^{190}Os(t,α),(pol t,α) 1976Hi08,1977Hi06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, Balraj Singh	NDS 142, 1 (2017)	15-Apr-2017

1976Hi08: (t,α),E=15 MeV beam from Los Alamos Scientific Laboratory′s FN tandem Van de Graaff accelerator. The reaction products were analyzed with a Q3D magnetic spectrometer and detected with a helical-cathode position sensitive proportional counter. Measured σ. FWHM=8-12 keV.

1977Hi06: (pol t,α),E=17 MeV beam from Los Alamos polarized triton source and model FN tandem Van de Graaff accelerator with a polarization of 0.75. Target was 95.5% enriched ^{190}Os ≈150 μg/cm^2 thick deposited onto 50 μg/cm^2 carbon backing. The reaction products were analyzed in a Q3D Type II magnetic spectrometer and detected with a one meter long helical-cathode position-sensitive proportional counter. Measured σ(θ) and analyzing powers $A_y(\theta)$ from 15° to 50° in steps of 5°. FWHM=20 keV. Relative cross sections were within ≈10%, whereas absolute cross sections were accurate to ≈15%. Comparison of σ(θ) and $A_y(\theta)$ data with DWBA calculations. Deduced levels, J^π, hexadecapole deformation.

^{189}Re Levels

NSF=Nuclear structure factor.
Nuclear structure factors (NSF) from 1977Hi06 supersede those in 1976Hi08.

E(level)[†]	J^π[‡]	L[#]	dσ/dΩ mb/sr[&]	Comments
0	$5/2^+$	2	148 *15*	Experimental NSF=0.49; theoretical value=0.56 for 5/2, 5/2[402].
125 *3*	$(9/2^-)$	(5)	4.7 *7*	J^π: $(7/2^+,9/2^-)$ from σ(θ) and $A_y(\theta)$ data, $9/2^-$ supported by model interpretation. Experimental NSF=0.05; theoretical value=0.005 for 9/2, 9/2[514].
146 *3*	$(7/2^+)$	(4)	5.9 *9*	J^π: L-1/2 from σ(θ) and $A_y(\theta)$ data, $7/2^+$ supported by model interpretation. Experimental NSF=0.07; theoretical value=0.03 for 7/2, 5/2[402].
260 *3*	$3/2^+$	2	145 *14*	E(level): may include $1/2^+$ member of 1/2[411] rotational band.
279 *3*			*a*	
303 *3*	$(11/2^-)$	5	*a*	Experimental NSF<1.48; theoretical value=1.38 for 11/2, 9/2[514] (1977Hi06).
481 *3*	$(5/2\&7/2)^+$	(2+4)	*b*	E(level),J^π: unresolved doublet with positive analyzing power. Broad peak with angular distribution consistent with states of different spin.
501 *3*	$(3/2^+)$	(2)	*b*	J^π: L=(2) from σ(θ) and L-1/2 from $A_y(\theta)$ data.
599 *3*	$(3/2^+)$	(2)	13 *2*	Experimental NSF=0.04.
640 *3*	$(5/2^+,3/2^-,7/2^-)$	(2,1,3)[@]	13 *2*	
670 *3*	$(3/2^+)$	(2)	21 *2*	Experimental NSF=0.08.
697 *3*	$(7/2^+)$	(4)	59 *6*	Experimental NSF=0.72; theoretical value=0.97 for 7/2, 7/2[404].
852 *3*	$(5/2^+)$	(2)	33 *3*	Experimental NSF=0.11.
877 *3*	$(9/2^+,11/2^-,7/2^-)$	(5,4,3)[@]	23 *2*	Experimental NSF=0.26.
1097 *3*				E(level): observed only in 1976Hi08.
1223 *3*	$5/2^+$	2	45 *4*	Experimental NSF=0.15.
1308 *3*	$(5/2^+)$	(2)	23 *2*	Experimental NSF=0.08.
1396 *3*	$(3/2^+,5/2^-,1/2^-)$	(2,3,1)[@]	19 *2*	
1423 *3*	$11/2^-$	5	86 *9*	Experimental NSF=1.10; theoretical value=0.93 for 11/2, 7/2[523].
1502 *10*	$(11/2^-)$	(5)[@]	62 *6*	J^π: $(7/2^-,9/2^+,11/2^-)$ from $A_y(\theta)$ data, however, a tentative $(11/2^-)$ could be explained by hexadecapole deformation effects (1977Hi06). Experimental NSF=0.82.
1632 *10*			24 *2*	
1916 *10*				
1959 *10*				

[†] From 1976Hi08. The authors state that uncertainties are up to 3 keV up to 1500 keV, and estimated 10 keV above this energy.

Continued on next page (footnotes at end of table)

^{190}Os(t,α),(pol t,α) 1976Hi08,1977Hi06 (continued)

^{189}Re Levels (continued)

‡ Assigned by authors on the basis of comparison of experimental $\sigma(\theta)$ and analyzing powers ($A_y(\theta)$) data with DWBA calculations.

As implied from J^π assignments in columns 2 and 3 of Table 2 in 1977Hi06 based on analysis of both the $\sigma(\theta)$ and $A_y(\theta)$ data and comparison with DWBA calculations.

@ From shell-model and Nilsson model predictions, L= 0, 2, 4 and 5 states should be strongly populated as compared to L=1 and 3 states in a proton pickup reaction, since there are no p- or f-states in the shell.

& Values are from 1977Hi06 at 50°. Cross sections are also given at 40° by 1976Hi08.

a $d\sigma/d\Omega$(279+303)=151 mb/sr *15*.

b $d\sigma/d\Omega$(481+501)=174 mb/sr *17*.