^{198}Pt(^{3}He,d) 1978Mu08,1980AtZZ

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1978Mu08 (also 1977MuZD thesis): E=41 MeV; magnetic spectrograph, angular distribution measured from 2.5° to 40°. L transfers and S estimated from DWBA fits to $\sigma(\theta)$ data. Assumed slightly oblate nucleus (β_2=−0.10) to make Nilsson-state assignments. Ratios of (^{3}He,d)/(α,t) cross sections used to confirm L transfers. FWHM=25 keV. A total of 18 groups reported up to 3570 keV, three above 3083 keV.
Additional information 1.
1980AtZZ: E=25.5 MeV, magnetic spectrograph, angular distributions at nine angles from 6° to 60° (lab). FWHM≈20 keV. Relative intensities are accurate to 5%, the absolute cross sections accurate to 25%. A total of 32 groups is reported up to 3083 keV. Comparisons with three different models: rotational-vibrational model (RVM), strong-coupling model (SCM) and particle asymmetric rotor model (PAR).
Both the studies (1980AtZZ,1978Mu08) interpret ^{199}Au nucleus as oblate deformed with $\beta_2 \approx -0.13$. The Nilsson labeling scheme used by 1978Mu08 seems incorrect since the orbital labels (in figure 10 of 1978Mu08) are the same in the oblate region as in the prolate region. These labels are expected to be different in the oblate region and seem to be correctly labeled in 1980AtZZ.

^{199}Au Levels

Differential cross sections given under comments are At 10° (lab). The σ ratio (α,t)/(^{3}He,d) is At 20° (lab) (1978Mu08).

E(level)‡	Jπ†	L	$C^2_{jl}U^2$[b]	Comments
0[c]	3/2+	2#	0.81	C^2S=0.193 (1978Mu08). 3/2[402] (corresponding orbital is 3/2[431] in 1980AtZZ) assignment in 1978Mu08. The 319 level is associated with 3/2[431] orbital by 1980AtZZ. dσ/dΩ=140 μb/sr; σ(α,t)/σ(^{3}He,d)=0.91 (1978Mu08). Additional information 2.
79[c]	1/2+	0#	0.22	Additional information 3. C^2S=0.198 (1978Mu08). dσ/dΩ=76 μb/sr; σ(α,t)/σ(^{3}He,d)=0.16 (1978Mu08).
319	3/2+&5/2+	2#	0.092,0.138	E(level): possibly a doublet: 317.0, 5/2+ and 323.6, 3/2+ in 'Adopted Levels'. Additional information 4. 3/2[431] assignment in 1980AtZZ, 1/2[400] (corresponding orbital is 1/2[431] in 1980AtZZ) in 1978Mu08. C^2S=0.032 (1978Mu08) for 3/2+. σ(α,t)/σ(^{3}He,d)=1.13 (1978Mu08).
543[c]	5/2+&11/2−	2+5#	0.46,1.16	Additional information 5. C^2S=0.070 for 5/2+, 0.098 for 11/2− (1978Mu08). E(level): 543+549 unresolved doublet. For 11/2− level: 1/2[501] in 1980AtZZ (corresponding orbital is 1/2[550] in 1978Mu08). dσ/dΩ=75 μb/sr; σ(α,t)/σ(^{3}He,d)=2.0 for doublet (1978Mu08).
733&	1/2−,7/2−	1,3@	0.010,0.036	Jπ: 7/2− In 'Adopted Levels'. If 7/2−, possible orbital is 1/2[501] (1980AtZZ). σ(α,t)(45°)/σ(^{3}He,d)(30°)=2.2 (1980AtZZ).
787&	1/2	0,1@	0.046,0.016	Jπ: 3/2+ In 'Adopted Levels'. σ(α,t)(45°)/σ(^{3}He,d)(30°)=10 (1980AtZZ).
815	1/2+	0#	0.20	C^2S=0.326 for L=0 (1978Mu08). $C^2_{jl}U^2$: 2.6 for possible L=4, 7/2+ component (1980AtZZ). Additional information 6. 1/2[440] orbital (1980AtZZ) (corresponding orbital is 1/2[411] in 1978Mu08). L: According to 1980AtZZ this peak possibly includes L=4 component, but the

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^{198}Pt(^{3}He,d) 1978Mu08,1980AtZZ (continued)

^{199}Au Levels (continued)

E(level)[‡]	Jπ[†]	L	$C_{jl}^2U^2$[b]	Comments
				data seem to fit L=0 in both 1980AtZZ and 1978Mu08. dσ/dΩ=180 μb/sr; σ(α,t)/σ(^{3}He,d)=0.34 (1978Mu08).
1077 *5*	3/2$^+$	2		Jπ: 3/2$^+$,5/2$^+$ In 'Adopted Levels'. Possible member of 1/2[440] (labeled as 1/2[411] by 1978Mu08) band (1978Mu08). C^2S=0.025 (1978Mu08). E(level),L: from 1978Mu08. A peak near this energy is present In the spectra shown by 1980AtZZ from both the (^{3}He,d) and (α,t) reactions, but it is not listed As a level In ^{199}Au In tabular data. dσ/dΩ=27 μb/sr (1978Mu08).
1159		0		Jπ: (3/2$^+$,5/2$^+$,7/2$^+$) In 'Adopted Levels'; L=0 is inconsistent with 'adopted' Jπ. L: from 1978Mu08. Additional information 7. C^2S=0.035 (1978Mu08). dσ/dΩ=40 μb/sr (1978Mu08).
1183[&]	9/2$^-$,11/2$^+$	5,6[@]	0.165,0.30	Jπ: (1/2 to 7/2)$^+$ In 'Adopted Levels'. σ(α,t)(45°)/σ(^{3}He,d)(30°)=1.7 (1980AtZZ).
1245[&]		(0)[@]	0.040	Jπ: 3/2$^+$,5/2$^+$,7/2$^+$ In 'Adopted Levels'; L=(0) is inconsistent with 'adopted' Jπ. σ(α,t)(45°)/σ(^{3}He,d)(30°)=6.2 (1980AtZZ).
1314	11/2$^+$	6[@]	0.156	Jπ: No assignment In 'Adopted Levels'. E(level): 1335 *5* group in 1978Mu08 is probably the same level As 1314 In 1980AtZZ. L: 3 (1978Mu08) for 1335. C^2S=0.034 for L=3, 7/2$^-$ (1978Mu08). σ(α,t)/σ(^{3}He,d)=0.8 (1978Mu08). σ(α,t)(45°)/σ(^{3}He,d)(30°)=3.2 (1980AtZZ).
1542	11/2$^+$	6[@]	0.32	Jπ: (11/2$^+$,13/2$^+$) In 'Adopted Levels'. E(level),L: see comment for 1563 level. σ(α,t)(45°)/σ(^{3}He,d)(30°)=1.4 (1980AtZZ).
1563		0[@]	0.016	Jπ: (5/2,7/2)$^+$ In 'Adopted Levels'; L=0 is inconsistent with 'adopted' Jπ. E(level): 1580 *5* group In 1978Mu08 probably corresponds to 1542+1563 in 1980AtZZ. L: (2) for 1580 (1978Mu08) (note that 7/2$^-$ listed by 1978Mu08 is inconsistent with their L=(2) assignment). σ(α,t)(45°)/σ(^{3}He,d)(30°)=1.7 (1980AtZZ). dσ/dΩ=28 μb/sr; σ(α,t)/σ(^{3}He,d)=1.0 for 1580 (1978Mu08). C^2S=0.019 for L=(2) (1978Mu08).
1696	7/2,9/2$^-$	(3,4,5)[@]		Jπ: (5/2 to 11/2)$^+$ In 'Adopted Levels'. E(level),L,$C_{jl}^2U^2$: see comment for 1729 level. σ(α,t)(45°)/σ(^{3}He,d)(30°)=2.8 (1980AtZZ).
1729	(11/2$^+$)	(6)[@]	0.138	Jπ: No assignment In 'Adopted Levels'. E(level): 1770 *5* group In 1978Mu08 probably corresponds to 1696+1729 in 1980AtZZ. L: 3 for 1770 group (1978Mu08). C^2S=0.032 for L=3, 7/2$^-$ (1978Mu08). dσ/dΩ=26 μb/sr (1978Mu08).
1803[&]				
1861	9/2$^-$	5[@]	1.20	Jπ: 9/2$^-$,11/2$^-$ In 'Adopted Levels'. 9/2[514] orbital (1980AtZZ) (corresponding label is 9/2[505] in 1978Mu08). E(level): 1910 *5* group In 1978Mu08 corresponds mainly to 1861 group In 1980AtZZ, but May contain contribution from 1890 group also. σ(α,t)(45°)/σ(^{3}He,d)(30°)=14 (1980AtZZ). C^2S=0.374 for L=5, 9/2$^-$ (1978Mu08).

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^{198}Pt(^{3}He,d) 1978Mu08,1980AtZZ (continued)

^{199}Au Levels (continued)

E(level)[‡]	Jπ[†]	L	$C^2_{j1}U^2$[b]	Comments
				dσ/dΩ=30 μb/sr; σ(α,t)/σ(^{3}He,d)=4.97 (1978Mu08).
1890	11/2$^+$	6[@]	0.18	Jπ: (11/2$^+$,13/2$^+$) In 'Adopted Levels'. E(level): see comment for 1861 level.
2112[&]		0[@]	0.017	σ(α,t)(45°)/σ(^{3}He,d)(30°)=3.0 (1980AtZZ).
2221[&]		0[@]	0.009	σ(α,t)(45°)/σ(^{3}He,d)(30°)=2.6 (1980AtZZ).
2324[&]	1/2$^-$	1[@]	0.006	Jπ: (1/2$^-$,3/2$^-$) In 'Adopted Levels'. σ(α,t)(45°)/σ(^{3}He,d)(30°)=5.0 (1980AtZZ).
2374	7/2$^-$	3[@]	0.27	Jπ: (5/2$^-$,7/2$^-$) In 'Adopted Levels'. Possible 7/2[514] orbital (1980AtZZ). E(level): 2390 *10* group In 1978Mu08 probably corresponds to 2374 in 1980AtZZ. C^2S=0.040 for L=3, 7/2$^-$ (1978Mu08). σ(α,t)(45°)/σ(^{3}He,d)(30°)=2.2 (1980AtZZ). dσ/dΩ=37 μb/sr (1978Mu08).
2412[&]		0[@]	0.034	
2484[&]	7/2$^+$,9/2$^-$	4,5[@]	0.25,0.195	Jπ: (7/2$^+$,9/2,11/2$^-$) In 'Adopted Levels'.
2512	5/2	2,3[@]	0.47,0.204	Jπ: (3/2$^+$,5/2,7/2$^-$) In 'Adopted Levels'. E(level): possibly the 2540 *10* group In 1978Mu08. L: 3 In 1978Mu08 for 2540 group. C^2S=0.045 for L=3, 7/2$^-$ (1978Mu08). dσ/dΩ=61 μb/sr; σ(α,t)/σ(^{3}He,d)=1.19 (1978Mu08).
2592	3/2$^+$,5/2$^-$	2,3[@]	0.136,0.093	Jπ: (3/2$^+$,5/2,7/2$^-$) In 'Adopted Levels'. E(level): possibly the 2650 *10* group In 1978Mu08. L: (3) In 1978Mu08 for 2650 group. C^2S=0.037 for L=(3), 7/2$^-$ (1978Mu08). dσ/dΩ=37 μb/sr (1978Mu08).
2734[&]		0[@]	0.014	σ(α,t)(45°)/σ(^{3}He,d)(30°)=2.4 (1980AtZZ).
2795	3/2$^+$,5/2$^-$	2,3[@]	0.14,0.063	Jπ: (3/2$^+$,5/2,7/2$^-$) In 'Adopted Levels'. E(level): possibly the 2950 *10* group In 1978Mu08. L: 3 In 1978Mu08 for 2950 group. C^2S=0.035 for L=3, 7/2$^-$ (1978Mu08). σ(α,t)(45°)/σ(^{3}He,d)(30°)=2.9 (1980AtZZ). dσ/dΩ=82 μb/sr (1978Mu08).
2863[&]	9/2$^-$,13/2$^+$	5,6[@]	0.45,0.95	Jπ: (9/2$^-$,11/2,13/2$^+$) In 'Adopted Levels'. If 13/2$^+$, possible 13/2[606] orbital (1980AtZZ), 1978Mu08 associated 3400 level with this orbital. σ(α,t)(45°)/σ(^{3}He,d)(30°)=2.6 (1980AtZZ).
3013[&]	3/2$^+$,5/2$^-$	2,3[@]	0.25,0.17	Jπ: (3/2$^+$,5/2,7/2$^-$) In 'Adopted Levels'.
3044	7/2$^-$	3[@]	0.54	Jπ: (5/2$^-$,7/2$^-$) In 'Adopted Levels'. Possible 7/2[523] orbital (1980AtZZ). E(level): 3130 *10* group in 1978Mu08 probably corresponds to 3044+3083, since the 3044 group in 1980AtZZ and 3130 group in 1978Mu08 is the second most intense peak in the spectra shown, the most intense being 1861 group in 1980AtZZ and 1910 group in 1978Mu08. C^2S=0.084 for L=3, 7/2$^-$ (1978Mu08). dσ/dΩ=300 μb/sr; σ(α,t)/σ(^{3}He,d)=0.64 (1978Mu08).
3083	5/2$^-$,7/2$^+$	3,4[@]	0.69,0.51	Jπ: (5/2$^-$,7/2,9/2$^+$) In 'Adopted Levels'. E(level): see comment for 3044 level.
3400[a] *10*	13/2$^+$	6[a]		Jπ: (11/2$^+$,13/2$^+$) In 'Adopted Levels'. C^2S=0.45 (1978Mu08). possible $i_{13/2}$ orbital (1978Mu08). dσ/dΩ=31 μb/sr; σ(α,t)/σ(^{3}He,d)=5.6 (1978Mu08).

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^{198}Pt(^{3}He,d) 1978Mu08,1980AtZZ (continued)

^{199}Au Levels (continued)

E(level)‡	Jπ†	L	Comments
3570[a] *10*	7/2⁻	(3)[a]	Jπ: (5/2⁻,7/2⁻) In 'Adopted Levels'. C^2S=0.013 (1978Mu08).

† Assumed by 1980AtZZ or 1978Mu08 for calculation of spectroscopic factor. The assignment in 'Adopted Levels' is indicated if different.

‡ From 1980AtZZ. The values from 1978Mu08 agree up to about 1300 keV with those from 1980AtZZ. Above 1300, the values in 1978Mu08 are consistently higher than those in 1980AtZZ, for example 1861 in 1980AtZZ is 1910 in 1978Mu08. At the far end the difference may be as much as 100 keV. The values from 1980AtZZ are adopted here for two reasons: 1. the resolution seems somewhat better in 1980AtZZ and a larger number of groups is seen; 2. 1980AtZZ state that they measured energies at two different facilities (McMaster and Rochester) and essentially obtained the same energies.

From 1980AtZZ and 1978Mu08, same assignment in both studies.

@ From 1980AtZZ.

& From 1980AtZZ only.

[a] From 1978Mu08 only. Due to possible calibration problems in 1978Mu08, the quoted energy may be too high by as much as 100 keV.

[b] From 1980AtZZ. 1978Mu08 give C^2S values which are listed under comments.

[c] Band(A): 1/2[431] band (1980AtZZ). The same band is labeled 1/2[400] in 1978Mu08.

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Band(A): 1/2[431] band (1980AtZZ)

5/2^{+} &11/2^{-} 543

1/2^{+} 79

3/2^{+} 0

$^{199}_{79}Au_{120}$