#### $^{124}$ Sn( $^{15}$ N,5n $\gamma$ ) 2001Ba75

		History	
Туре	Author	Citation	Literature Cutoff Date
Full Evaluation	A. A. Sonzogni	NDS 103, 1 (2004)	31-Jul-2004

E=82 MeV: Measured E $\gamma$ , I $\gamma$ ,  $\gamma\gamma$  and  $\gamma\gamma(\theta)$ (DCO) using the CAESAR detector array comprised of 6 Compton-suppressed HPGe detectors and 2 LEPS detectors. Other: 1992Ol03,  $^{128}$ Te( $^{10}$ B,4n $\gamma$ ), E=44 MeV.

E(level) <sup>†</sup>	J <sup>π</sup> ‡	E(level) <sup>†</sup>	J <sup>π</sup> ‡	E(level) <sup>†</sup>	Jπ‡	E(level) <sup>†</sup>	Jπ
0.0+y	6-	1812.6+y <i>4</i>	$12^{-}$	3138.9+y <sup>b</sup> 4		4357.2+y 5	$18^{+}$
53.36+y 20	7-	1886.2+y& 3	12-	3168.3+y <sup>e</sup> 4	16+	4434.0+y 5	
211.5+y <sup>&amp;</sup> 3	8-	1969.5+y <sup>@</sup> 3	13+	3279.6+y 4	$16^{+}$	4698.9+y <sup>@</sup> 4	$19^{+}$
240.8+y 3	8-	2051.1+y <sup>g</sup> 3	13+	3281.0+y <sup>c</sup> 5	16-	4729.6+y <sup>d</sup> 5	19-
518.7+y <sup>a</sup> 3	9-	2132.8+y <sup>a</sup> 4	13-	3284.7+y <sup>#</sup> 4	16+	4815.3+y <sup>f</sup> 4	19+
668.6+y <i>3</i>	9+	2168.3+y <sup>e</sup> 4	$14^{+}$	3352.4+y 4		4838.7+y 5	
813.6+y <sup>#</sup> 3	$10^{+}$	2198.1+y <sup>C</sup> 3	12-	3529.8+y 4		4866.6+y 5	$19^{+}$
925.6+y <i>3</i>	10-	2238.8+y <sup>b</sup> 3	12-	3775.8+y <sup>@</sup> 4	$17^{+}$	5079.4+y <sup>#</sup> 4	$20^{+}$
953.8+y 4		2369.0+y <sup>d</sup> 3	13-	3787.0+y 4	$17^{(+)}$	5110.9+y <sup>c</sup> 6	$20^{-}$
976.1+y <sup>&amp;</sup> 3	$10^{-}$	2404.3+y <sup>#</sup> 4	$14^{+}$	3789.4+y <sup>d</sup> 5	$17^{-}$	5144.6+y <i>4</i>	
1195.2+y <sup>@</sup> 3	$11^{+}$	2418.1+y <sup>g</sup> 4	$(14^{+})$	3825.0+y 4	$17^{+}$	5461.3+y 5	
1199.4+y <sup>b</sup> 3	10-	2596.7+y 4		3831.2+y <sup>f</sup> 4	$17^{+}$	5605.8+y <sup>d</sup> 6	(21-
1233.8+y <sup>a</sup> 3	$11^{-}$	2598.2+y <sup>C</sup> 4	$14^{-}$	3884.2+y 5	$17^{-}$	5714.4+y <sup>@</sup> 4	$21^{+}$
1412.1+y <sup>g</sup> 3	$11^{+}$	2640.9+y 4	$14^{+}$	3918.2+y 5		6137.3+y <sup>#</sup> 4	$22^{+}$
1533.2+y <sup>#</sup> 3	$12^{+}$	2690.3+y& 4	(14 <sup>-</sup> )	4025.8+y 5	$17^{-}$	6178.7+y <sup>C</sup> 7	(22-
1575.2+y <i>4</i>	$11^{(+)}$	2779.4+y <sup>f</sup> 4	15+	4120.9+y <sup>#</sup> 4	$18^{+}$	6742.0+y <sup>@</sup> 4	(23+
1710.3+y <sup>g</sup> 3	$12^{+}$	2832.4+y 4		4133.5+y <sup>e</sup> 4	$18^{+}$	6806.2+y <sup>d</sup> 7	(23-
1796.7+y <sup>b</sup> 4	11-	2850.1+y <sup>@</sup> 4	15+	4306.9+y <sup>c</sup> 5	$18^{-}$	7179.7+y <sup>#</sup> 5	(24+
1798.7+y 4	12+	2874.5+y <sup>d</sup> 5	15-	4315.6+y 4	18		

<sup>134</sup>La Levels

 $^{\dagger}$  From least-squares fit to Ey's.

<sup>‡</sup> As given by 2001Ba75, assuming that the 668+Y level has a J<sup> $\pi$ </sup> value of 9<sup>+</sup>, and the remaining values are deduced from  $\gamma$ multipolarities and band properties.

<sup>#</sup> Band(A):  $\pi h_{11/2} \nu h_{11/2}$ ,  $\alpha = 0$ .

- <sup>@</sup> Band(a):  $\pi h_{11/2} \nu h_{11/2}$ ,  $\alpha = 1$ .
- & Band(B): band based on  $8^-$ ,  $\alpha=0$ .
- <sup>*a*</sup> Band(b): band based on  $8^-$ ,  $\alpha = 1$ .
- <sup>b</sup> Band(C): band based on  $10^{-}$ .
- <sup>*c*</sup> Band(D):  $\pi h_{11/2} \nu g(_{7/2} h_{11/2}^2)$ ,  $\alpha = 0$ .
- <sup>d</sup> Band(d):  $\pi h_{11/2} \nu(g_{7/2} h_{11/2}^2)$ ,  $\alpha = 1$ .
- <sup>*e*</sup> Band(E):  $\pi g_{7/2} \nu (g_{7/2} h_{11/2}^2)$ ,  $\alpha = 0$ .
- <sup>f</sup> Band(e):  $\pi g_{7/2} \nu (g_{7/2} h_{11/2}^2)$ ,  $\alpha = 1$ .
- <sup>*g*</sup> Band(F): Chiral doublet partner of  $\pi h_{11/2} \nu h_{11/2}$ .

## <sup>124</sup>Sn(<sup>15</sup>N,5nγ) **2001Ba75** (continued)

# $\gamma(^{134}\text{La})$

 $DCO=I[\gamma_1(48^\circ/145^\circ),\gamma_2(97^\circ)]/I[\gamma_1(97^\circ),\gamma_2(48^\circ/145^\circ)]$ .  $DCO_1=DCO$  ratio with gate on a stretched quadrupole transition.  $DCO_2=DCO$  ratio with gate on a stretched dipole transition.

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Eγ	$I_{\gamma}$	$E_i$ (level)	$\mathbf{J}_i^{\pi}$	$E_f$	$\mathbf{J}_{f}^{\pi}$	Mult.	Comments
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	53.35 3		53.36+y	7-	0.0+y	6-		DCO <sub>1</sub> =0.57 7.
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			2		2			$DCO_2 = 0.76 \ 8.$
$        \begin{array}{ccccccccccccccccccccccccccccc$	120.69 <i>3</i>	8.7 <i>3</i>	1533.2+y	$12^{+}$	1412.1+y	$11^{+}$		
	130.14 <i>3</i>	32.1 10	2369.0+y	13-	2238.8+y	12-		$DCO_1 = 0.59$ 7.
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	144.67 <i>3</i>	182 6	813.6+y	$10^{+}$	668.6+y	9+		$DCO_1 = 0.63 \ 4.$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$								DCO <sub>2</sub> =0.95 4.
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	149.65 <i>4</i>	9.4 <i>3</i>	668.6+y	9+	518.7+y	9-		$DCO_1 = 1.0 \ 6.$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	158.10 <i>3</i>	90 4	211.5+y	8-	53.36+y	7-	M1(+E2)	$\alpha(\exp)=0.23$ 9
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$								$DCO_1 = 0.61 \ 3.$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	170.70 3	39.5 12	2369.0+y	13-	2198.1+y	$12^{-}$		$DCO_1 = 0.55 5.$
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	187.51 3	92 4	240.8+y	8-	53.36+y	7-	M1(+E2)	$\alpha(\exp)=0.145$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$								$DCO_1 = 0.68 \ 4.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		100.0						$DCO_2 = 0.95 4.$
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	229.14 3	103 3	2598.2+y	14-	2369.0+y	13-		$DCO_1 = 0.61 \ 4.$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	246.78 19	1.7 3	2132.8+y	13-	1886.2+y	12-		D.00 0.50 5
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	257.57 3	31.1 10	1233.8+y	11	9/6.1+y	10		$DCO_1 = 0.53 5.$
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	263.91 5	5.4 3	5079.4+y	201	4815.3+y	19'		$DCO_2 = 1.3 4.$
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	276.33 3	96.3	28/4.5+y	15	2598.2+y	14		$DCO_1 = 0.59 4.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	278.02.5	10.3 4	518.7+y	9 10+	240.8+y	8		DCO 102
$\begin{array}{rcrcrcrc} 298.194 & 11.14 & 1710.3+y & 18 & 522.3h+y & 17 & DCO_2=0.82 & 24.\\ 307.103 & 108 & 3 & 518.7+y & 9^- & 211.5+y & 8^- & DCO_1=0.48 & 3.\\ 338.073 & 57.4 & 18 & 1533.2+y & 12^+ & 1195.2+y & 11^+ & DCO_2=0.80 & 6.\\ 345.47 & 8 & 3.3 & 2 & 4120.9+y & 18^+ & 3775.8+y & 17^+ & \\ 352.404 & 9.2 & 2238.8+y & 12^- & 1886.2+y & 12^- & \\ 379.77 & 20 & 2.2 & 4 & 5079.4+y & 20^+ & 4698.9+y & 19^+ & \\ 381.28^{\dagger} & 3 & 157^{\dagger} & 5 & 1195.2+y & 11^+ & 813.6+y & 10^+ & DCO_1=0.37 & 4.\\ DCO_2=0.82 & 5. & \\ 388.486 & 6.7 & 3 & 3168.3+y & 16^+ & 2779.4+y & 15^+ & DCO_1=0.37 & 4.\\ 22.703 & 25.9 & 4729.6+y & 19^- & 4729.6+y & 19^- & DCO_1=0.48 & 7.\\ 422.703 & 25.9 & 4729.6+y & 19^- & 4306.9+y & 18^- & DCO_1=0.55 & 4.\\ 423.454 & 32.1 & 13 & 2404.3+y & 14^+ & 1969.5+y & 13^+ & DCO_1=0.56 & 7.\\ 434.454 & 32.1 & 13 & 2404.3+y & 14^+ & 1969.5+y & 13^+ & DCO_1=0.62 & 4.\\ 434.454 & 32.1 & 13 & 2404.3+y & 14^+ & 1969.5+y & 13^+ & DCO_1=0.62 & 4.\\ 434.68 & 43.3 & 14 & 2850.1+y & 15^+ & DCO_2=0.81 & 5.\\ 442.315 & 7.6 & 3 & 2238.8+y & 12^- & 1796.7+y & 11^- & DCO_2=0.81 & 5.\\ 445.68 & 43.3 & 14 & 2850.1+y & 15^+ & 2404.3+y & 14^+ & DCO_1=0.57 & 5.\\ 456.92 & 7.53 & 24 & 668.6+y & 9^+ & 211.5+y & 8^- & DCO_1=0.62 & 4.\\ 457.45 & 16.0 & 7 & 976.1+y & 10^- & 518.7+y & 9^- & DCO_2=1.02.\\ 456.83 & 43.3 & 14 & 2850.1+y & 15^+ & 2404.3+y & 14^+ & DCO_1=0.57 & 5.\\ 456.92 & 7.53 & 24 & 668.6+y & 9^+ & 211.5+y & 8^- & DCO_2=0.81 & 5.\\ 457.54 & 16.0 & 7 & 976.1+y & 10^- & 518.7+y & 9^- & DCO_2=1.02.\\ 458.87 & 7 & 784.25 & 2168.3+y & 14^+ & 1710.3+y & 12^+ & DCO_2=1.29.9 & 17.\\ 456.83 & 43.3 & 14 & 2850.1+y & 15^+ & 15^+ & DCO_2=1.29.9 & 17.\\ 456.99 & 15 & 38.4 & 2051.1+y & 13^+ & 1575.2+y & 11(^+) & 0CO_2=1.29.9 & 17.\\ 456.97 & 736.94.4y & 17^+ & 328.7+y & 16^+ & DCO_1=0.63 & 5.\\ 494.87 & 3 & 19.76 & 5050.8+y & (21^-) & 511.0+y & 20^- & DCO_1=0.64 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 020.1+0.61 & 12. & 02$	289.25 4	10.3 4	4120.9+y	18	3831.2+y	17+		$DCO_2 = 1.0 2.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	295.52 0	3.2.3	4120.9+y	18	3823.0+y	11+		$DCO_2 = 0.85 24.$
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	298.19 4	11.14	1/10.3+y	12	1412.1+y	0-		$DCO_2 = 1.0 2.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	307.10 3	57 4 18	1522 2 H	9 12+	211.3 + y 1105 2 + y	0 11+		$DCO_1 = 0.465$ .
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	340.85.5	1306	1333.2+y 2051 1+y	12 13 <sup>+</sup>	1793.2 + y 1710.3 + y	$11 \\ 12^+$		$DCO_2 = 0.80 \ 0.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	345.03 5	332	$2031.1 \pm y$ $4120.0 \pm y$	13	$1710.3 \pm y$ $3775.8 \pm y$	12		$DCO_2 = 0.7772.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	352 40 4	9.32	$2738 \ 8\pm y$	10	$1886.2 \pm v$	$17 \\ 12^{-}$		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	379 77 20	2.2 + 2.2 = 4	$5079.4 \pm v$	$20^{+}$	$4698.9 \pm v$	10+		
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$291.09^{+}.20$	157 5	1105 2 ····	11+	912 C +	10+		DCO 0.27.4
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	381.28 3	157 5	1195.2+y	11	813.0+y	10		$DCO_1 = 0.374$ .
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$		<b>•• - †</b> •		• • •	1=20 4	10-		$DCO_2 = 0.82$ 3.
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	381.28 3	22.718	5110.9+y	20-	4729.6+y	19-		$DCO_1 = 0.48$ 7.
406.52 $3$ 82.3 $25$ 5281.0+y1628/4.5+y15DCO1=0.55 $4$ .422.70 $3$ 25.9 $8$ 4729.6+y19 <sup>-</sup> 4306.9+y18 <sup>-</sup> DCO1=0.56 $7$ .427.49 $3$ 176 $5$ 668.6+y9 <sup>+</sup> 240.8+y $8^-$ DCO1=0.51 $6$ .434.45 $4$ 32.1 $13$ 2404.3+y14 <sup>+</sup> 1969.5+y13 <sup>+</sup> DCO1=0.51 $6$ .434.97 $4$ 33.2 $15$ 3284.7+y16 <sup>+</sup> 2850.1+y15 <sup>+</sup> DCO for 434.45+434.97.436.33 $3$ 68.7 $22$ 1969.5+y13 <sup>+</sup> 1533.2+y12 <sup>+</sup> DCO2=0.81 $5$ .442.31 $5$ 7.6 $3$ 2238.8+y12 <sup>-</sup> 1796.7+y11 <sup>-</sup> DCO1=0.57 $5$ .445.68 $3$ 43.3 $14$ 2850.1+y15 <sup>+</sup> 2404.3+y14 <sup>+</sup> DCO1=0.57 $5$ .456.92 $3$ 75.3 $24$ 668.6+y9 <sup>+</sup> 211.5+y8 <sup>-</sup> DCO1=0.61 $8$ .457.54 $5$ 16.0 $7$ 976.1+y10 <sup>-</sup> 518.7+y9 <sup>-</sup> DCO2=1.22 $9$ .458.27 $3$ 78.4 $25$ 2168.3+y14 <sup>+</sup> 1710.3+y12 <sup>+</sup> DCO2=1.59 $11$ .476.29 $4$ 21.4 $7$ 1710.3+y12 <sup>+</sup> 1233.8+y11 <sup>-</sup> DCO1=0.63 $5$ .490.75 $4$ 16.4 $6$ 3775.8+y17 <sup>+</sup> 3284.7+y16 <sup>+</sup> DCO1=0.76 $12$ .502.25 $4$ 13.3 $5$ 3787.0+y17 <sup>(+)</sup> 3284.7+y16 <sup>+</sup> DCO1=0.48 $5$ .508.57 $3$ 53.9 $17$ 3789.4+y17 <sup>-</sup> 3281.0+y16 <sup>-</sup> DCO1=0.48 $5$ .	388.48 6	6.7 3	3168.3+y	16'	2779.4+y	15'		$DCO_1 = 0.395.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	406.52 3	82.3 25	3281.0+y	16	2874.5+y	15		$DCO_1 = 0.55 \ 4.$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	422.70.3	25.9 8	4/29.6+y	19	4306.9+y	18		$DCO_1 = 0.56 /.$
434.43 4 $32.115$ $2404.3+y$ $14^{+}$ $1969.3+y$ $15^{+}$ $DCO_1=0.516.$ DCO for $434.45+434.97.$ $434.974$ $33.215$ $3284.7+y$ $16^{+}$ $2850.1+y$ $15^{+}$ $DCO$ for $434.45+434.97.$ $436.33$ $68.722$ $1969.5+y$ $13^{+}$ $1533.2+y$ $12^{+}$ $DCO_2=0.815.$ $442.315$ $7.63$ $2238.8+y$ $12^{-}$ $1796.7+y$ $11^{-}$ $DCO_2=1.02.$ $445.683$ $43.314$ $2850.1+y$ $15^{+}$ $2404.3+y$ $14^{+}$ $DCO_1=0.575.$ $456.923$ $75.324$ $668.6+y$ $9^{+}$ $211.5+y$ $8^{-}$ $DCO_1=0.618.$ $457.545$ $16.07$ $976.1+y$ $10^{-}$ $518.7+y$ $9^{-}$ $DCO_2=1.229.$ $458.273$ $78.425$ $2168.3+y$ $14^{+}$ $1710.3+y$ $12^{+}$ $DCO_2=1.591.1.$ $475.9915$ $3.84$ $2051.1+y$ $13^{+}$ $1575.2+y$ $11^{(+)}$ $DCO_1=0.635.$ $490.754$ $16.46$ $3775.8+y$ $17^{+}$ $3284.7+y$ $16^{+}$ $DCO_1=0.7612.$ $494.873$ $19.76$ $5605.8+y$ $(21^{-})$ $5110.9+y$ $20^{-}$ $DCO_1=0.4512.$ $502.254$ $13.35$ $3787.0+y$ $17^{(+)}$ $3284.7+y$ $16^{+}$ $DCO_1=0.4512.$ $508.573$ $53.917$ $3789.4+y$ $17^{-}$ $3281.0+y$ $16^{-}$ $DCO_1=0.485.$	427.49 3	1/6.5	008.0+y	9 <sup>1</sup>	240.8+y	8 12+		$DCO_1 = 0.624$ .
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	454.45 4	52.1 15	2404.5+y	14	1909.3+y	15		$DCO_1 = 0.310$ .
436.37 433.2 133284.7+y162850.1+y13DCO 101 434.43+434.97.436.33 368.7 221969.5+y13 <sup>+</sup> 1533.2+y12 <sup>+</sup> DCO2=0.81 5.442.31 57.6 32238.8+y12 <sup>-</sup> 1796.7+y11 <sup>-</sup> DCO2=1.0 2.445.68 343.3 142850.1+y15 <sup>+</sup> 2404.3+y14 <sup>+</sup> DCO1=0.57 5.456.92 375.3 24668.6+y9 <sup>+</sup> 211.5+y8 <sup>-</sup> DCO2=1.02 9.458.27 378.4 252168.3+y14 <sup>+</sup> 1710.3+y12 <sup>+</sup> DCO2=1.59 11.475.99 153.8 42051.1+y13 <sup>+</sup> 1575.2+y11 <sup>(+)</sup> 14 <sup>+</sup> 476.29 421.4 71710.3+y12 <sup>+</sup> 1233.8+y11 <sup>-</sup> DCO1=0.63 5.490.75 416.4 63775.8+y17 <sup>+</sup> 3284.7+y16 <sup>+</sup> DCO1=0.76 12.502.25 413.3 53787.0+y17 <sup>(+)</sup> 3284.7+y16 <sup>+</sup> DCO1=0.45 12.508.57 353.9 173789.4+y17 <sup>-</sup> 3281.0+y16 <sup>-</sup> DCO1=0.48 5.	121 07 1	22 2 15	2294 7 1 1	16+	2850 1 1 1	15+		DCO 101 $434.43 + 434.97$ .
442.31 57.6 32238.8+y1212 $DCO_2=0.815$ .442.31 57.6 32238.8+y12 <sup>-</sup> 1796.7+y11 <sup>-</sup> $DCO_2=1.0.2$ .445.68 343.3 142850.1+y15 <sup>+</sup> 2404.3+y14 <sup>+</sup> $DCO_1=0.575$ .456.92 375.3 24668.6+y9 <sup>+</sup> 211.5+y8 <sup>-</sup> $DCO_2=1.229$ .457.54 516.0 7976.1+y10 <sup>-</sup> 518.7+y9 <sup>-</sup> $DCO_2=1.59$ 11.455.99 153.8 42051.1+y13 <sup>+</sup> 1575.2+y11 <sup>(+)</sup> $DCO_1=0.635$ .476.29 421.4 71710.3+y12 <sup>+</sup> 1233.8+y11 <sup>-</sup> $DCO_1=0.635$ .490.75 416.4 63775.8+y17 <sup>+</sup> 3284.7+y16 <sup>+</sup> $DCO_1=0.76$ 12.502.25 413.3 53787.0+y17 <sup>(+)</sup> 3284.7+y16 <sup>+</sup> $DCO_1=0.45$ 12.508.57 353.9 173789.4+y17 <sup>-</sup> 3281.0+y16 <sup>-</sup> $DCO_1=0.48$ 5.	434.97 4	55.2 15 68 7 22	$1060.5 \pm y$	10	$2630.1 \pm y$ 1533 2 ± y	12+		$DCO_{101} + 34.43 + 434.97.$
$445.68$ $3$ $13$ $2250.8+y$ $12$ $1750.7+y$ $11$ $DCO_2=1.02$ $445.68$ $3$ $314$ $2850.1+y$ $15^+$ $2404.3+y$ $14^+$ $DCO_1=0.57$ $456.92$ $3$ $75.3$ $24$ $668.6+y$ $9^+$ $211.5+y$ $8^ DCO_1=0.61$ $457.54$ $5$ $16.0$ $7$ $976.1+y$ $10^ 518.7+y$ $9^ DCO_2=1.22$ $458.27$ $78.4$ $25$ $2168.3+y$ $14^+$ $1710.3+y$ $12^+$ $DCO_2=1.59$ $475.99$ $15$ $3.8$ $4$ $2051.1+y$ $13^+$ $1575.2+y$ $11^{(+)}$ $476.29$ $4$ $21.4$ $7$ $1710.3+y$ $12^+$ $1233.8+y$ $11^ 490.75$ $4$ $16.4$ $6$ $3775.8+y$ $17^+$ $3284.7+y$ $16^+$ $494.87$ $3$ $19.7$ $6$ $5605.8+y$ $(21^-)$ $5110.9+y$ $20^ DCO_1=0.76$ $502.25$ $4$ $13.3$ $5$ $3787.0+y$ $17^{(+)}$ $3284.7+y$ $16^+$ $DCO_1=0.45$ $508.57$ $3$ $53.9$ $17$ $3789.4+y$ $17^ 3281.0+y$ $16^ DCO_1=0.48$	442 31 5	763	$1909.3 \pm y$ 2238 8±y	$13^{-1}$	1555.2 + y 1706 7+y	11-		$DCO_2 = 1.0.2$
445.06 543.5 142650.14 y152404.54 y14DCO1=0.57 5. $456.92 3$ $75.3 24$ $668.6+y$ $9^+$ $211.5+y$ $8^-$ DCO1=0.61 8. $457.54 5$ $16.0 7$ $976.1+y$ $10^ 518.7+y$ $9^-$ DCO2=1.22 9. $458.27 3$ $78.4 25$ $2168.3+y$ $14^+$ $1710.3+y$ $12^+$ DCO2=1.59 11. $475.99 15$ $3.8 4$ $2051.1+y$ $13^+$ $1575.2+y$ $11^{(+)}$ $11^{(+)}$ $476.29 4$ $21.4 7$ $1710.3+y$ $12^+$ $1233.8+y$ $11^ DCO_1=0.63 5.$ $490.75 4$ $16.4 6$ $3775.8+y$ $17^+$ $3284.7+y$ $16^+$ $DCO_1=0.76 12.$ $502.25 4$ $13.3 5$ $3787.0+y$ $17^{(+)}$ $3284.7+y$ $16^+$ $DCO_1=0.45 12.$ $508.57 3$ $53.9 17$ $3789.4+y$ $17^ 3281.0+y$ $16^ DCO_1=0.48 5.$	442.51 5	13 3 14	$2230.0 \pm y$ 2850 1 $\pm y$	12	$1790.7 \pm y$ $2404.3 \pm y$	$11 \\ 1/1^+$		$DCO_2 = 1.0 2.$
450.52 516.5 24000.01 y $j$ $211.51 y$ $0$ $DCO_1 = 0.01 0.$ 457.54 516.0 7976.1+y $10^ 518.7+y$ $9^ DCO_2 = 1.22 9.$ 458.27 378.4 252168.3+y $14^+$ $1710.3+y$ $12^+$ $DCO_2 = 1.59 11.$ 475.99 153.8 42051.1+y $13^+$ $1575.2+y$ $11^{(+)}$ 476.29 421.4 71710.3+y $12^+$ $1233.8+y$ $11^ DCO_1 = 0.63 5.$ 490.75 416.4 63775.8+y $17^+$ $3284.7+y$ $16^+$ $DCO_1 = 0.76 12.$ 502.25 413.3 53787.0+y $17^{(+)}$ $3284.7+y$ $16^+$ $DCO_1 = 0.45 12.$ 508.57 353.9 173789.4+y $17^ 3281.0+y$ $16^ DCO_1 = 0.48 5.$	456 92 3	75 3 24	2650.1 + y 668.6+y	0 <sup>+</sup>	2404.5+y 211 5+y	8-		$DCO_1 = 0.57.5$
10.131310.0710.11191010.11191010.111910458.27378.4252168.3+y14 <sup>+</sup> 1710.3+y12 <sup>+</sup> $DCO_2=1.22$ $DCO_2=1.59$ $II.$ 475.99153.842051.1+y13 <sup>+</sup> 1575.2+y $11^{(+)}$ $DCO_1=0.63$ $5.$ 476.29421.471710.3+y12 <sup>+</sup> 1233.8+y $11^ DCO_1=0.63$ $5.$ 490.75416.463775.8+y $17^+$ 3284.7+y $16^+$ $DCO_1=0.76$ $12.$ 502.25413.353787.0+y $17^{(+)}$ 3284.7+y $16^+$ $DCO_1=0.45$ $12.$ 508.57353.9 $17$ 3789.4+y $17^-$ 3281.0+y $16^ DCO_1=0.48$ $5.$	457 54 5	16.0.7	976.1 + y	10-	518.7 + y	0- 0-		$DCO_2 = 1.22.9$
$100.215$ $100.125$ $2100.547$ $11$ $1110.547$ $12$ $DCO_2 = 1.5711$ $475.99$ $15$ $3.84$ $2051.1+y$ $13^+$ $1575.2+y$ $11^{(+)}$ $476.294$ $21.47$ $1710.3+y$ $12^+$ $1233.8+y$ $11^ DCO_1 = 0.635.$ $490.754$ $16.46$ $3775.8+y$ $17^+$ $3284.7+y$ $16^+$ $494.873$ $19.76$ $5605.8+y$ $(21^-)$ $5110.9+y$ $20^ DCO_1 = 0.7612.$ $502.254$ $13.35$ $3787.0+y$ $17^{(+)}$ $3284.7+y$ $16^+$ $DCO_1 = 0.4512.$ $508.573$ $53.917$ $3789.4+y$ $17^ 3281.0+y$ $16^ DCO_1 = 0.485.$	458 27 3	78.4.25	$2168.3 \pm v$	$14^{+}$	1710.3 + y	12+		$DCO_2 = 1.22$ ).
$175.74$ $2051.1+y$ $12^{+}$ $1275.2+y$ $11^{-}$ $DCO_1=0.635.$ $476.294$ $21.47$ $1710.3+y$ $12^{+}$ $1233.8+y$ $11^{-}$ $DCO_1=0.635.$ $490.754$ $16.46$ $3775.8+y$ $17^{+}$ $3284.7+y$ $16^{+}$ $DCO_1=0.7612.$ $494.873$ $19.76$ $5605.8+y$ $(21^{-})$ $5110.9+y$ $20^{-}$ $DCO_1=0.7612.$ $502.254$ $13.35$ $3787.0+y$ $17^{(+)}$ $3284.7+y$ $16^{+}$ $DCO_1=0.4512.$ $508.573$ $53.917$ $3789.4+y$ $17^{-}$ $3281.0+y$ $16^{-}$ $DCO_1=0.485.$	475 99 15	384	$2051.1 \pm v$	13+	$1575.2 \pm v$	$11^{(+)}$		
490.75 416.4 63775.8+y17+3284.7+y16+494.87 319.7 65605.8+y $(21^-)$ 5110.9+y20^-DCO1=0.76 12.502.25 413.3 53787.0+y $17^{(+)}$ 3284.7+y16+DCO1=0.45 12.508.57 353.9 173789.4+y17^-3281.0+y16^-DCO1=0.48 5.	476 29 4	21.07	$1710.3 \pm v$	$12^{+}$	$1273.2 \pm y$ 1233.8 \pm y	11-		$DCO_1 = 0.63.5$
494.87 319.7 65605.8+y $(21^-)$ 5110.9+y $20^-$ DCO1=0.76 12.502.25 413.3 53787.0+y $17^{(+)}$ 3284.7+y $16^+$ DCO1=0.45 12.508.57 353.9 173789.4+y $17^-$ 3281.0+y $16^-$ DCO1=0.48 5.	490 75 4	1646	3775 8+v	$12^{12}$ $17^{+}$	3284.7+v	16+		2001-0.05 5.
502.25 4   13.3 5   3787.0+y $17^{(+)}$ 3284.7+y $16^+$ DCO <sub>1</sub> =0.45 12.     508.57 3   53.9 17   3789.4+y $17^-$ 3281.0+y $16^-$ DCO <sub>1</sub> =0.48 5.	494.87 3	19.7 6	5605 8+v	$(21^{-})$	5110.9 + v	20-		$DCO_1 = 0.76 12$
$508.57 \ 3 \ 53.9 \ 17 \ 3789.4 + y \ 17^{-} \ 3281.0 + y \ 16^{-} \ DCO_1 = 0.48 \ 5.$	502.25.4	13 3 5	3787 0+v	$17^{(+)}$	3284.7+v	16+		$DCO_1 = 0.45.12$
	508.57 3	53.9 17	3789.4+v	17-	3281.0+v	16-		$DCO_1 = 0.48 5.$

Continued on next page (footnotes at end of table)

# <sup>124</sup>Sn(<sup>15</sup>N,5nγ) **2001Ba75** (continued)

# $\gamma$ <sup>(134</sup>La) (continued)</sup>

$E_{\gamma}$	$I_{\gamma}$	E <sub>i</sub> (level)	$\mathbf{J}_i^{\pi}$	$\mathbf{E}_{f}$	$\mathbf{J}_f^{\pi}$	Comments
515.40 3	63.1 20	1710.3+v	$12^{+}$	1195.2+v	11+	DCO <sub>1</sub> =0.40 4.
						$DCO_2=0.73$ 5.
517.49 <i>3</i>	30.2 10	4306.9+y	18-	3789.4+y	$17^{-}$	$DCO_1 = 0.49$ 7.
539.79 5	10.8 4	4315.6+y	18	3775.8+y	$17^{+}$	DCO <sub>2</sub> =0.94 11.
545.60 6	11.9 5	2596.7+y		2051.1+y	13+	-
556.75 7	5.9 2	2369.0+y	13-	1812.6+y	$12^{-}$	
570.20 5	11.6 5	4357.2+y	$18^{+}$	3787.0+y	$17^{(+)}$	DCO <sub>2</sub> =0.86 8.
572.89 4	14.9 5	6178.7+y	$(22^{-})$	5605.8+y	$(21^{-})$	DCO <sub>1</sub> =0.57 12.
577.78 5	12.3 5	4698.9+y	19+	4120.9+y	$18^{+}$	DCO <sub>2</sub> =0.99 14.
597.42 5	11.9 6	1796.7+y	11-	1199.4+y	$10^{-}$	DCO <sub>2</sub> =0.73 9.
598.67 4	22.9 9	1412.1+y	$11^{+}$	813.6+y	$10^{+}$	DCO <sub>1</sub> =0.15 <i>16</i> .
603.17 5	11.8 5	3884.2+y	$17^{-}$	3281.0+y	16-	
603.47 5	20.9 9	1798.7+y	$12^{+}$	1195.2+y	$11^{+}$	DCO <sub>2</sub> =0.77 6.
604.35 5	6.5 20	6742.0+y	$(23^{+})$	6137.3+y	$22^{+}$	
611.05 4	29.1 10	2779.4+y	$15^{+}$	2168.3+y	$14^{+}$	
627.52 5	8.6 <i>3</i>	6806.2+y	(23 <sup>-</sup> )	6178.7+y	(22 <sup>-</sup> )	
635.17 6	9.2 4	5714.4+y	$21^{+}$	5079.4+y	$20^{+}$	$DCO_2 = 0.76 \ 16.$
637.22 12	3.8 <i>3</i>	3918.2+y		3281.0+y	16-	
644.59 8	5.7 3	4434.0+y		3789.4+y	17-	
652.26 6	10.6 5	1886.2+y	12-	1233.8+y	11-	$DCO_1 = 0.45 \ 9.$
656.34 6	8.5 4	3825.0+y	17+	3168.3+y	16+	$DCO_1 = 0.33 \ 8.$
662.55 6	11.8 5	3831.2+y	17+	3168.3+y	16+	$DCO_1 = 0.45$ 7.
671.40 5	17.4 7	2640.9+y	14+	1969.5+y	$13^{+}$	$DCO_2 = 0.65 \ 8.$
680.76 <i>4</i>	24.7 10	1199.4+y	10-	518.7+y	9-	$DCO_2=0.77$ 6.
684.85 <i>4</i>	20.6 10	925.6+y	10-	240.8+y	8-	$DCO_2 = 1.68 \ l6.$
705.13 8	6.9 4	4838.7+y		4133.5+y	18+	
707.89 8	8.5 5	2418.1+y	$(14^{+})$	1710.3+y	$12^{+}$	
715.35 3	69.4 22	1233.8+y	11-	518.7+y	9-	
719.46 3	55.8 18	1533.2+y	12+	813.6+y	10+	$DCO_2 = 1.46 \ 10.$
733.03 9	5.1 3	4866.6+y	19+	4133.5+y	$18^{+}$	$DCO_2 = 0.69 \ 17.$
735.52 12	4.4 3	976.1+y	10-	240.8+y	8-	
742.3 3	4.3 8	953.8+y		211.5+y	8-	
743.49 6	14.7 7	1412.1+y	11+	668.6+y	9+	$DCO_2 = 1.6 2.$
744.66 6	10.2 4	4025.8+y	17-	3281.0+y	16-	$DCO_2 = 0.87 \ 11.$
761.66 10	8.76	1575.2+y	$11^{(+)}$	813.6+y	$10^{+}$	$DCO_2 = 0.84 \ 14.$
764.71 <i>4</i>	26.5 11	976.1+y	10-	211.5+y	8-	$DCO_2 = 1.73 \ 11.$
774.38 6	12.7 5	1969.5+y	13+	1195.2+y	$11^{+}$	$DCO_2 = 1.26 \ 16.$
804.00 9	9.3 6	2690.3+y	$(14^{-})$	1886.2+y	12-	
836.21 4	20.1 7	4120.9+y	18+	3284.7+y	16+	$DCO_2 = 1.40 \ 15.$
841.43 <i>13</i>	3.9 3	4120.9+y	18+	3279.6+y	16+	
855.71 9	7.8 5	2051.1+y	13+	1195.2+y	11+	<b>PCO</b>
870.84 4	39.9 13	2404.3+y	14+	1533.2+y	12+	$DCO_1 = 0.89 9.$
879.71.6	14.9 9	3284.7+y	16	2404.3+y	14	$DCO_2 = 1.53 \ 14.$
881.04 6	17.69	2850.1+y	15+	1969.5+y	13+	
887.24 6	15.6 7	1812.6+y	12	925.6+y	10	$DCO_2 = 1.72$ 16.
898.85 10	11.2 8	2132.8+y	13	1233.8+y	11	$DCO_1 = 1.09 \ I3.$
900.14 12	10.1 9	3138.9+y	10-	2238.8+y	12	DC0 0.00 22
910.30 8	8.1.5	1886.2+y	12	9/6.1+y	10	$DCO_1 = 0.98$ 22.
914.01 <i>1</i> 8	2.0 5	5/89.4+y	1 / 10 <sup>+</sup>	28/4.3+y	13 17 <sup>+</sup>	
923.03 15	5.15	4698.9+y	19	3//5.8+y	1/	
923.18 10	0.3 4	5775.8+y	17.	2830.1+y	13.	
947.4 <sup>+</sup> 4	1.1 2	5079.4+y	$20^{+}$	4133.5+y	18+	$E_{\gamma}$ : Poor fit in the level scheme. Level energy difference=945.9.
948.02 8	8.4 4	3352.4+y	<b>a</b> 0 1	2404.3+y	14+	
958.55 4	21.8 7	5079.4+y	20+	4120.9+y	18+	$DCO_2 = 1.8 2.$
964.43 <i>3</i>	27.2 10	2198.1+y	$12^{-}$	1233.8+y	11-	$DCO_1 = 0.35 \ 4.$

#### $^{124}$ Sn( $^{15}$ N,5n $\gamma$ ) 2001Ba75 (continued)

# $\gamma(^{134}$ La) (continued)

Eγ	$I_{\gamma}$	E <sub>i</sub> (level)	$\mathbf{J}_i^{\pi}$	$E_f$	$\mathbf{J}_{f}^{\pi}$	Comments
965.59 4	19.5 7	4133.5+y	18+	3168.3+y	16+	DCO <sub>1</sub> =0.86 10.
		-		2		DCO <sub>2</sub> =1.46 18.
984.07 10	5.0 <i>3</i>	4815.3+y	19+	3831.2+y	$17^{+}$	
990.86 14	3.6 3	4815.3+y	19+	3825.0+y	$17^{+}$	
998.76 6	9.2 4	2198.1+y	12-	1199.4+y	$10^{-}$	DCO <sub>2</sub> =1.8 2.
1000.21 4	42.5 14	3168.3+y	16+	2168.3+y	$14^{+}$	DCO <sub>2</sub> =1.9 2.
1002.06 17	3.0 2	2198.1+y	12-	1195.2+y	$11^{+}$	
1005.27 4	21.3 8	2238.8+y	$12^{-}$	1233.8+y	$11^{-}$	DCO <sub>1</sub> =0.46 <i>6</i> .
1015.59 9	5.9 <i>3</i>	5714.4+y	$21^{+}$	4698.9+y	19+	
1019.80 15	4.1 3	2832.4+y		1812.6+y	$12^{-}$	
1023.68 14	4.7 <i>3</i>	5144.6+y		4120.9+y	$18^{+}$	
1025.96 8	5.5 <i>3</i>	4306.9+y	18-	3281.0+y	16-	
1028.19 18	2.9 3	6742.0+y	$(23^{+})$	5714.4+y	$21^{+}$	
1038.57 12	4.2 3	4815.3+y	19+	3775.8+y	$17^{+}$	
1039.19 7	7.9 <i>3</i>	2238.8+y	12-	1199.4+y	$10^{-}$	
1042.39 10	6.2 3	7179.7+y	$(24^{+})$	6137.3+y	$22^{+}$	
1043.09 10	5.3 <i>3</i>	2238.8+y	$12^{-}$	1195.2+y	$11^{+}$	
1046.25 9	6.8 4	3825.0+y	$17^{+}$	2779.4+y	$15^{+}$	
1051.77 9	5.7 3	3831.2+y	$17^{+}$	2779.4+y	$15^{+}$	
1057.66 4	21.0 7	6137.3+y	$22^{+}$	5079.4+y	$20^{+}$	$DCO_1 = 0.87 \ 12.$
1111.52 9	7.1 4	3279.6+y	16+	2168.3+y	$14^{+}$	
1125.40 12	5.4 4	3529.8+y		2404.3+y	$14^{+}$	
1151.55 12	3.9 <i>3</i>	4025.8+y	17-	2874.5+y	$15^{-}$	DCO <sub>2</sub> =1.9 9.
1222.41 11	3.4 2	2198.1+y	$12^{-}$	976.1+y	$10^{-}$	
1263.07 16	2.6 2	2238.8+y	12-	976.1+y	$10^{-}$	
1272.27 12	2.9 2	2198.1+y	$12^{-}$	925.6+y	10-	
1312.99 10	4.0 2	2238.8+y	12-	925.6+y	10-	
1327.81 14	3.0 2	5461.3+y		4133.5+y	$18^{+}$	

<sup>†</sup> Multiply placed with intensity suitably divided.
<sup>‡</sup> Placement of transition in the level scheme is uncertain.

## $^{124}$ Sn( $^{15}$ N,5n $\gamma$ ) 2001Ba75



<sup>134</sup><sub>57</sub>La<sub>77</sub>

## <sup>124</sup>Sn(<sup>15</sup>N,5nγ) 2001Ba75



<sup>134</sup><sub>57</sub>La<sub>77</sub>

#### $^{124}$ Sn( $^{15}$ N,5n $\gamma$ ) 2001Ba75

### Level Scheme (continued)

Legend Intensities: Relative  $I_{\gamma}$ ٠ @ Multiply placed: intensity suitably divided •



### $^{124}$ Sn( $^{15}$ N,5n $\gamma$ ) 2001Ba75

## Level Scheme (continued)

Level Scheme (continued)	Legend			
Intensities: Relative $I_{\gamma}$ @ Multiply placed: intensity suitably divided	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			



<sup>134</sup><sub>57</sub>La<sub>77</sub>











<sup>134</sup><sub>57</sub>La<sub>77</sub>