### <sup>205</sup>Tl(γ,γ') 1974Ol05,2016Be31

		History	
Туре	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 166, 1 (2020)	20-Apr-2020

1974Ol05: Gamma-ray source produced by neutron capture on natural iron; Detectors:Ge(Li) with NaI Compton suppression shield; Measured: Ey, Iy.

2016Be31: Ey=7.5 MeV bremsstrahlung from the S-DALINAC accelerator and the Darmstadt High Intensity Photon Setup.

Measured E $\gamma$ , I $\gamma$ ,  $\gamma(\theta)$  using natural Tl target and 99.9% enriched <sup>205</sup>Tl target. The (pol  $\gamma, \gamma'$ ) experiment was performed using HI $\gamma$ S facility at TUNL for study of two levels at 4961 and 4968 keV. Deduced integrated  $\sigma$ , widths, B(M1), B(E1), pygmy dipole resonances, reduced excitation probabilities, and dipole strength distribution. Others (the same collaboration): 2015BeZY, 2014Be09.

Others: 1969Mo17, 1969Ra09, 1970Ce01, 1970Mo26, 1972Wo21, 1976Ea02, 1990Be20.

#### <sup>205</sup>Tl Levels

E(level) <sup>†</sup>	$J^{\pi \ddagger b}$	$g\Gamma_0^2/\Gamma^{cd}$	$\sigma_{\rm int} \ ({\rm eV \ b})^d$
0	1/2+		
203.85 12	3/2+		
619.37 <i>13</i>	5/2+		
924.37 23	7/2+		
1141.10 17	$(3/2^+)$		
1181.2.3	$(5/2^+)$		
1219.22 10	$\frac{1}{2}$		
1340.3 3	$(3/2^+)$ $(1/2^+)$		
1454.4 5	(1/2) (1/2+3/2+)		
1574 73 20	$(1/2^+, 3/2^+)$		
1866.1.5	$(1/2^+, 3/2^-)$		
1966.82 14	$(1/2^+, 3/2^+)$		
2002.70 19	$(3/2^+)$		
2088.9 3	$(1/2^+, 3/2^+)$		
2098 4	$3/2^+, 5/2^+$		
2163.2 6	$(1/2^+, 3/2^+)$		
2209.5? 7	$(1/2, 3/2, 5/2, 7/2^+)$		
2220.8 4	$(1/2^+, 3/2^+)$		
2304.4 4	$(1/2^+, 3/2^+)$		
2316.3 4	$(1/2^+, 3/2^+)$		
2555.3 5	$(1/2^+, 3/2^+)$		
2560.2 4	$(1/2^+, 3/2^+)$		
2721.1 4	$(1/2^+, 3/2^+)$		
2/50.6 0	$(1/2^+, 3/2^+)$		
2094.4 4	(1/2, 3/2) (1/2+3/2+)		
3177 3 0	(1/2, 3/2) (1/2+3/2+)		
3259 4	$(1/2^{-}, 3/2^{-})$		
3287.6 7	$(1/2^+, 3/2^+)$		
4000.64 <sup>#</sup> 20	(-1- ,-1- )	0.32 eV 6	78 14
4159.95 <sup>#</sup> 20		0.44 eV 10	99 22
4262.5 <sup>#</sup> 4		0.28 eV 6	58 12
4341.9 <sup>#@</sup> 5		0.12 eV 2	24 5
4348.4 <sup>#@&amp;</sup> 4		0.15 eV 2	30 5
4731.7 <sup>#@a</sup> 7		0.10 eV 2	17 4
4741.5 <sup>#</sup> 9		0.36 eV 7	61 12
4828.2 <sup>#</sup> 11		0.16 eV 4	27 7
4878.5 <sup>#</sup> 4		0.21 eV 4	34 6

# <sup>205</sup>Tl Levels (continued)

$ \begin{array}{llllllllllllllllllllllllllllllllllll$	E(level) <sup>†</sup>	$\mathrm{g}\Gamma_0^2/\Gamma^{cd}$	$\sigma_{\rm int}~({\rm eV~b})^{d}$	Comments
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	4926.6 <sup>#</sup> 6	0.30 eV 6	48 9	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4938.06 <sup>#a</sup> 20	0.55 eV 7	86 11	$g\Gamma_0 = 0.79 \text{ eV } 11.$
4961.34 <sup>#d1</sup> $9$ $2.00 eV$ $35$ $312 55$ $g\Gamma_0=3.30 eV$ $99 (5-DALINAC experiment) and 2.79 eV 50 in HlySexperiment (2016Be31).4975.2^{th}60.46 eV527g\Gamma_0=5.9 eV1/ (S-DALINAC experiment) and 4.93 eV 92 in HlyS experiment(2016Be31).4975.2^{th}60.46 eV527g\Gamma_0=5.9 eV1/ (S-DALINAC experiment) and 4.93 eV 92 in HlyS experiment(2016Be31).4975.2^{th}60.46 eV52741 105007.6^{th}60.39 eV8125007.6^{th}60.37 eV31 55123.9^{th}50.21 eV31 75211.9^{th}60.37 eV31 1052305.7^{th}0.37 eV175335.7^{th}60.57 eV175343.7^{th}0.37 eV175343.7^{th}0.31 eV175343.7^{th}0.57 eV175405.7^{th}0.57 eV175405.7^{th}0.57 eV175405.7^{th}0.68 eV175557.7^{th}0.68 eV175557.7^{th}0.68 eV17555.7^{th}0.58 eV16561.9^{th}0.58 eV17555.7^{th}0.58 eV17555.7^{th}0.58 eV17555.7^{th}0.58 eV16575.2^{th}0.58 eV17565.7^{th}0.58 eV$	4947.1 <sup><b>#</b></sup> 10	0.25 eV 5	40 8	
$4967.87^{Ha}$ $2.46 \text{ eV}$ $382 71$ $g\Gamma_0=5.9 \text{ eV}$ $1/(5-DALINAC experiment)$ and $4.93 \text{ eV}$ $92 \text{ in HlyS experiment}$ $4975.2^{H}$ $0.46 \text{ eV}$ $72 7$ $4110$ $(2016Be31)$ . $4991.2^{H}$ $0.28 \text{ eV}$ $74110$ $(2016Be31)$ . $5007.6^{H}$ $0.28 \text{ eV}$ $74110$ $(2016Be31)$ . $5015.6^{H}$ $0.39 \text{ eV}$ $8512$ $(2016Be31)$ . $5017.5^{H}$ $0.21 \text{ eV}$ $315$ $(512.9^{H})^{2}$ $0.33 \text{ eV}$ $8512$ $5123.9^{H}$ $0.37 \text{ eV}$ $13$ $19$ $(216He31)^{10}$ $(216He31)^{10}$ $5124.9^{H}$ $0.37 \text{ eV}$ $13$ $517$ $537574^{H}$ $0.57 \text{ eV}$ $399$ $5353574^{H}$ $0.57 \text{ eV}$ $476$ $630$ $55754^{H}$ $0.51 \text{ eV}$ $7274^{H}$ $56837^{H}$ $0.58 \text{ eV}$ $311^{H}$ $5987^{H}$ $0.68 \text{ eV}$ $54313^{H}$ $5116^{H}$ $0.57 \text{ eV}$ $4311$ $55587^{H}$ $0.68 \text{ eV}$ $54314^{H}$ $55957^{H}$ $0.68 \text{ eV}$ $5414^{H}$ $55957^{H}$ $0.68 \text{ eV}$ $630^{H}$ $917^{H}$ $56524^{H}$ <td>4961.34<sup>#a</sup> 19</td> <td>2.00 eV 35</td> <td>312 55</td> <td><math>g\Gamma_0=3.30</math> eV 59 (S-DALINAC experiment) and 2.79 eV 50 in HI<math>\gamma</math>S experiment (2016Be31).</td>	4961.34 <sup>#a</sup> 19	2.00 eV 35	312 55	$g\Gamma_0=3.30$ eV 59 (S-DALINAC experiment) and 2.79 eV 50 in HI $\gamma$ S experiment (2016Be31).
$ \begin{array}{rcl} 4975 2^{6} & 6 & 0.46 \ eV 5 & 72 \ 7 \\ 4994 2^{6} & 3 & 0.27 \ eV 7 & 41 \ 10 \\ 5036 6^{6} & 6 & 0.39 \ eV 8 & 58 \ 12 \\ 5071 5^{6} 6^{6} & 5 & 0.21 \ eV 4 & 31 \ 5 \\ 5123 9^{6} & 5 & 0.31 \ eV 7 & 48 \ 11 \\ 5164 7^{6} & 7 & 0.27 \ eV 7 & 39 \ 7 \\ 5211 9^{6} & 6 & 0.57 \ eV 7 & 38 \ 19 \\ 5240 5^{7} & 7 & 0.37 \ eV 7 & 38 \ 19 \\ 5240 5^{7} & 7 & 0.37 \ eV 7 & 5 & 39 \ 7 \\ 5385 7^{6} & 6 & 0.37 \ eV 7 & 38 \ 19 \\ 5391 0^{7} & 4 & 0.37 \ eV 7 & 38 \ 19 \\ 5391 0^{7} & 4 & 0.37 \ eV 7 & 5 & 39 \ 7 \\ 5385 7^{6} & 5 & 0.57 \ eV 7 & 76 \ 18 \\ 5391 0^{7} & 4 & 0.54 \ eV \ 17 & 72 \ 14 \\ 5406 7^{6} & 8 & 0.33 \ eV 5 & 48 \ 7 \\ 5433 0^{6} & 6 & 0.51 \ eV 9 & 67 \ 12 \\ 5451 3^{6} & 5 & 0.57 \ eV 7 & 80 \ 35 \\ 5577 2^{6} 6^{2} & 7 & 0.35 \ eV 9 & 43 \ 11 \\ 5585 2^{76} 6^{2} & 6 & 0.69 \ eV 2 & 86 \ 30 \\ 5577 2^{6} 6^{2} & 7 & 0.35 \ eV 9 & 43 \ 11 \\ 5580 7^{6} & 6 & 0.69 \ eV 2 & 86 \ 30 \\ 5577 2^{6} 6^{2} & 7 & 0.35 \ eV 9 & 43 \ 11 \\ 5580 7^{6} & 6 & 0.69 \ eV 2 & 124 \ 25 \ g\Gamma_{0} = 1.89 \ eV 39 \ (2016 \ Be31). \\ 5580 2^{6} 6^{2} & 6 & 0.39 \ eV 17 \ 15 \\ 5585 2^{76} 2^{6} & 6 & 1.73 \ eV \ 13 \ 67 \ 15 \\ 5753 7^{6} & 6 & 0.58 \ eV \ 79 \ 9 \ 107 \ 11 \\ 5664 8^{6u} 6 & 1.73 \ eV \ 13 \ 67 \ 15 \ 878 \ 2^{6} \ 1 \ 75 \ 13 \ 879 \ 14 \ 10 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 15 \ 107 \ 17 \ 17 \ 15 \ 107 \ 1$	4967.87 <sup>#a</sup> 10	2.46 eV 45	382 71	$g\Gamma_0=5.9 \text{ eV } 11$ (S-DALINAC experiment) and 4.93 eV 92 in HI $\gamma$ S experiment (2016Be31).
$ \begin{aligned} & 49942^3 \ 3 & 0.27 \ eV \ 7 & 41 \ 10 \\ & 5007.6^7 \ 6 & 0.28 \ eV \ 5 & 42 \ 7 \\ & 5007.5^7 \ 6 & 0.39 \ eV \ 8 & 58 \ 12 \\ & 5071.5^7 \ 6^6 \ 0 & 53 \ eV \ 7 & 81 \ 13 \\ & 5123.9^7 \ 5 & 0.33 \ eV \ 7 & 81 \ 14 \\ & 5164.7^8 \ 7 & 0.27 \ eV \ 5 & 39 \ 7 \\ & 5211.9^7 \ 6 & 0.57 \ eV \ 13 & 81 \ 10 \\ & 5240.5^7 \ 7 & 0.37 \ eV \ 13 & 50 \ 17 \\ & 5240.5^7 \ 7 & 0.37 \ eV \ 13 & 50 \ 17 \\ & 5343.7^7 \ 6 & 0.57 \ eV \ 13 & 50 \ 17 \\ & 5343.7^7 \ 6 & 0.57 \ eV \ 14 & 76 \ 18 \\ & 5359.1^{67} \ 6 & 0.51 \ eV \ 16 \ 71 \ 2 \\ & 5433.0^{67} \ 6 & 0.51 \ eV \ 16 \ 71 \ 2 \\ & 5433.0^{67} \ 6 & 0.51 \ eV \ 2 \\ & 677 \ 2 \\ & 5552.7^{47} \ 5 & 0.70 \ eV \ 14 & 70 \ 12 \\ & 5543.3^{67} \ 6 & 0.51 \ eV \ 2 \\ & 5552.7^{47} \ 5 & 0.70 \ eV \ 14 & 90 \ 17 \\ & 5552.7^{47} \ 6 & 7 \ 0.70 \ eV \ 2 \\ & 70 \ eV \ 2 \\ & 71 \ eV \ 2 \\ & 5552.7^{47} \ 6 & 0.33 \ eV \ 2 \\ & 86 \ 30 \ 57550.7^{47} \ 6 \ 10 \ eV \ 2 \\ & 71 \ eV \ 2 \\ & 86 \ 30 \ 57550.7^{47} \ 6 \ 10 \ eV \ 2 \\ & 91 \ eV \ 2 \ 2 \ 2 \ EV \ 2 \\ & 91 \ eV \ 2 \ 2 \ EV \ 2 \ 2 \ 2 \ EV \ 2 \ 2 \ 2 \ 2 \ 2 \ 2 \ 2 \ 2 \ 2 \ $	4975.2 <sup>#</sup> 6	0.46 eV 5	72 7	
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	4994.2 <sup>#</sup> 3	0.27 eV 7	41 10	
$\begin{split} & 503.6 {}^66 & 6 & 0.39  eV  8 & 88  12 \\ & 5071.5^{46} eV  5 & 0.21  eV  4 & 31  5 \\ & 5164.7^{46} eV  7 & 0.27  eV  5 & 39  7 \\ & 5164.7^{46} eV  7 & 0.27  eV  5 & 39  7 \\ & 5211.9^{47}  6 & 0.57  eV  13 & 81  19 \\ & 5240.5^{47}  7 & 0.37  eV  13 & 50  17 \\ & 5383.7^{46}  4 & 0.37  eV  13 & 50  17 \\ & 5343.7^{46}  4 & 0.37  eV  13 & 50  17 \\ & 5343.7^{46}  4 & 0.37  eV  13 & 50  17 \\ & 5343.7^{46}  4 & 0.37  eV  13 & 50  17 \\ & 5343.7^{46}  4 & 0.54  eV  11 & 72  14 \\ & 5406.7^{46}  8 & 0.33  eV  5 & 48  7 \\ & 543.0^{46}  5 & 0.57  eV  14 & 90  17 \\ & 5454.13^{46}  5 & 0.70  eV  14 & 90  17 \\ & 5552.7^{46}  a  0 & 0.54  eV  7 & 280  35 \\ & 5480.3^{46}  5 & 0.70  eV  14 & 90  17 \\ & 5552.7^{46}  a  0 & 0.66  eV  24 & 86  30 \\ & 5577.2^{46}  a  0 & 0.66  eV  12 & 4714 \\ & 5610.5^{47}  6 & 1.02  eV  12 & 4714 \\ & 5610.5^{47}  6 & 1.02  eV  12 & 4714 \\ & 5652.4^{47}  5 & 2.28  eV  36 & 274  44 \\ & 5664.8^{46}  6 & 1.73  eV  16 & 207  19 \\ & 5658.7^{47}  3 & 2.84  eV  46  337  55 & g\Gamma_0 = 4.80  eV  80  (2016Be31). \\ & 5693.4^{47}  9 & 0.57  eV  13 & 6715 \\ & 5737.7^{47}  8 & 0.68  eV  8 & 79  9 \\ & 5756.0^{47}  3 & 2.84  eV  46  337  55 & g\Gamma_0 = 4.80  eV  80  (2016Be31). \\ & 5793.7^{47}  8 & 0.68  eV  8 & 79  9 \\ & 5786.0^{47}  3 & 2.84  eV  46  325  30 & g\Gamma_0 = 4.80  eV  80  (2016Be31). \\ & 5797.9^{47}  9 & 0.94  eV  15 & 107  17 \\ & 5802.9^{46}  6  0.55  eV  12 & 63  14 & g\Gamma_0 = 1.80  eV  59  (2016Be31). \\ & 5797.9^{47}  9 & 0.94  eV  15 & 107  17 \\ & 5802.9^{46}  6 & 0.55  eV  16  63  14 & g\Gamma_0 = 1.80  eV  59  (2016Be31). \\ & 511.7^{47}  9 & 0.39  eV  9  45  11 \\ & 5864.8^{47}  9 & 0.40  eV  6  45  7 \\ & 5878.2^{47}  5 & 1.05  eV  10 & 711 \\ & 5864.8^{47}  9 & 0.40  eV  6  45  7 \\ & 5878.2^{47}  5 & 1.05  eV  10 & 711 \\ & 5864.8^{47}  9 & 0.40  eV  6  45  7 \\ & 5878.2^{47}  5 & 1.05  eV  10 & 711 \\ & 5864.8^{47}  9 & 0.40  eV  6 $	5007.6 <sup>#</sup> 6	0.28 eV 5	42 7	
$\begin{aligned} & 5071.5^{10} e^{6} e^{5} & 5 & 0.21 eV 4 & 31 5 \\ & 5123.9^{47} 5 & 0.33 eV 7 & 48 11 \\ & 5164.7^{10} c^{7} & 0.27 eV 5 & 39 7 \\ & 5211.9^{47} 6 & 0.57 eV 13 & 81 19 \\ & 5240.5^{47} & 0.37 eV 1 & 52 15 \\ & 5380.7^{46} 4 & 0.37 eV 1 & 52 15 \\ & 5380.7^{46} 4 & 9 & 0.29 eV 6 & 39 9 \\ & 5387.4^{47} 5 & 0.57 eV 14 & 76 18 \\ & 5391.0^{47} 4 & 0.54 eV 11 & 72 14 \\ & 5406.7^{40} 8 & 0.33 eV 5 & 48 7 \\ & 5430.7^{40} 6 & 0.51 eV 9 & 67 12 \\ & 5451.3^{46} 5 & 0.70 eV 14 & 90 17 \\ & 5552.7^{46} a 6 & 0.69 eV 24 & 86 30 \\ & 5577.2^{46} a 6 & 0.69 eV 24 & 86 30 \\ & 5577.2^{46} a 6 & 0.69 eV 24 & 86 30 \\ & 5578.2^{46} a 8 & 0.39 eV 12 & 47 14 \\ & 5610.5^{47} 6 & 1.02 eV 27 & 124 25 \\ & 5580.7^{47} 9 & 0.68 eV 12 & 54 18 \\ & 5588.2^{46} a 8 & 0.39 eV 12 & 47 14 \\ & 5664.8^{47} 6 & 1.73 eV 16 & 207 19 \\ & 5685.7^{47} 3 & 2.84 eV 46 & 337 55 \\ & 5737.7^{47} 8 & 0.68 eV 8 & 79 9 \\ & 575.60^{47} 3 & 2.84 eV 46 & 337 55 \\ & 5783.7^{47} 8 & 0.68 eV 8 & 79 9 \\ & 575.60^{47} 3 & 2.81 eV 26 & 325 30 \\ & g\Gamma_0 = 4.80 eV 80 (2016Be31). \\ & 5693.4^{47} 9 & 0.57 eV 13 & 67 15 \\ & 5737.7^{47} 8 & 0.68 eV 8 & 79 9 \\ & 5718.1^{47} 5 & 0.55 eV 12 & 6314 \\ & g\Gamma_0 = 1.80 eV 59 (2016Be31). \\ & 5791.1^{47} 9 & 0.39 eV 8 & 449 \\ & 5811.7^{47} 9 & 0.39 eV 9 & 457 11 \\ & 5786.8^{47} 6 & 0.57 eV 13 & 67 17 \\ & 5802.9^{47} 6 & 0.55 eV 12 & 6314 \\ & g\Gamma_0 = 1.80 eV 59 (2016Be31). \\ & 5797.9^{47} 9 & 0.39 eV 9 & 457 11 \\ & 581.7^{47} 5 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.37 eV 10 & 717 \\ & 5802.9^{47} 6 & 0.57 eV 10 & 717 \\ & 5802.9^{47} 6 & 0.57 eV 10 & 6314 \\ & g\Gamma_0 = 1.80 eV 59 (2016Be31). \\ & 5797.9^{47} 9 & 0.39 eV 8 & 457 \\ & 5817.8^{47} 5 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.37 eV 10 & 711 \\ & 5864.8^{47} 9 & 0.37 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105 11 \\ & 5864.8^{47} 9 & 0.39 eV 9 & 105$	5036.6 <sup>#</sup> 6	0.39 eV 8	58 12	
$\begin{split} 5123.9^{\#} 5 & 0.33 \text{ eV} 7 & 48 \ 1/ \\ 5164.7^{\#} 6 & 0.57 \text{ eV} \ 13 & 50 \ 17 \\ 5240.5^{\#} 7 & 0.37 \text{ eV} \ 11 & 52 \ 15 \\ 5308.7^{\#} 4 & 0.37 \text{ eV} \ 13 & 50 \ 17 \\ 5343.7^{\#} 6^{2} 4 & 0.37 \text{ eV} \ 13 & 50 \ 17 \\ 5343.7^{\#} 6^{2} 4 & 0.37 \text{ eV} \ 14 & 76 \ 18 \\ 5391.0^{\#} 4 & 0.57 \text{ eV} \ 11 & 72 \ 14 \\ 5406.7^{\#} 6^{2} & 0.33 \text{ eV} \ 7 & 48 \ 7 \\ 5406.7^{\#} 6^{2} & 0.33 \text{ eV} \ 7 & 48 \ 7 \\ 5406.7^{\#} 6^{2} & 0.33 \text{ eV} \ 7 & 48 \ 7 \\ 5451.3^{\#} 6 & 5 \ 0.70 \text{ eV} \ 14 & 90 \ 17 \\ 54552.7^{\#} 6^{2} 4 & 0.33 \text{ eV} \ 7 & 48 \ 7 \\ 5552.7^{\#} 6^{2} 4 & 0.33 \text{ eV} \ 7 & 48 \ 7 \\ 5552.7^{\#} 6^{2} 4 & 0.39 \text{ eV} \ 12 & 47 \ 14 \\ 5589.7^{\#} 9 & 0.68 \text{ eV} \ 15 & 84 \ 18 \\ 5598.2^{\#} 6^{2} & 0.39 \text{ eV} \ 12 & 47 \ 14 \\ 5589.7^{\#} 9 & 0.68 \text{ eV} \ 15 & 84 \ 18 \\ 5598.2^{\#} 6^{2} & 0.39 \text{ eV} \ 12 & 47 \ 14 \\ 5664.8^{\#} 6 & 1.02 \text{ eV} 2 \ 124 \ 25 \ 9^{\Gamma_0} = 1.89 \text{ eV} \ 39 \ (2016\text{Be}31). \\ 5619.9^{\#} 7 & 0.88 \text{ eV} \ 9 \ 107 \ 11 \\ 5652.4^{\#} 5 & 2.28 \text{ eV} \ 36 \ 714 \ 4 \\ 5664.8^{\#} 6 & 1.73 \text{ eV} \ 16 \ 207 \ 19 \ 5655.7^{\#} \ 3 \ 2.84 \text{ eV} \ 46 \ 377 \ 55 \ 9^{\Gamma_0} = 4.60 \text{ eV} \ 71 \ (2016\text{Be}31). \\ 5693.4^{\#} 9 & 0.57 \text{ eV} \ 13 \ 67 \ 15 \ 5737.7^{\#} \ 8 \ 0.68 \text{ eV} \ 87 \ 99 \ 575.60^{\#} \ 3 \ 2.84 \text{ eV} \ 46 \ 375 \ 59 \ 9^{\Gamma_0} = -1.80 \text{ eV} \ 59 \ (2016\text{Be}31). \\ 5781.3^{\#} 5 & 0.55 \text{ eV} \ 16 \ 63 \ 19 \ \ 9^{\Gamma_0} = 2.18 \text{ eV} \ 42 \ (2016\text{Be}31). \\ 5781.3^{\#} 5 & 0.55 \text{ eV} \ 16 \ 63 \ 19 \ \ 9^{\Gamma_0} = 2.18 \text{ eV} \ 59 \ (2016\text{Be}31). \\ 5781.3^{\#} 4 & 0.93 \text{ eV} \ 9 \ 105 \ 11 \ \ 9^{\Gamma_0} = 1.80 \text{ eV} \ 59 \ (2016\text{Be}31). \\ 5864.8^{\#} 9 \ 0.40 \text{ eV} \ 6 \ 45 \ 7 \ 59 \ 5787.2^{\#} 5 \ 105 \text{ eV} \ 20 \ 116 \ 22 \ 500.6^{\#} 6 \ 0.77 \ (2016\text{Be}31). \\ 5864.8^{\#} 9 \ 0.40 \text{ eV} \ 6 \ 45 \ 7 \ 501.16 \ 22 \ 500.6^{\#} 6 \ 0.77 \ (2016\text{Be}31). \\ 5864.8^{\#} 9 \ 0.40 \text{ eV} \ 6 \ 45 \ 7 \ 501.16 \ 22 \ 500.6^{\#} 6 \ 0.77 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 40 \ 7 \ 7 \ 7 \ 7 \ 7$	5071.5 <sup>#@&amp;</sup> 5	0.21 eV 4	31 5	
$\begin{split} & 5164.7^{46} 7 & 0.27 \ eV 5 & 39 \ 7 \\ & 211.9^{4} 6 & 0.57 \ eV 13 & 81 \ 19 \\ & 5240.5^{4} 7 & 0.37 \ eV 11 & 52 \ 15 \\ & 5308.7^{40} 4 & 0.37 \ eV 13 & 50 \ 17 \\ & 5343.7^{40} 6 & 9 & 0.29 \ eV 6 & 39 \ 9 \\ & 5357.4^{4} 5 & 0.57 \ eV 14 & 76 \ 18 \\ & 5391.0^{4} 4 & 0.54 \ eV 11 & 72 \ 14 \\ & 5406.7^{40} 8 & 0.33 \ eV 5 & 48 \ 7 \\ & 543.0^{40} 5 & 0.57 \ eV 14 & 76 \ 18 \\ & 543.0^{40} 5 & 0.51 \ eV 9 & 67 \ 12 \\ & 5451.3^{46} 5 & 0.51 \ eV 9 & 67 \ 12 \\ & 5451.3^{46} 5 & 0.57 \ eV 14 & 90 \ 17 \\ & 5552.7^{40} 6 & 0.69 \ eV 24 & 86 \ 30 \\ & 5577.2^{40} 6 & 0.69 \ eV 24 & 86 \ 30 \\ & 5577.2^{40} 6 & 0.69 \ eV 24 & 86 \ 30 \\ & 5577.2^{40} 6 & 0.69 \ eV 24 & 86 \ 30 \\ & 5577.2^{40} 6 & 0.39 \ eV \ 12 \ 471 \ 48 \\ & 5610.5^{4} 6 & 1.02 \ eV 21 \ 124 \ 25 \\ & g\Gamma_0 = 1.89 \ eV \ 39 \ (2016Be31). \\ & 5659.4^{4} 5 & 2.28 \ eV \ 46 \ 337 \ 55 \\ & g\Gamma_0 = 4.80 \ eV \ 80 \ (2016Be31). \\ & 5664.8^{44} 6 & 1.73 \ eV \ 16 \ 377 \ 55 \\ & 5737.7^{4} 8 & 0.68 \ eV \ 87 \ 99 \\ & 5755.6^{4} 3 & 2.81 \ eV \ 26 \ 325 \ 30 \\ & g\Gamma_0 = -4.66 \ eV \ 71 \ (2016Be31). \\ & 5781.3^{4} 5 & 0.55 \ eV \ 16 \ 319 \\ & g\Gamma_0 = -1.80 \ eV \ 59 \ (2016Be31). \\ & 5781.3^{4} 5 & 0.55 \ eV \ 16 \ 319 \\ & g\Gamma_0 = -1.80 \ eV \ 59 \ (2016Be31). \\ & 5781.3^{4} 5 & 0.55 \ eV \ 16 \ 319 \\ & g\Gamma_0 = -1.80 \ eV \ 59 \ (2016Be31). \\ & 5781.3^{4} 5 & 0.55 \ eV \ 16 \ 319 \\ & g\Gamma_0 = -1.80 \ eV \ 59 \ (2016Be31). \\ & 5781.3^{4} 5 & 0.55 \ eV \ 16 \ 319 \\ & g\Gamma_0 = -1.80 \ eV \ 59 \ (2016Be31). \\ & 5781.3^{4} 5 & 0.55 \ eV \ 16 \ 319 \\ & g\Gamma_0 = -1.80 \ eV \ 59 \ (2016Be31). \\ & 5811.8^{4} 4 & 0.93 \ eV \ 9 \ 105 \ 11 \\ & 5864.8^{44} 9 \\ & 0.93 \ eV \ 20 \ 116 \ 22 \\ & 5810.6^{4} 6 & 0.72 \ eV \ 10 \ 79 \ 11 \\ & 5864.8^{4} 9 \\ & 0.93 \ eV \ 20 \ 165 \ 22 \\ & 5910.6^{4} 6 & 0.72 \ eV \ 10 \ 79 \ 11 \\ & 5963.2^{4} 9 \\ & 0.58 \ eV \ 13 \ 63 \ 14 \\ & g\Gamma_0 = -1.76 \ eV \ 60 \ (2016Be31). \\ & 600 \ eV \ 60 \ (2016Be31). \\ & 600 \ eV \ 60 \ (2016Be31). \\ & 600 \ eV \ 60 \ (2016Be31). \\ & 600 \ eV \ 60 \ (2016Be31). \\ & 600 \ eV \ 60 \ (2016Be31). \\ & 600 \ eV \ 60 \ (2$	5123.9 <sup>#</sup> 5	0.33 eV 7	48 11	
$\begin{split} & 5211.9^{\#} 6 & 0.57 \text{ eV} 13 & 81 19 \\ & 5240.5^{\#} 7 & 0.37 \text{ eV} 11 & 52 15 \\ & 5383.7^{\#} 4 & 0.37 \text{ eV} 13 & 50 17 \\ & 5343.7^{\#} @ a & 9 & 0.29 \text{ eV} 6 & 39 & 9 \\ & 5357.4^{\#} 5 & 0.57 \text{ eV} 14 & 76 18 \\ & 5391.0^{\#} 4 & 0.54 \text{ eV} 11 & 72 14 \\ & 5406.7^{\#} @ 8 & 0.33 \text{ eV} 5 & 48 & 7 \\ & 5433.0^{\#} 6 & 0.51 \text{ eV} 9 & 67 12 \\ & 5431.3^{\#} 6 & 0.51 \text{ eV} 9 & 67 12 \\ & 5431.3^{\#} 6 & 0.70 \text{ eV} 14 & 90 17 \\ & 5552.7^{\#} 26 & 6 & 0.69 \text{ eV} 24 & 86 30 \\ & 5577.2^{\#} 26 & 6 & 0.69 \text{ eV} 24 & 86 30 \\ & 5577.2^{\#} 26 & 0.68 \text{ eV} 15 & 84 18 \\ & 5598.2^{\#} 26 & 0.39 \text{ eV} 12 & 47 14 \\ & 5610.5^{\#} 6 & 1.02 \text{ eV} 21 & 124 25 \\ & 5610.5^{\#} 6 & 1.02 \text{ eV} 21 & 124 25 \\ & 5648.8^{\#} 6 & 1.73 \text{ eV} 13 & 67 15 \\ & 5737.7^{\#} 8 & 0.68 \text{ eV} 43 & 37 55 \\ & 5735.7^{\#} 8 & 0.68 \text{ eV} 43 & 37 55 \\ & 5755.6^{\#} 3 & 2.84 \text{ eV} 46 & 337 55 \\ & 5737.7^{\#} 8 & 0.68 \text{ eV} 8 & 79 & 9 \\ & 5755.6^{\#} 3 & 2.84 \text{ eV} 26 & 325 30 \\ & 5793.9^{\#} 9 & 0.55 \text{ eV} 16 & 63 19 \\ & $g\Gamma_0 = 1.80 \text{ eV} 59 (2016\text{ Be}31). \\ & 5781.3^{\#} 5 & 0.55 \text{ eV} 16 & 63 19 \\ & $g\Gamma_0 = 1.80 \text{ eV} 59 (2016\text{ Be}31). \\ & 5781.3^{\#} 5 & 0.55 \text{ eV} 16 & 63 19 \\ & $g\Gamma_0 = 1.80 \text{ eV} 59 (2016\text{ Be}31). \\ & 5781.3^{\#} 5 & 0.55 \text{ eV} 16 & 63 19 \\ & $g\Gamma_0 = 1.80 \text{ eV} 59 (2016\text{ Be}31). \\ & 5781.3^{\#} 4 & 0.93 \text{ eV} 9 & 105 11 \\ & 5804.8^{\#} 4 & 0.93 \text{ eV} 9 & 105 11 \\ & 5864.8^{\#} 9 & 0.40 \text{ eV} 6 & 45 7 \\ & 5811.7^{\#} 9 & 0.39 \text{ eV} 8 & 44 9 \\ & 5819.8^{\#} 4 & 0.93 \text{ eV} 9 & 105 11 \\ & 5864.8^{\#} 9 & 0.40 \text{ eV} 6 & 45 7 \\ & 5878.2^{\#} 5 & 1.05 \text{ eV} 13 & 63 14 \\ & $g\Gamma_0 = 1.76 \text{ eV} 60 (2016\text{ Be}31). \\ & 5963.2^{\#} 9 & 0.58 \text{ eV} 13 & 63 14 \\ & $g\Gamma_0 = 1.76 \text{ eV} 60 (2016\text{ Be}31). \\ & 5963.2^{\#} 9 & 0.58 \text{ eV} 13 & 63 14 \\ & $g\Gamma_0 = 1.76 \text{ eV} 60 (2016\text{ Be}31). \\ & 5963.2^{\#} 9 & 0.58 \text{ eV} 13 & 63 14 \\ & $g\Gamma_0 = 1.76 \text{ eV} 60 (2016\text{ Be}31). \\ & 5963.2^{\#} 9 & 0.58 \text{ eV} 13 & 63 14 \\ & $g\Gamma_0 = 1.76 \text{ eV} 60 (2016\text{ Be}31). \\ & 5963.2^{\#} 9 & 0.58 \text{ eV} 13 & 63 14 \\ & $g\Gamma_0 = 1.76 \text{ eV} 60 (2016\text{ Be}31). \\ $	5164.7 <sup>#&amp;</sup> 7	0.27 eV 5	39 7	
$ \begin{aligned} 5240.5^{\#} 7 & 0.37 \text{ eV } 11 & 52 15 \\ 5308.7^{\#} 2 & 0.39 \text{ eV } 13 & 50 17 \\ 5343.7^{\#} 2^{\#} 2 & 0.29 \text{ eV } 6 & 39 \text{ 9} \\ 5351.4^{\#} 5 & 0.57 \text{ eV } 14 & 76 18 \\ 5391.0^{\#} 4 & 0.54 \text{ eV } 11 & 72 14 \\ 5406.7^{\#} 2 & 0.33 \text{ eV } 5 & 48 7 \\ 5433.0^{\#} 6 & 0.51 \text{ eV } 9 & 67 12 \\ 5431.3^{\#} 5 & 2.16 \text{ eV } 27 & 280 35 \\ 5480.3^{\#} 2 & 5 & 0.70 \text{ eV } 14 & 90 17 \\ 5552.7^{\#} 2 & 60 \text{ oV } 24 & 86 30 \\ 5577.2^{\#} 2^{\#} 2 & 6 & 0.69 \text{ eV } 24 & 86 30 \\ 5577.2^{\#} 2^{\#} 2 & 6 & 0.69 \text{ eV } 24 & 86 30 \\ 5577.2^{\#} 2^{\#} 2 & 0.68 \text{ eV } 15 & 84 18 \\ 5598.2^{\#} 2 & 0.68 \text{ eV } 12 & 47 14 \\ 5610.5^{\#} 6 & 1.02 \text{ eV } 21 & 124 25 & g\Gamma_0 = 1.89 \text{ eV } 39 (2016\text{ Be}31). \\ 5619.9^{\#} 7 & 0.88 \text{ eV } 9 & 107 11 \\ 5665.4^{\#} 5 & 2.28 \text{ eV } 36 & 274 44 \\ 5664.8^{\#} 4 & 1.73 \text{ eV } 16 & 207 19 \\ 5685.7^{\#} 3 & 2.84 \text{ eV } 46 & 337 55 & g\Gamma_0 = 4.80 \text{ eV } 80 (2016\text{ Be}31). \\ 5693.4^{\#} 9 & 0.57 \text{ eV } 13 & 67 15 \\ 5773.7^{\#} 8 & 0.68 \text{ eV } 8 & 79 9 \\ 5756.0^{\#} 3 & 2.81 \text{ eV } 26 & 325 30 & g\Gamma_0 = 4.66 \text{ eV } 71 (2016\text{ Be}31). \\ 5781.3^{\#} 5 & 0.55 \text{ eV } 16 & 6319 & g\Gamma_0 = 2.18 \text{ eV } 94 (2016\text{ Be}31). \\ 5797.9^{\#} 9 & 0.39 \text{ eV } 8 & 44 9 \\ 5819.8^{\#} 4 & 0.39 \text{ eV } 12 & 5114 \\ 5864.8^{\#} 9 & 0.40 \text{ eV } 6 & 457 7 \\ 5802.9^{\#} 6 & 0.55 \text{ eV } 12 & 6314 & g\Gamma_0 = 1.80 \text{ eV } 59 (2016\text{ Be}31). \\ 5811.7^{\#} 9 & 0.39 \text{ eV } 8 & 44 9 \\ 5819.8^{\#} 4 & 0.93 \text{ eV } 9 & 105 11 \\ 5864.8^{\#} 9 & 0.40 \text{ eV } 6 & 457 7 \\ 5878.2^{\#} 5 & 1.05 \text{ eV } 10 & 79 11 \\ 5963.2^{\#} 9 & 0.58 \text{ eV } 13 & 6314 & g\Gamma_0 = 1.76 \text{ eV } 60 (2016\text{ Be}31). \\ 597.9^{\#} 9 & 0.58 \text{ eV } 10 & 79 11 \\ 5963.2^{\#} 9 & 0.58 \text{ eV } 13 & 6314 & g\Gamma_0 = 1.76 \text{ eV } 60 (2016\text{ Be}31). \\ 5963.2^{\#} 9 & 0.58 \text{ eV } 13 & 6314 & g\Gamma_0 = 1.76 \text{ eV } 60 (2016\text{ Be}31). \\ 5963.2^{\#} 9 & 0.58 \text{ eV } 13 & 6314 & g\Gamma_0 = 1.76 \text{ eV } 60 (2016\text{ Be}31). \\ 5963.2^{\#} 9 & 0.58 \text{ eV } 13 & 6314 & g\Gamma_0 = 1.76 \text{ eV } 60 (2016\text{ Be}31). \\ 5963.2^{\#} 9 & 0.58 \text{ eV } 13 & 6314 & g\Gamma_0 = 1.76 \text{ eV } 60 (2016\text{ Be}31). \\ 5963.2^{\#} $	5211.9 <sup>#</sup> 6	0.57 eV 13	81 <i>19</i>	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5240.5 <sup>#</sup> 7	0.37 eV 11	52 15	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	5308.7 <sup>#a</sup> 4	0.37 eV 13	50 17	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	5343.7 <sup>#@a</sup> 9	0.29 eV 6	39 9	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	5357.4 <sup><b>#</b></sup> 5	0.57 eV 14	76 18	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	5391.0 <sup>#</sup> 4	0.54 eV 11	72 14	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	5406.7 <sup>#@</sup> 8	0.33 eV 5	48 7	
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	5433.0 <sup>#</sup> 6	0.51 eV 9	67 12	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5451.3 <sup>#a</sup> 5	2.16 eV 27	280 35	
$\begin{aligned} &5552.7^{\#@a} 6 & 0.69 \text{ eV } 24 & 86 30 \\ &5577.2^{\#@a} 7 & 0.35 \text{ eV } 9 & 43 11 \\ &5589.7^{\#} 9 & 0.68 \text{ eV } 15 & 84 18 \\ &5598.2^{\#@a} 8 & 0.39 \text{ eV } 12 & 47 14 \\ &5610.5^{\#} 6 & 1.02 \text{ eV } 21 & 124 25 \\ &5619.9^{\#} 7 & 0.88 \text{ eV } 9 & 107 11 \\ &5652.4^{\#} 5 & 2.28 \text{ eV } 36 & 274 44 \\ &5664.8^{\#a} 6 & 1.73 \text{ eV } 16 & 207 19 \\ &5664.8^{\#a} 6 & 1.73 \text{ eV } 16 & 207 19 \\ &5685.7^{\#} 3 & 2.84 \text{ eV } 46 & 337 55 \\ &5737.7^{\#} 8 & 0.68 \text{ eV } 8 & 79 9 \\ &5756.0^{\#} 3 & 2.81 \text{ eV } 26 & 325 30 \\ &5779.9^{\#} 9 & 0.57 \text{ eV } 13 & 67 15 \\ &5779.9^{\#} 9 & 0.94 \text{ eV } 15 & 107 17 \\ &5802.9^{\#a} 6 & 0.55 \text{ eV } 16 & 63 19 \\ &5811.7^{\#} 9 & 0.39 \text{ eV } 8 & 44 9 \\ &5811.8^{\#} 4 & 0.93 \text{ eV } 9 & 105 11 \\ &5864.8^{\#} 9 & 0.40 \text{ eV } 6 & 45 7 \\ &5878.2^{\#} 5 & 1.05 \text{ eV } 20 & 116 22 \\ &5910.6^{\#} 6 & 0.72 \text{ eV } 10 & 79 11 \\ &5963.2^{\#} 9 & 0.58 \text{ eV } 13 & 63 14 \\ &g\Gamma_0 = 1.76 \text{ eV } 60 (2016\text{Be31}). \end{aligned}$	5480.3 <sup>#@</sup> 5	0.70 eV 14	90 17	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5552.7 <sup>#@a</sup> 6	0.69 eV 24	86 <i>30</i>	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5577.2 <sup>#@a</sup> 7	0.35 eV 9	43 11	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5589.7 <sup>#</sup> 9	0.68 eV 15	84 18	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	5598.2 <sup>#@a</sup> 8	0.39 eV 12	47 14	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5610.5 <sup>#</sup> 6	1.02 eV 21	124 25	$g\Gamma_0 = 1.89 \text{ eV} 39 (2016\text{Be}31).$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5619.9 <sup>#</sup> 7	0.88 eV 9	107 11	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5652.4 <sup>#</sup> 5	2.28 eV 36	274 44	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5664.8 <sup>#a</sup> 6	1.73 eV 16	207 19	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5685.7 <sup>#</sup> 3	2.84 eV 46	337 55	$g\Gamma_0=4.80 \text{ eV} 80 (2016\text{Be}31).$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5693.4 <sup>#</sup> 9	0.57 eV 13	67 15	
$\begin{array}{llllllllllllllllllllllllllllllllllll$	5737.7 <sup>#</sup> 8	0.68 eV 8	79 9	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5756.0 <sup>#</sup> 3	2.81 eV 26	325 30	$g\Gamma_0=4.66 \text{ eV } 71 \text{ (2016Be31)}.$
$5797.9^{\#} 9 \qquad 0.94 \text{ eV } 15 \qquad 107  17 \qquad $	5781.3 <sup>#</sup> 5	0.55 eV 16	63 19	$g\Gamma_0=2.18 \text{ eV } 94 \text{ (2016Be31)}.$
$5802.9^{\#a} \ 6 \qquad 0.55 \text{ eV } 12 \qquad 63 \ 14 \qquad \text{g}\Gamma_0 = 1.80 \text{ eV } 59 \ (2016\text{Be}31).$ $5811.7^{\#} \ 9 \qquad 0.39 \text{ eV } 8 \qquad 44 \ 9 \qquad 5819.8^{\#} \ 4 \qquad 0.93 \text{ eV } 9 \qquad 105 \ 11 \qquad 5864.8^{\#} \ 9 \qquad 0.40 \text{ eV } 6 \qquad 45 \ 7 \qquad 5878.2^{\#} \ 5 \qquad 1.05 \text{ eV } 20 \qquad 116 \ 22 \qquad 5910.6^{\#} \ 6 \qquad 0.72 \text{ eV } 10 \qquad 79 \ 11 \qquad 5963.2^{\#} \ 9 \qquad 0.58 \text{ eV } 13 \qquad 63 \ 14 \qquad \text{g}\Gamma_0 = 1.76 \text{ eV } 60 \ (2016\text{Be}31).$	5797.9 <sup>#</sup> 9	0.94 eV 15	107 17	
$5811.7^{\#} 9   0.39 \text{ eV } 8   44   9   5819.8^{\#}   4   0.93 \text{ eV } 9   105   11   5864.8^{\#}   9   0.40 \text{ eV } 6   45   7   5878.2^{\#}   5   1.05 \text{ eV } 20   116   22   5910.6^{\#}   6   0.72 \text{ eV } 10   79   11   5963.2^{\#}   9   0.58 \text{ eV } 13   63   14   g\Gamma_0 = 1.76 \text{ eV } 60   (2016\text{Be}31).   (2016\text{Be}31).   (2016\text{Be}31)   600   8^{\#}   4   0.46 \text{ eV } 7   48   7   68   7   68   68   68   68   68 $	5802.9 <sup>#a</sup> 6	0.55 eV 12	63 14	$g\Gamma_0 = 1.80 \text{ eV } 59 \text{ (2016Be31)}.$
$5819.8^{\#} 4 \qquad 0.93 \text{ eV } 9 \qquad 105 \ 11 \\5864.8^{\#} 9 \qquad 0.40 \text{ eV } 6 \qquad 45 \ 7 \\5878.2^{\#} 5 \qquad 1.05 \text{ eV } 20 \qquad 116 \ 22 \\5910.6^{\#} 6 \qquad 0.72 \text{ eV } 10 \qquad 79 \ 11 \\5963.2^{\#} 9 \qquad 0.58 \text{ eV } 13 \qquad 63 \ 14 \qquad g\Gamma_0 = 1.76 \text{ eV } 60 \ (2016\text{Be}31).$	5811.7 <sup>#</sup> 9	0.39 eV 8	44 9	
$5864.8^{\#} 9 \qquad 0.40 \text{ eV } 6 \qquad 45 7$ $5878.2^{\#} 5 \qquad 1.05 \text{ eV } 20 \qquad 116 22$ $5910.6^{\#} 6 \qquad 0.72 \text{ eV } 10 \qquad 79 11$ $5963.2^{\#} 9 \qquad 0.58 \text{ eV } 13 \qquad 63 14 \qquad g\Gamma_0=1.76 \text{ eV } 60 \text{ (2016Be31).}$	5819.8 <sup>#</sup> 4	0.93 eV 9	105 11	
$5878.2^{\#} 5   1.05 \text{ eV } 20   116   22  5910.6^{\#} 6   0.72 \text{ eV } 10   79   11  5963.2^{\#} 9   0.58 \text{ eV } 13   63   14   g\Gamma_0 = 1.76 \text{ eV } 60   (2016\text{Be}31). $	5864.8 <sup>#</sup> 9	0.40 eV 6	45 7	
5910.6 <sup>#</sup> 6 0.72 eV 10 79 11 5963.2 <sup>#</sup> 9 0.58 eV 13 63 14 $g\Gamma_0=1.76$ eV 60 (2016Be31).	5878.2 <sup>#</sup> 5	1.05 eV 20	116 22	
$5963.2^{\#} 9$ 0.58 eV 13 63 14 g $\Gamma_0$ =1.76 eV 60 (2016Be31).	5910.6 <sup>#</sup> 6	0.72 eV 10	79 11	
	5963.2 <sup>#</sup> 9	0.58 eV 13	63 14	$g\Gamma_0=1.76 \text{ eV } 60 \text{ (2016Be31)}.$
0000.8" 4 0.40 eV / 48 /	6060.8 <sup>#</sup> 4	0.46 eV 7	48 7	

#### $^{205}{\rm Tl}(\gamma,\gamma')$ 1974Ol05,2016Be31 (continued)

### <sup>205</sup>Tl Levels (continued)

E(level) <sup>†</sup>	Jπ <b>‡b</b>	$g\Gamma_0^2/\Gamma^{cd}$	$\sigma_{\rm int}~({\rm eV~b})^{d}$	Comments
6088.6 <sup>#</sup> 5		0.77 eV 16	80 16	
6109.5 <sup>#</sup> 8		0.63 eV 15	65 16	
6146.9 <sup>#</sup> 9		0.67 eV 10	68 10	
6176.7 <sup><b>#</b>&amp; 4</sup>		0.58 eV 8	58 8	
6189.0 <sup><b>#&amp;</b> 6</sup>		0.47 eV 8	47 8	
6213.4 <sup><b>#</b>&amp; 9</sup>		0.47 eV 17	46 17	
6315.3 <sup><b>#</b>&amp; 10</sup>		0.39 eV 7	37 7	
6364.7 <sup><b>#</b>&amp; 6</sup>		0.43 eV 7	41 6	
7251.6 7	$(3/2^+)$	0.014 eV 7		$g\Gamma_0^2/\Gamma$ : From Γ <sub>0</sub> =0.025 eV 6 and Γ <sub>0</sub> /Γ=0.56 6 in 1972Wo21. E(level): Excited by the 7252-keV γ from ${}^{63}Cu(n,\gamma)$ (1972Wo21).
7646.42 17	$1/2^{-}$	0.43 eV 7		$g\Gamma_0^2/\Gamma$ : From $\Gamma_0=0.57$ eV 3 and $\Gamma_0/\Gamma=0.58$ 6 (1972Wo21).

<sup>†</sup> From a least-squares fit to  $E\gamma$  in 1974Ol05, unless otherwise stated. <sup>‡</sup> From 1974Ol05. <sup>#</sup> From 2016Be31. <sup>@</sup> Possible branching transition (2016Be31). <sup>&</sup> Observed only in data taken with the enriched target (2016Be31).

<sup>*a*</sup> Single-escape contribution subtracted (2016Be31).

<sup>b</sup> From 1974O105. <sup>c</sup> g=(2J+1)/2 for J=1/2 target, where J=spin of the excited state. <sup>d</sup> From 2016Be31, unless otherwise stated.

$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	E <sub>i</sub> (level)	$\mathrm{J}_i^\pi$	$E_f$	${ m J}_f^\pi$
203.8 3	≈19	203.85	3/2+	0	1/2+
415.6 <i>1</i>	7.1	619.37	5/2+	203.85	3/2+
<sup>x</sup> 482.1 9	4.7				
619.2 <i>3</i>	0.4	619.37	5/2+	0	$1/2^{+}$
646.9 5	0.3	1866.1	$(5/2^+)$	1219.22	$1/2^{+}$
<sup>x</sup> 714.7 <sup>&amp;</sup> 5	0.3				
714.7 <mark>&amp;</mark> 5	0.3	3018.0	$(1/2^+, 3/2^+)$	2304.4	$(1/2^+, 3/2^+)$
720.5 2	1.2	924.37	7/2+	203.85	3/2+
747.6 2	1.7	1966.82	$(1/2^+, 3/2^+)$	1219.22	$1/2^{+}$
854.9 10	0.6	2721.1	$(1/2^+, 3/2^+)$	1866.1	$(5/2^+)$
892.4 8	0.6	2894.4	$(1/2^+, 3/2^+)$	2002.70	$(3/2^+)$
937.3 2	3.5	1141.10	$(3/2^+)$	203.85	3/2+
<sup>x</sup> 955.6 <sup>&amp;</sup> 3	0.9				
964.6 <mark>&amp;</mark> 7	0.4	2304.4	$(1/2^+, 3/2^+)$	1340.3	$(3/2^+)$
977.1 <i>3</i>	0.8	1181.2	$(5/2^+)$	203.85	3/2+
1001.2 5	1.0	2220.8	$(1/2^+, 3/2^+)$	1219.22	$1/2^{+}$
1015.5 5	0.7	1219.22	$1/2^{+}$	203.85	3/2+
1078.2 6	1.0	2002.70	$(3/2^+)$	924.37	7/2+
1136.3 <i>3</i>	2.0	1340.3	$(3/2^+)$	203.85	3/2+
1140.9 <i>3</i>	1.6	1141.10	$(3/2^+)$	0	$1/2^{+}$
1163.4 4	0.5	2304.4	$(1/2^+, 3/2^+)$	1141.10	$(3/2^+)$
1173.0 20	0.4	2316.3	$(1/2^+, 3/2^+)$	1141.10	$(3/2^+)$

Continued on next page (footnotes at end of table)

 $\gamma(^{205}\text{Tl})$ 

# $\gamma$ (<sup>205</sup>Tl) (continued)

${\rm E_{\gamma}}^{\dagger}$	$I_{\gamma}^{\dagger}$	E <sub>i</sub> (level)	$\mathbf{J}_i^\pi$	$E_f$	${ m J}_f^\pi$	Comments
1219.2 <i>1</i>	2.9	1219.22	1/2+	0	1/2+	
<sup>x</sup> 1235.2 3	1.0					
1351.3 2	2.4	1555.16	$(1/2^+, 3/2^+)$	203.85	3/2+	
1383.5 2	2.7	2002.70	$(3/2^+)$	619.37	$5/2^+$	
1419.0 10	0.5	2560.2 1434 4	$(1/2^+, 3/2^+)$	1141.10	$(3/2^{+})$ $1/2^{+}$	
1469 5 3	1.2 0.7	2088.9	$(1/2^+)$ $(1/2^+ 3/2^+)$	619 37	$5/2^+$	
1555.9 7	0.4	1555.16	$(1/2^+, 3/2^+)$	0	$1/2^+$	
1574.7 2	1.6	1574.73	$(1/2^+, 3/2^+)$	0	1/2+	
<sup>x</sup> 1600.2 <sup>&amp;</sup> 8	0.5					
1600.2 <mark>&amp;</mark> 8	0.5	2220.8	$(1/2^+, 3/2^+)$	619.37	5/2+	
1623.6 <mark>&amp;</mark> 8	0.6	3177.3	$(1/2^+, 3/2^+)$	1555.16	$(1/2^+, 3/2^+)$	
1696.8 5	0.6	2316.3	$(1/2^+, 3/2^+)$	619.37	5/2+	
1713.0 <i>3</i>	0.7	2894.4	$(1/2^+, 3/2^+)$	1181.2	$(5/2^+)$	
1763.0 <sup>&amp;</sup> 20	0.3	1966.82	$(1/2^+, 3/2^+)$	203.85	3/2+	
1876.6 9	0.5	3018.0	$(1/2^+, 3/2^+)$	1141.10	$(3/2^+)$	
1885.1 5	1.1	2088.9	$(1/2^+, 3/2^+)$	203.85	$3/2^+$	
1941.1 4	0.0	2560.2	$(1/2^+, 3/2^+)$ $(1/2^+, 3/2^+)$	019.37	$\frac{5}{2^+}$	
2002.1.4	0.5	2002.70	$(1/2^+, 3/2^-)$	0	$1/2^+$	
2005.6 6	0.4	2209.5?	$(1/2,3/2,5/2,7/2^+)$	203.85	$3/2^+$	
<sup>x</sup> 2013.9 5	0.4					
2088.8 20	1.2	2088.9	$(1/2^+, 3/2^+)$	0	1/2+	
2101.7 8	0.8	2721.1	$(1/2^+, 3/2^+)$	619.37	5/2+	
2111.0°C 15	0.3	2316.3	$(1/2^+, 3/2^+)$	203.85	$3/2^+$	
2134.0 10	0.4	2750.6	$(1/2^+, 3/2^+)$ $(1/2^+, 3/2^+)$	019.37	$\frac{5}{2^{+}}$	
x220.97	0.0	2220.8	(1/2, 3/2)	0	1/2	
$2275.8^{\circ}$ 14	0.5	2004 4	$(1/2^+ 2/2^+)$	610.27	5/2+	
2273.8 14	0.5	2694.4	(1/2, 3/2) (1/2+3/2+)	203.85	$\frac{3}{2}$	
x2380.5 7	0.6	2000.0	(1/2 ,3/2 )	200.00	5/2	
2518.8 15	1.1	2721.1	$(1/2^+, 3/2^+)$	203.85	3/2+	
2555.0 20	1.2	2555.3	$(1/2^+, 3/2^+)$	0	1/2+	
2557.0 20	2.0	2560.2	$(1/2^+, 3/2^+)$	0	$1/2^+$	
2693.3 15	0.5	2894.4	$(1/2^+, 3/2^+)$	203.85	$3/2^+$	
2720.0 9	0.7 0.4	2721.1	(1/2, 3/2) $(1/2^+ 3/2^+)$	0	$\frac{1}{2}$ $\frac{1}{2^+}$	
3179.3 15	0.5	3177.3	$(1/2^+, 3/2^+)$	0	$1/2^+$	
3288.0 10	0.8	3287.6	$(1/2^+, 3/2^+)$	0	$1/2^+$	
4000.6 <sup>‡</sup> 2		4000.64		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.26\ 21.$
4159.9 <sup>‡</sup> 2		4159.95		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.79$ 11.
4262.5 <sup>‡</sup> 4		4262.5		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=1.33\ 26.$
4341.9 <sup>‡</sup> 5		4341.9		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=1.02.36$
					,	$E_{\gamma}$ : also a possible transition from 4061.1 level.
4342.1 <sup>‡</sup> 6		4961.34		619.37	5/2+	
4348.4 <sup>‡</sup> 4		4348.4		0	$1/2^{+}$	$E_{\gamma}$ : also a possible transition from 4967.8 level.
4348.4 <sup>‡</sup> 4		4967.87		619.37	5/2+	
4359.0 8	0.7	7646.42	1/2-	3287.6	$(1/2^+, 3/2^+)$	
4387 4	0.1	7646.42	1/2-	3259	(5/2 <sup>-</sup> )	$E_{\gamma}, I_{\gamma}$ : From 1969Mo17.
4470.0 10	0.6	7646.42	$1/2^{-1}$	3177.3	$(1/2^+, 3/2^+)$	
4028.0 10	0.8	/040.42	1/2	3018.0	$(1/2^+, 3/2^+)$	W/00 <sup>0</sup> W/(100 <sup>0</sup> ) 1 20 57
4/31.0* /		4/31./		0	1/2	$W(90^\circ)/W(130^\circ)=1.29$ 57. $E_{\gamma}$ : also a possible transition from 4938.2 level.

# $\gamma$ (<sup>205</sup>Tl) (continued)

$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	E <sub>i</sub> (level)	$\mathbf{J}_i^{\pi}$	$E_f$	$J_f^{\pi}$	Comments
4731.6 <sup>‡</sup> 7	16 <sup>#</sup>	4938.06		203.85	3/2+	
4741.4 <sup>‡</sup> 9		4741.5		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=0.76$ 17.
4752.1 7	2.2	7646.42	$1/2^{-}$	2894.4	$(1/2^+, 3/2^+)$	
4759.3 <sup>‡</sup> 7		4961.34		203.85	3/2+	$E_{\gamma}$ : transition confirmed in HI $\gamma$ S experiment.
4764.1 <sup>‡</sup> 4		4967.87		203.85	3/2+	$E_{\gamma}$ : transition confirmed in HI $\gamma$ S experiment.
4828.1 <sup>‡</sup> 11		4828.2		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.25$ 48.
4878.4 <sup>‡</sup> 4		4878.5		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.20$ 38.
4896.8 6	1.6	7646.42	1/2-	2750.6	$(1/2^+, 3/2^+)$	
4925.0 5	3.0	/646.42	1/2	2721.1	$(1/2^+, 3/2^+)$	W(000\W(1200\) 1 02 20
4926.5 <sup>+</sup> 0	o 4 <b>#</b> _2	4926.6		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.2530.$
4938.2 <sup>+</sup> 2	84" 3	4938.06		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.19$ 17.
4947.0+ 10	05# 2	4947.1		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.2137.$
4961.17 2	85" 3	4961.34		0	1/2*	<ul> <li>I<sub>y</sub>: from HIyS experiment. Other: 78 2 in S-DALINAC, Darmstadt experiment.</li> <li>W(90°)/W(130°)=0.87 16.</li> </ul>
4967.8 <sup>‡</sup> 1	71 2	4967.87		0	1/2+	<ul> <li>I<sub>γ</sub>: from HIγS experiment. Other: 65 2 in S-DALINAC, Darmstadt experiment.</li> <li>W(90°)/W(130°)=0.93 10.</li> </ul>
4975.1 <sup>‡</sup> 6		4975.2		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.03$ 17.
4994.1 <sup>‡</sup> 3		4994.2		0	1/2+	$W(90^{\circ})/W(130^{\circ})=0.95$ 36.
5007.5 6		5007.6		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.14$ 32.
5036.54 6		5036.6		0	1/2+	$W(90^{\circ})/W(130^{\circ})=0.89\ 23.$
5071.4+ 5	2.0	5071.5	1/2-	0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=1.11$ 37.
5091.0 8	3.0 2.4	7646.42	1/2 $1/2^{-}$	2555.3	$(1/2^+, 3/2^+)$ $(1/2^+, 3/2^+)$	
5123.8 <sup>‡</sup> 5		5123.9	,	0	1/2+	$W(90^{\circ})/W(130^{\circ})=0.76$ 32.
5164.6 <sup>‡</sup> 7		5164.7		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=1.27 \ 31.$
5211.8 <sup>‡</sup> 6		5211.9		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.77$ 33.
5240.4 <sup>‡</sup> 7		5240.5		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.66\ 20.$
5308.6 <sup>‡</sup> 4		5308.7		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.94\ 25.$
5329.8 6	0.9	7646.42	1/2-	2316.3	$(1/2^+, 3/2^+)$	
5342.2 6	0.8	7646.42	1/2	2304.4	$(1/2^+, 3/2^+)$	MI(000) MI(1000) 0.00 (0
5343.67 9	40 <b>#</b>	5343.7		0	1/2 5/2+	$W(90^{\circ})/W(130^{\circ})=0.9943.$
5343.6 <sup>+</sup> 9	43"	5963.2		619.37	5/2*	$\mathbf{W}(000) \mathbf{W}(1200) = 0.04$
$5357.5^{+}5$		5357.4		0	$1/2^{+}$	$W(90) / W(130) = 0.84 \ 13.$
$5390.9 \cdot 4$		5406 7		0	1/2	W(90) / W(130) = 0.90 21. W(000) / W(1200) = 0.92 20
5400.0 - + 0	o <b>z</b> #	5610.5		202.95	$1/2^{+}$	W(90)/W(150) = 0.8220.
5425.3 5	27	7646.42	$1/2^{-}$	205.85	$(1/2^+, 3/2^+)$	
5432.9 <sup>‡</sup> 6		5433.0	-, -	0	1/2+	$W(90^{\circ})/W(130^{\circ})=0.74$ 18.
5451.2 <sup>‡</sup> 5		5451.3		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.98$ 9.
5480.2 <sup>‡</sup> 5		5480.3		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.89$ 17.
5480.2 <sup>‡</sup> 5	23	5685.7		203.85	3/2+	
x5483.1 5	1.0		4.15		(4 (a.t 1-1))	
5483.1 5	1.0	7646.42	$1/2^{-1}$	2163.2	$(1/2^+, 3/2^+)$	$E_{\rm L}$ , $E_{\rm row} = 1060 M_0 17$
5552 6 <sup>‡</sup> 6	2.1	7040.42 5552 7	1/2	2098 0	$\frac{3}{2}, \frac{3}{2}$	$E_{\gamma, i\gamma}$ , FIOII 1909/0017. W(00°)/W(130°)-1 34 32
5552 6 <sup>‡</sup> 6	22 <b>#</b>	5756.0		203.85	1/2 3/2+	W(DU )   W(1DU ) - 1.34 J2.
5552.0, 0	22	5750.0		203.03	5/2	

# $\gamma(^{205}\text{Tl})$ (continued)

$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	E <sub>i</sub> (level)	$\mathbf{J}_i^{\pi}$	$\mathbf{E}_{f}$	$\mathbf{J}_f^{\pi}$	Comments
5557.4 5	3.2	7646.42	$1/2^{-}$	2088.9	$(1/2^+, 3/2^+)$	
5577.1 <sup>‡</sup> 7		5577.2		0	1/2+	$W(90^{\circ})/W(130^{\circ})=1.42$ 49.
5577.1 <sup>‡</sup> 7	50 <sup>#</sup>	5781.3		203.85	3/2+	
5589.6 <sup>‡</sup> 9		5589.7		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.76$ 13.
5598.1 <sup>‡</sup> 8		5598.2		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.96$ 47.
5598.1 <sup>‡</sup> 8	39 <sup>#</sup>	5802.9		203.85	3/2+	
5610.4 <sup>‡</sup> 8	73 <sup>#</sup> 2	5610.5		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.87\ 21.$
5619.8 <sup>‡</sup> 7 5643.4 5	3.2	5619.9 7646.42	1/2-	0 2002.70	$\frac{1}{2^+}$ (3/2 <sup>+</sup> )	$W(90^{\circ})/W(130^{\circ})=0.94$ 18.
5652.3 <sup>‡</sup> 5		5652.4		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.82$ 8.
5664.7 <sup>‡</sup> 6 5679 9 4	67	5664.8 7646 42	1/2-	0 1966 82	$\frac{1}{2^{+}}$ $(\frac{1}{2^{+}}, \frac{3}{2^{+}})$	W(90°)/W(130°)=0.94 <i>14</i> .
5686 2 <sup>‡</sup> 3	77 2	5685.7	1/2	0	$(1/2^+, 3/2^-)$	$W(90^{\circ})/W(130^{\circ})=0.89.8$
5693.3 <sup>‡</sup> 9	=	5693.4		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=0.92.34$
5737.6 <sup>‡</sup> 8		5737.7		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=0.90$ 17.
5755.8 <sup>‡</sup> 3	78 <sup>#</sup> 7	5756.0		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=0.89$ 7.
5781.4 <sup>‡</sup> 6	50 <b>#</b> 7	5781.3		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=0.86\ 20.$
5797.8 <sup>‡</sup> 9		5797.9		0	1/2+	$W(90^{\circ})/W(130^{\circ})=0.76$ 15.
5803.8 <sup>‡</sup> 9	61 <sup><b>#</b></sup> 7	5802.9		0	$1/2^+$	$W(90^{\circ})/W(130^{\circ})=0.79\ 28.$
5811.6 <sup>‡</sup> 9		5811.7		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.12$ 40.
5819.7 <sup>‡</sup> 4		5819.8		0	1/2+	$W(90^{\circ})/W(130^{\circ})=1.07$ 15.
5864.7 <sup>‡</sup> 9		5864.8		0	1/2+	$W(90^{\circ})/W(130^{\circ})=0.92$ 26.
5878.1 <sup>‡</sup> 5		5878.2		0	1/2+	$W(90^{\circ})/W(130^{\circ})=0.81$ 10.
5910.5 <sup>‡</sup> 6		5910.6		0	$1/2^{+}$	W(90°)/W(130°)=0.93 13.
5963.8 <sup>‡</sup> 18	57 <sup>#</sup> 6	5963.2		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.69$ 14.
6060.7 <sup>‡</sup> 4		6060.8		0	$1/2^{+}$	W(90°)/W(130°)=0.86 17.
6071.2 8	1.4	7646.42	$1/2^{-}$	1574.73	$(1/2^+, 3/2^+)$	
6088.5 <sup>+</sup> 5 6091.9 7	0.8	6088.6 7646.42	1/2-	0 1555.16	$1/2^+$ (1/2 <sup>+</sup> ,3/2 <sup>+</sup> )	$W(90^{\circ})/W(130^{\circ})=0.74$ 15.
6109.4 <sup>‡</sup> 8		6109.5		0	$1/2^{+}$	W(90°)/W(130°)=0.70 23.
6146.8 <sup>‡</sup> 9		6146.9		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.82$ 13.
6176.6 <sup>‡</sup> 4		6176.7		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.87$ 19.
6188.9 <sup>‡</sup> 6 6212.5 8	1.2	6189.0 7646.42	1/2-	0 1434.4	$1/2^+$ (1/2 <sup>+</sup> )	$W(90^{\circ})/W(130^{\circ})=0.82\ 21.$
6213.3 <sup>‡</sup> 9 6305.0 7	0.8	6213.4 7646.42	1/2-	0 1340.3	$\frac{1/2^{+}}{(3/2^{+})}$	W(90°)/W(130°)=0.51 15.
6315.2 <sup>‡</sup> 10		6315.3		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=0.85\ 26.$
6364.6 <sup>‡</sup> 6		6364.7		0	$1/2^{+}$	$W(90^{\circ})/W(130^{\circ})=1.01$ 29.
6427 <i>4</i> 6505.1 <i>4</i> 7047 7252	0.6 3.7	7646.42 7646.42 7251.6 7251.6	$1/2^{-}$ $1/2^{-}$ $(3/2^{+})$ $(3/2^{+})$	1219.22 1141.10 203.85 0	$1/2^+$ (3/2 <sup>+</sup> ) 3/2 <sup>+</sup> 1/2 <sup>+</sup>	$E_{\gamma}, I_{\gamma}$ : From 1969Mo17.
7442.0 20	0.7	7646.42	$1/2^{-}$	203.85	3/2+	
7645.8 4	59.5	7646.42	$1/2^{-}$	0	1/2+	

 $^{\dagger}$  From 1974Ol05, unless otherwise stated.  $\Delta I\gamma{<}10\%$  for strongest transitions.

#### $^{205}$ Tl $(\gamma,\gamma')$ 1974Ol05,2016Be31 (continued)

### $\gamma(^{205}\text{Tl})$ (continued)

<sup>‡</sup> From 2016Be31, based on level-energy differences.
 <sup>#</sup> Branching intensity from 2016Be31.

- <sup>(a)</sup> Multiply placed. <sup>(b)</sup> Placement of transition in the level scheme is uncertain. <sup>x</sup>  $\gamma$  ray not placed in level scheme.



 $^{205}_{\ 81}\text{Tl}_{124}$ 

### <sup>205</sup>Tl(γ,γ') 1974Ol05,2016Be31









 $^{205}_{81}{\rm Tl}_{124}$ 

### <sup>205</sup>Tl(γ,γ') **1974Ol05,2016Be31**



 $^{205}_{81}\text{Tl}_{124}$