.0 1763.29 3163.0 2645.9 4347.8 3163.0 4347.8	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 7/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 7/2 ⁻ 7/2 ⁺ 9/2 ⁻ 9/2 ⁻
E_{γ} 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5	$\gamma(0)$	I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ I_{00}	4 3 1 13 2 6 4 14 5 1 4 6	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0 Q+0	-0 +0.0	0, $p\alpha\gamma$) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5926.9 6087.2	<i>J</i> ^π 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻	$\begin{array}{c} E_{\rm f} \\ 0.0 \\ 1763.29 \\ 0.0 \\ 3002.0 \\ 2645.9 \\ 1763.29 \\ 0.0 \\ 1763.29 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 4347.8 \\ 5407.3 \\ \end{array}$	3/2+ 5/2+ 3/2+ 7/2+ 5/2+ 3/2+ 5/2+ 7/2- 7/2+ 9/2- 7/2- 9/2- 11/2-
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5 1739.5	$\gamma($	I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ I_{00} I	4 3 1 13 2 6 4 14 5 1 4 6 9	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0 Q+0	-0. +0. +0.	0, pαγ) δ 6 4 18 7 65 30 12 3 1	$\begin{array}{c} E_i \\ \hline \\ 1763.29 \\ 2645.9 \\ 2645.9 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3943.4 \\ 4347.8 \\ 4347.8 \\ 4347.8 \\ 5407.3 \\ 5407.3 \\ 5926.9 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ \end{array}$	J^{π} $5/2^{+}$ $7/2^{+}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $1/2^{-}$ $1/2^{-}$ $1/2^{-1}$ $1/2^{-$	$\begin{array}{c} E_{\rm f} \\ 0.0 \\ 1763.29 \\ 0.0 \\ 3002.0 \\ 2645.9 \\ 1763.29 \\ 0.0 \\ 1763.29 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ \end{array}$	3/2+ 5/2+ 3/2+ 7/2+ 5/2+ 3/2+ 5/2+ 7/2- 7/2+ 9/2- 7/2- 9/2- 11/2- 9/2-
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5 1739.5 296	γ (0) 2 5 5 1 5 7 4 1 4 5 2 2 5 5 5 5 1	$\begin{array}{c} 135 \text{ Cl} \\ \overline{I} \\ \gamma \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 0 \\ $	4 3 1 13 2 6 4 14 5 1 4 6 9	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0 D+Q Q+0	-0. +0.0 +0.0	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5926.9 6087.2 6087.2 6087.2 6380.7	J^{π} 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻	$\begin{array}{c} E_{\rm f} \\ 0.0 \\ 1763.29 \\ 0.0 \\ 3002.0 \\ 2645.9 \\ 1763.29 \\ 0.0 \\ 1763.29 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ 6087.2 \\ \end{array}$	3/2+ 5/2+ 3/2+ 7/2+ 5/2+ 3/2+ 5/2+ 7/2- 7/2- 7/2- 9/2- 11/2- 9/2- 13/2- 13/2-
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5 1739.5 296 971 1720 201 201 201 201 201 201 201 2	γ (0) 2 5 5 1 5 7 4 1 4 5 2 5 5 1 1 5 5 1 5 7 4 1 4 5 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 5 1 5 7 4 1 5 5 5 5 5 5 5 5 5 5 5 5 5	I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ $I_{0.0}$	4 3 1 13 2 6 4 14 5 1 4 6 9	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0 +0.(+0.)	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5926.9 6087.2 6087.2 6380.7 6380.7	J^{π} 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻ 13/2 ⁻ 13/2 ⁻	$\begin{array}{c} E_f\\ 0.0\\ 1763.29\\ 0.0\\ 3002.0\\ 2645.9\\ 1763.29\\ 0.0\\ 1763.29\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 25607.3\\ 2$	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 7/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 11/2 ⁻ 9/2 ⁻ 13/2 ⁻ 11/2 ⁻ 12/2 ⁻
Eγ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5 1739.5 296 971 1786.2 1946.2	γ (2 5515741452255115751155511555	$\begin{array}{c} 53 \\ \text{Cl} \\ \text{I} \\ \text{I} \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 .0 \\ 7.9 \\ 9.7 \\ 48 \\ 5 \end{array}$	4 3 1 13 2 6 4 14 5 1 4 6 9 9	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0 +0.0	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5926.9 6087.2 6087.2 6087.2 6380.7 7873.4	J^{π} 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻ 13/2 ⁺ 13/2 ⁺	$\begin{array}{c} E_{\rm f} \\ 0.0 \\ 1763.29 \\ 0.0 \\ 3002.0 \\ 2645.9 \\ 1763.29 \\ 0.0 \\ 1763.29 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 4347.8 \\ 3163.0 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ 6087.2 \\ 5407.3 \\ 6087.2 \\ 6$	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 7/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 11/2 ⁻ 9/2 ⁻ 13/2 ⁻ 11/2 ⁻ 13/2 ⁻ 11/2 ⁻
$\begin{array}{c}\\ E\gamma\\\\ 1763.3\\ 882.9\\ 2645.7\\ 161\\ 517.4\\ 1399.9\\ 3162.7\\ 2180\\ 1184.9\\ 1701.6\\ 1059.5\\ 2244.2\\ 1578.9\\ 680.5\\ 1739.5\\ 296\\ 971\\ 1786.2\\ 1946.2\\ 2466.2\\ \end{array}$	γ (C) 2 5 1 5 7 4 1 4 5 2 5 5 1 5 5 1 5 5 5 1 5 5 5 1 5 7 4 1 4 5 5 5 5 5 5 5 5 5 5 5 5 5	$\begin{array}{c} 53 \\ (5) \\ $	4 3 1 13 2 6 4 14 5 1 4 6 9 9 4 226 2	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0. +0.0	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5926.9 6087.2 6087.2 6087.2 6380.7 7873.4 7873.4 7873.4	J^{π} 5/2 ⁺ 7/2 ⁺ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻ 13/2 ⁻ 13/2 ⁺ 13/2 ⁺	$\begin{array}{c} E_{\rm f} \\ 0.0 \\ 1763.29 \\ 0.0 \\ 3002.0 \\ 2645.9 \\ 1763.29 \\ 0.0 \\ 1763.29 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ 6087.2 \\ 5407.3 \\ 6087.2 \\ 5926.9 \\ 5407.3 \\ \end{array}$	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 11/2 ⁻ 9/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻
$\begin{array}{c}\\ E\gamma\\\\ 1763.3\\ 882.9\\ 2645.7\\ 161\\ 517.4\\ 1399.9\\ 3162.7\\ 2180\\ 1184.9\\ 1701.6\\ 1059.5\\ 2244.2\\ 1578.9\\ 680.5\\ 1739.5\\ 296\\ 971\\ 1786.2\\ 1946.2\\ 2466.2\\ 2232.7\\ \end{array}$	γ (C) 2 5 5 1 5 7 4 1 4 5 2 5 5 1 5 7 4 1 5 5 5 1 5 7 4 1 5 5 5 5 5 5 5 5 5 7 4 1 5 5 5 5 5 5 5 5 5 7 4 1 5 5 5 5 5 5 5 5 5 5 5 5 5	$\begin{array}{c} 53 \\ \text{Cl} \\ \text{I} \\ \gamma \\ \hline \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 52.0 \\ 19.2 \\ 100 \\ 100 \\ 100 \\ 57 \\ 48.5 \\ 100 \\ 57 \end{array}$	4 3 1 13 2 6 4 14 5 1 4 6 9 9 4 226 2 3	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0. +0.	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 5407.3 5407.3 5926.9 6087.2 6087.2 6380.7 7873.4 7873.4 7873.4 7873.4 8319.7	J^{π} $5/2^{+}$ $7/2^{+}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $9/2^{-}$ $11/2^{-}$ $11/2^{-}$ $13/2^{-}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $15/2^{-}$	$\begin{array}{c} E_{\rm f} \\ 0.0 \\ 1763.29 \\ 0.0 \\ 3002.0 \\ 2645.9 \\ 1763.29 \\ 0.0 \\ 1763.29 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ 6087.2 \\ 5407.3 \\ 6087.2 \\ 5926.9 \\ 5407.3 \\ 6087.2 \\ \end{array}$	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 11/2 ⁻ 9/2 ⁻ 13/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻
$\begin{array}{c}\\ E\gamma\\\\ 1763.3\\ 882.9\\ 2645.7\\ 161\\ 517.4\\ 1399.9\\ 3162.7\\ 2180\\ 1184.9\\ 1701.6\\ 1059.5\\ 2244.2\\ 1578.9\\ 680.5\\ 1739.5\\ 296\\ 971\\ 1786.2\\ 1946.2\\ 2466.2\\ 2232.7\\ 2911.9\\ \end{array}$	γ (2 5 5 1 5 7 4 1 4 5 2 2 5 5 1 1 5 5 6 8	$\begin{array}{c} 135 \text{ Cl} \\ \hline I \\ \gamma \\ \hline 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 52.0 \\ 19.2 \\ 100 \\ 100 \\ 57 \\ 100 \\ 57 \\ 100 \\ \end{array}$	4 3 1 13 2 6 4 14 5 1 4 6 9 9 4 26 2 3 5	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0. +0.0 +0.1	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 5407.3 5407.3 5926.9 6087.2 6087.2 6380.7 6380.7 6380.7 7873.4 7873.4 7873.4 7873.4 7873.4	J^{π} $5/2^+$ $7/2^+$ $7/2^-$ $7/2^-$ $7/2^-$ $9/2^-$ $9/2^-$ $11/2^-$ $11/2^-$ $11/2^-$ $13/2^-$ $13/2^+$ $13/2^+$ $13/2^+$ $13/2^+$ $15/2^-$	$\begin{array}{c} E_{\rm f} \\ 0.0 \\ 1763.29 \\ 0.0 \\ 3002.0 \\ 2645.9 \\ 1763.29 \\ 0.0 \\ 1763.29 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 3163.0 \\ 2645.9 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ 5407.3 \\ 4347.8 \\ 6087.2 \\ 5407.3 \\ 6087.2 \\ 5926.9 \\ 5407.3 \\ 6087.2 \\ 5926.9 \\ 5407.3 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6$	3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 3/2 ⁺ 5/2 ⁺ 5/2 ⁺ 7/2 ⁻ 7/2 ⁻ 9/2 ⁻ 11/2 ⁻ 9/2 ⁻ 13/2 ⁻ 11/2 ⁻ 13/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻ 11/2 ⁻ 13/2 ⁻ 11/2 ⁻ 11/2 ⁻ 13/2 ⁻ 11/2 ⁻
$\begin{array}{c}\\ E\gamma\\\\ 1763.3\\ 882.9\\ 2645.7\\ 161\\ 517.4\\ 1399.9\\ 3162.7\\ 2180\\ 1184.9\\ 1701.6\\ 1059.5\\ 2244.2\\ 1578.9\\ 680.5\\ 1739.5\\ 296\\ 971\\ 1786.2\\ 1946.2\\ 2466.2\\ 2232.7\\ 2911.9\\ 2399.8 \end{array}$	γ (2) 2551 5741 4522551 1555688	$\begin{array}{c} 133 \text{ Cl} \\ \hline \\ I\gamma \\ \hline \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 57 \\ 100 \\ 10$	4 3 1 13 2 6 4 14 5 1 4 6 9 9 4 26 2 3 5 3	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0. +0.0 +0.1	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5407.3 5926.9 6087.2 6087.2 6380.7 6380.7 7873.4 7873.4 7873.4 7873.4 7873.4 7873.4 7873.4	J^{π} $5/2^+$ $7/2^+$ $7/2^-$ $7/2^-$ $7/2^-$ $7/2^-$ $9/2^-$ $11/2^-$ $11/2^-$ $11/2^-$ $13/2^-$ $13/2^+$ $13/2^+$ $13/2^+$ $13/2^+$ $15/2^-$ $15/2^-$	$\begin{array}{c} E_f\\ 0.0\\ 1763.29\\ 0.0\\ 3002.0\\ 2645.9\\ 1763.29\\ 0.0\\ 1763.29\\ 3163.0\\ 2645.9\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 4347.8\\ 6087.2\\ 5407.3\\ 6087.2\\ 5926.9\\ 5407.3\\ 6087.2\\ 5926.9\\ 5407.3\\ 6087.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ 5407.2\\ $	$3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $5/2^{+}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $9/2^{-}$ $13/2^{-}$ $11/2^{-}$
$F_γ$ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5 1739.5 296 971 1786.2 1946.2 2466.2 2232.7 2911.9 2399.8 3080.0	γ (2 5 5 1 5 7 4 1 4 5 2 2 5 5 1 1 5 5 6 8 8 7 1 5 5 6 8 8 7 1 5 5 6 8 8 7 1 5 5 5 5 5 5 5 5 5 5 5 5 5	$\begin{array}{c} 133 \text{ Cl} \\ \mathbf{I} \\ \mathbf{V} \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 0 \\ $	4 3 1 13 2 6 4 14 5 1 4 6 9 4 26 2 3 5 3 2	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0. +0.0 +0.1	0, pαγ) δ 6 4 18 7 65 30 12 3 1	$\begin{array}{c} E_i \\ \hline \\ 1763.29 \\ 2645.9 \\ 2645.9 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3943.4 \\ 4347.8 \\ 4347.8 \\ 4347.8 \\ 5407.3 \\ 5926.9 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6380.7 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 8319.7 \\ 8319.7 \\ 8487.4 \\ 8487.4 \\ \end{array}$	J^{π} $5/2^{+}$ $7/2^{+}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $11/2^{-}$ $11/2^{-}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $15/2^{-}$ $15/2^{-}$ $15/2^{-}$ $15/2^{-}$	$\begin{array}{c} E_f\\ 0.0\\ 1763.29\\ 0.0\\ 3002.0\\ 2645.9\\ 1763.29\\ 0.0\\ 1763.29\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5926.9\\ 5407.3\\ 6087.2\\ 5407.2\\ 6087.2\\ 5407.2\\ 6087.2\\ 6087.2\\ 6087.2\\ 6087.2\\ 6087.2\\ 6087.2\\ 6087.2\\ 6087.2\\ 6087.2\\ $	$3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $5/2^{+}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $9/2^{-}$ $13/2^{-}$ $11/2^{-}$
$F_γ$ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5 1739.5 296 971 1786.2 1946.2 2466.2 2232.7 2911.9 2399.8 3080.0 915.4	γ (I_{γ} I_{γ} $I_{1.1}$ $I_{0.5}$ $I_{0.0}$	4 3 1 13 2 6 4 14 5 1 4 6 9 4 26 2 3 5 3 2 7 7	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0 +0.0 +0	0, $p\alpha\gamma$) δ 6 4 18 7 65 30 12 3 1	$\begin{array}{c} E_i \\ \hline \\ 1763.29 \\ 2645.9 \\ 2645.9 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3163.0 \\ 3943.4 \\ 4347.8 \\ 4347.8 \\ 5407.3 \\ 5926.9 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6087.2 \\ 6380.7 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 7873.4 \\ 8319.7 \\ 8419.7 \\ 8419.7 \\ 8487.4 \\ 8487.4 \\ 8788.8 \\ 8744.6 \\ 8784.8 \\ 8744.6 \\ 8744.8 \\ 874$	J^{π} $5/2^{+}$ $7/2^{+}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $11/2^{-}$ $11/2^{-}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $15/2^{-}$ $15/2^{-}$ $15/2^{-}$ $15/2^{+}$ $17/2^{+}$	$\begin{array}{c} E_f\\ 0.0\\ 1763.29\\ 0.0\\ 3002.0\\ 2645.9\\ 1763.29\\ 0.0\\ 1763.29\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 7873.4\\ 7072.4\\ $	$3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $5/2^{+}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $9/2^{-}$ $11/2^{-}$
$F_γ$ 1763.3 882.9 2645.7 161 517.4 1399.9 3162.7 2180 1184.9 1701.6 1059.5 2244.2 1578.9 680.5 1739.5 296 971 1786.2 1946.2 2466.2 2232.7 2911.9 2399.8 3080.0 915.4 971.4 1336.2	γ (2 5 5 1 5 7 4 1 4 5 2 2 5 5 5 1 1 5 5 5 6 8 8 7 4 5 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	$\begin{array}{c} 5.5 \text{ Cl} \\ \hline I \\ 7 \\ \hline I \\ 0 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\$	4 3 1 13 2 6 4 14 5 1 4 6 9 4 26 2 3 5 3 2 7 16 3	from ²⁴ M Mul1 D+Q Q+O D+Q D+Q Q+O	-0 +0.(+0.)	$0, p\alpha\gamma$) δ 6 4 18 7 65 30 12 3 1	E _i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 4347.8 5407.3 5926.9 6087.2 6087.2 6087.2 6380.7 6380.7 7873.4 7874.4	J^{π} $5/2^{+}$ $7/2^{+}$ $7/2^{-}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $11/2^{-}$ $11/2^{-}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $15/2^{-}$ $15/2^{-}$ $15/2^{-}$ $15/2^{-}$ $15/2^{+}$ $17/2^{+}$ $19/2^{-}$	$\begin{array}{c} E_f\\ 0.0\\ 1763.29\\ 0.0\\ 3002.0\\ 2645.9\\ 1763.29\\ 0.0\\ 1763.29\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 4347.8\\ 5407.3\\ 4347.8\\ 5407.3\\ 6087.2\\ 5926.9\\ 5407.3\\ 6087.2\\ 5926.9\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 7873.4\\ 7873.4\\ 7873.4\\ 6087.4\\ 7873.4\\ 6087.4\\ 7873.4\\ $	$3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $5/2^{+}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{+}$ $13/2^{+}$ $17/2^{+}$
Eγ 	γ (2 5 5 1 5 7 4 1 4 5 2 2 5 5 5 1 1 5 5 6 8 8 7 4 5 5 5 5 1 1 5 5 6 8 8 7 4 5 5 5 5 5 1 1 5 5 6 8 8 7 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	$\begin{array}{c} 53 \text{ Cl} \\ \hline \text{I} \\ \gamma \\ \hline \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 11.1 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 100 \\ 57 \\ 100 \\ 100 \\ 57 \\ 100 \\ 100 \\ 100 \\ 100 \\ 84 \\ \end{array}$	4 3 1 13 2 6 4 14 5 1 4 6 9 4 26 2 3 5 3 2 7 16 3 9	from ²⁴ M Mul1 D+Q Q+0 D+Q D+Q Q+0	-0. +0.0 +0	0, pαγ) δ 6 4 18 7 65 30 12 3 1	E_i 1763.29 2645.9 2645.9 3163.0 3163.0 3163.0 3163.0 3943.4 4347.8 4347.8 5407.3 5926.9 6087.2 6087.2 6087.2 6087.2 6380.7 7873.4 7873.4 7873.4 7873.4 7873.4 7873.4 7873.4 8319.7 8487.4 8788.8 8844.6 10181.0 10181.0	J^{π} $5/2^+$ $7/2^-$ $7/2^-$ $7/2^-$ $7/2^-$ $9/2^-$ $11/2^-$ $11/2^-$ $11/2^-$ $13/2^-$ $13/2^+$ $13/2^+$ $13/2^+$ $13/2^+$ $15/2^-$ 1	$\begin{array}{c} E_f\\ 0.0\\ 1763.29\\ 0.0\\ 3002.0\\ 2645.9\\ 1763.29\\ 0.0\\ 1763.29\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 2645.9\\ 4347.8\\ 3163.0\\ 4347.8\\ 5407.3\\ 4347.8\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 6087.2\\ 5407.3\\ 4844.6\\ 8447.4\\ \end{array}$	$3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $3/2^{+}$ $5/2^{+}$ $5/2^{+}$ $7/2^{-}$ $7/2^{-}$ $9/2^{-}$ $11/2^{-}$ $9/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{-}$ $11/2^{-}$ $13/2^{+}$ $13/2^{+}$ $13/2^{+}$ $15/2^{-}$

 J^{π}

 J^{π}

From ENSDF

1861.3 5 1377.8 10 2014.7 9 2069.8 10 2614.5 5 1113.3 5 2390.8 5	83 100 100 32.5 100 24.4 100	6 8 5 22 4 18 4		10181.0 10222.4 10859.1 10859.1 11459.0 12572.1 12572.1	19/2 17/2 19/2 19/2 21/2 23/2	2^{-} 8319 2^{-} 8844 2^{+} 8844 2^{+} 8788 2^{+} 8844 2^{-} 1145 2^{-} 1018	.7 15/2 ⁻ .6 17/2 ⁺ .6 17/2 ⁺ .8 15/2 ⁻ .6 17/2 ⁻ 9.0 21/2 ⁺ 1.0 19/2 ⁻	-
Note: mu 1976Va24	ltipola and/or	rities and r 2007Ks01	nixing rat	ios in t	hese	tables ar	e from	
E _i (level)	\mathbf{J}_i^{π}	E_{γ}^{\dagger}	Ι _γ &	E_f	\mathbf{J}_f^{π}	Mult. ^a	δ ^a	Comments
1219.0 1763.04	5/2+	1219 1763.16 <i>10</i>	100	0 0	3/2 ⁺ 3/2 ⁺	D+Q	-2.6 4	E _γ : from 1982Le04. A ₂ =-0.28 2, A ₄ =+0.05 3 (1976Wa11). A ₂ =-0.368 18, A ₄ =+0.13 2 (1976Va24). Δ _{IPDCO} =+0.13 5. R _{ADO} =0.77 3.
2645.79	7/2+	882.9 1	91	1763.04	5/2+			$R(\gamma(\theta))=1.43 \ 7.$ $\Delta_{IPDCO}=+0.01 \ 5.$ $R_{ADO}=0.75 \ 3.$ $\Delta_{2}=+0.31 \ 40 \ (1976Wall)$
		2645.7 3	91 <i>1</i>	0	3/2+	Q		$\begin{array}{l} \Delta_{\rm IPDCO} = +0.08 \ 5.\\ R_{\rm ADO} = 1.35 \ 4.\\ R(\gamma(\theta)) = 1.21 \ 6. \end{array}$
3002.5	5/2+	3003	100	0	$3/2^{+}$			E_{γ} : from 1982Le04 and 2007Ks01.
3162.83	7/2-	161 [‡] <i>1</i> 517.2 <i>1</i>	1.0 <i>3</i> 8.7 <i>4</i>	3002.5 2645.79	5/2+ 7/2+	D(+Q)	0	DCO=0.8 <i>l</i> gated on 2645 γ . A ₂ =+0.47 25 (1976Wa11).
		1399.9 [#] 7	0.30 4	1763.04	$5/2^{+}$			
		3162.5 1	90.0 6	0	3/2+	M2+E3	+0.16 <i>I</i>	δ: weighted average of +0.18 7 (1976Va24) and +0.16 <i>l</i> (2007Ks01). DCO=0.8 <i>l</i> gated on 2244γ. Δ_{IPDCO} =-0.06 2. R _{ADO} =1.30 2. R(γ(θ))=1.43 7. A ₂ =+0.37 3, A ₄ =-0.04 3 (1976Wa11). A ₂ =+0.416 6, A ₄ =-0.001 6 (1976Va24).
3942.6	9/2+	779 ^{@b} 1297	<14 6 <i>3</i>	3162.83 2645.79	7/2 ⁻ 7/2 ⁺			E_{γ} : from 1976Wa11 and 2007Ks01. I_{γ} : from 2007Ks01.
4347.85	9/2-	2180 [‡] <i>I</i> 1185.0 <i>2</i>	94 <i>10</i> 69 2	1763.04 3162.83	5/2 ⁺ 7/2 ⁻	M1+E2	-0.34 11	Δ_{IPDCO} =+0.07 5. δ : weighted average of -0.65 30 (1976Va24) and -0.3 1 (2007Ks01). DCO=2.4 4 gated on 3163 γ . Δ_{IPDCO} =-0.08 3. R _{ADO} =0.54 2. A ₂ =-0.66 4, A ₄ =+0.08 4 (1976Wa11).
		1702.0 3	31 1	2645.79	7/2+	E1+M2	+0.5 4	A ₂ =-0.065 25, A ₄ =+0.004 25 (19/6Va24). DCO=1.0 2 gated on 2645 γ . Δ_{IPDCO} =+0.04 4. R _{ADO} =0.76 6. A ₂ =-0.20 3 (1976Wa11).
5407.15	11/2-	4347.8 [#] 8 1059.3 2	<3 16.1 <i>5</i>	0 4347.85	3/2+ 9/2 ⁻	M1+E2	+0.13 3	 I_γ: from 2007Ks01. 7.5 7 from 2007De14. δ: weighted average of +0.12 3 (1976Va24) and +0.2 1 (2007Ks01). DCO=0.9 1 gated on 680γ.

 $^{35}_{17}\text{Cl}_{18}\text{-}5$

(HI,xnγ) 2004Ek01,2007De14,2007Ks01 (continued)

γ (³⁵Cl) (continued)

E _i (level)	\mathbf{J}_i^π	E_{γ}^{\dagger}	Iγ ^{&}	E_f	\mathbf{J}_f^{π}	Mult. ^a	δ^{a}	Comments
5407.15	11/2-	2244.2 2	84.1 7	3162.83	7/2-	E2(+M3)	0.000 1	$\Delta_{IPDCO} = -0.10 \ 4.$ $R_{ADO} = 1.05 \ 4.$ $A_2 = -0.04 \ 15 \ (1976Wa11).$ $A_2 = -0.08 \ 6, \ A_4 = +0.049 \ 46 \ (1976Va24).$ $DCO = 1.1 \ 1 \ gated on \ 3163\gamma.$ $\Delta_{IPDCO} = +0.04 \ 2.$ $R_{ADO} = 1.26 \ 3.$ $R(\gamma(\theta)) = 1.24 \ 6.$ $A_2 = +0.23 \ 2, \ A_4 = -0.08 \ 2 \ (1976Wa11).$ $A_{T} = -0.030 \ 2.0 \ A_{T} = 0.119 \ 22$
5926.9	11/2-	1579.1 <i>3</i>	90 <i>10</i>	4347.85	9/2-	(D+Q)	-0.2 1	$A_2 = +0.505\ 20,\ A_4 = -0.119\ 22$ (1976Va24). DCO=1.0 <i>I</i> gated on 1184 γ . $\Delta_{IPDCO} = +0.02\ 3.$ $R_{ADO} = 0.48\ I.$ $A_2 = -0.6\ 4\ (1976Wa11).$
6087.41	13/2-	1985 [@] 680.3 <i>1</i>	10 2 93 <i>I</i>	3942.6 5407.15	9/2 ⁺ 11/2 ⁻	M1(+E2)	+0.1 1	DCO=1.3 <i>I</i> gated on 2244 γ . Δ_{IPDCO} =-0.09 <i>2</i> . R _{ADO} =0.84 <i>2</i> . A ₂ =-0.20 <i>2</i> (1976Wa11). R($\gamma(\theta)$)=0.65 <i>3</i> .
		1739.4 4	71	4347.85	9/2-	Q		$\Delta_{\text{IPDCO}} = +0.12$ 7. RADO=1.38 10.
6119.2? 6380.8	(11/2 ⁻)	712 ^{@b} 296 [‡] 1 971 [‡] 1	<1	5407.15 6087.41 5407.15	11/2 ⁻ 13/2 ⁻ 11/2 ⁻			NADO NOO IOI
7873.3	13/2+	1786.2 [#] 5	6.2 3	6087.41	$13/2^{-}$	D(+Q)	-0.6 6	DCO=1.2 3 gated on 971 γ , E2.
		1946.4 <i>3</i>	29.7 17	5926.9	11/2-	E1+M2	+0.2 1	$R_{ADO}=1.37$ 7. DCO=1.3 2 gated on 971 γ . $\Delta_{IPDCO}=+0.11$ 6. $R_{ADO}=0.80$ 4.
		2465.9 <i>3</i>	63.7 13	5407.15	11/2-	E1+M2	-0.25 10	A_2 =-0.2 <i>T</i> (1970 wall). DCO=2.4 <i>3</i> gated on 3163γ. Δ_{IPDCO} =+0.21 <i>6</i> . R_{ADO} =0.77 <i>2</i> . A_2 =-0.21 <i>6</i> (1976 Wall).
8319.8	15/2-	2232.7 <mark>#</mark> 6	36.4 18	6087.41	13/2-			2
		2911.9 [#] 8	63.6 28	5407.15	$11/2^{-}$			R _{ADO} =1.35 5.
8324.4?	$(13/2^{-})$	2917 ^{@b}	100	5407.15	$11/2^{-}$	D(+Q)	-0.1 3	DCO=1.9 6 gated on 3163γ .
8481.4?	$(15/2^{-})$	2394 ^{@b}	<100	6087.41	13/2-	D(+Q)	+0.2 3	DCO=1.4 4 gated on 3163γ .
		3074 [@]	<100	5407.15	$11/2^{-}$			
8487.4	15/2-	2399.8# 8	75.9 26	6087.41	13/2-			
	(10)	3080.0" 7	24.1 15	5407.15	11/2-	54.03		R _{ADO} =1.20 <i>12</i> .
8558.3?	$(13/2^{-})$	2631 ev	100	5926.9	$11/2^{-1}$	D(+Q)	-0.2 3	DCO)=2.4 7 gated on 3163γ .
8/88./	15/2*	915.4" 4	100	/8/3.3	13/2	D(+Q)	-0.2 2	DCU=2.2 6 gated on 3163 γ . Rapp=0.69.3
8844.6	17/2+	971.4 2	100	7873.3	13/2+	Q		DCO=0.9 <i>I</i> gated on 2244γ. $\Delta_{IPDCO}=+0.08$ <i>4</i> . $R_{ADO}=1.38$ <i>3</i> . $A_2=+0.28$ <i>7</i> , $A_4=-0.18$ <i>7</i> (1976Wa11).
10181.1	19/2-	1336.3 [#] 5	37.4 13	8844.6	17/2+			DCO=2.0 4 gated on 971γ . R _{ADO} =0.75 2.

2004Ek01,2007De14,2007Ks01 (continued) $(HI,xn\gamma)$

$\gamma(^{35}\text{Cl})$ (continued)

E _i (level)	\mathbf{J}_i^{π}	E_{γ}^{\dagger}	Ι _γ &	$\mathbf{E}_f \qquad \mathbf{J}_f^{\pi}$	Comments
10181.1	19/2-	1693.5 [#] 5	31.5 33	8487.4 15/2-	R _{ADO} =1.44 7.
		1861.3 [#] 5	31.2 21	8319.8 15/2-	R _{ADO} =1.39 7.
10222.5	$17/2^{-}$	1377.8 [#] 10	100	8844.6 17/2+	R _{ADO} =1.32 <i>12</i> .
10859.1	$19/2^{+}$	2014.7 [#] 9	75 4	8844.6 17/2+	R _{ADO} =0.50 3.
		2069.8 [#] 10	25 2	8788.7 15/2+	R _{ADO} =1.57 11.
11459.1	$21/2^+$	2614.5 [#] 5	100	8844.6 17/2+	R _{ADO} =1.33 4.
12572.2	$23/2^{-}$	1113.3 [#] 5	19.6 14	11459.1 21/2+	R _{ADO} =0.86 9.
		2390.8 [#] 5	80.4 34	10181.1 19/2-	R _{ADO} =1.34 <i>12</i> .

[†] Weighted average from 1976Wa11, 1976Va24, 2004Ek01 and 2007De14, unless otherwise noted.

* From 1976Va24.
* From 2007De14.
@ From 2007Ks01.
& From 1976Wa11, 2004Ek01, 2007De14 and 2007Ks01. Weighted average is taken when available.

^{*a*} From $\gamma\gamma(\theta)$ in 1976Va24 and/or 2007Ks01. For mixing ratios, weighted average is taken when values are available from both.

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



(HI,xnγ) 2004Ek01,2007De14,2007Ks01

Legend

Level Scheme (continued)

Intensities: % photon branching from each level



 $^{35}_{17}\text{Cl}_{18}$





 $^{^{35}}_{17}\text{Cl}_{18}$