^{226}Ra(^{3}He,d) 1988Ma18

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ictp-2014 Workshop Group	NDS 132, 257 (2016)	15-Jan-2016

1988Ma18 (also 1986MaYU thesis): E(^{3}He)=30 MeV. Target=radioactive ^{226}Ra of ≈40 μg/cm^{2} thickness on carbon backing. Measured deuteron spectra at θ=27.5°, 45°, 70°, and 75° using Enge split-pole magnetic spectrometer at McMaster accelerator facility. FWHM=21-22 keV. DWBA analysis. Deduced levels, J, π, bands.

Experimental absolute cross sections at 70° for members of 3/2[532], 3/2[651], 1/2[530] and 1/2[660] bands were compared (in 1986MaZU) with theoretical values calculated for reflection symmetric and reflection asymmetric cases with octupole deformations of 0.03 and 0.09. No clear picture seemed to have emerged about the static octupole deformation of ^{227}Ac. See Table III C.4 in 1986MaZU for details.

Cross sections in μb/sr (1986MaYU)

Level	dσ/dΩ (70°)	dσ/dΩ (45°)	dσ/dΩ (75°)
0	<1	2.4 *10*	<1
27	<2	4.6 *10*	<1
46	<2	4.2 *10*	<2
74	<2	10.1 *30*	1.7 *10*
84	<2	1.9 *20*	<1
110	4.1 *9*	15.6 *20*	4.2 *10*
127	5.5 *9*	7.5 *20*	3.7 *10*
160	<1	4.2 *10*	<1
187	<2	2.8 *20*	<2
199	<3	6.5 *40*	
211	11.9 *20*	18.6 *30*	9.8 *10*
253/244		2.3 *10*	<1
271	<2	4.4 *10*	<1
305	2.9 *10*	6.1 *20*	1.9 *10*
320	7.3 *30*	36.4 *30*	4.4 *40*
330	18.1 *20*		5.3 *40*
355		15.9 *20*	4.9 *10*
367	10.1 *20*		
381		32 *17*	10.5 *50*
387	8.1 *20*		2.4 *60*
400/411		14.2 *60*	1.4 *10*
426	<2	a	
428	<2	a	
435	<2	a	3.8 *10*
438	<2	a	
469	<2	a	<2
501	2.7 *10*	a	4.0 *10*
514	<1	a	<2
523	2.9 *40*	a	
537	4.1 *10*	a	6.1 *10*
563	1.7 *8*	a	<1
590	4.6 *10*	a	3.4 *10*
639	<1	a	1.2 *5*
657	<1	a	<1
698	<1	a	<1
790	3.2 *7*	a	<2
860	2.3 *20*	a	<1
875	3.3 *20*	a	<2
1068	7.1 *10*	3.2 *20*	3.6 *10*
1096	16.1 *20*	30.4 *30*	10.9 *30*

a: No σ value is available due to impurity

^{227}Ac Levels

E(level)[†]	J^{π}[@]	Comments
0[&]	$3/2^-$	
27[#a]	$3/2^+$	
30[#&]	$5/2^-$	
46[a]	$5/2^+$	
74[&]	$7/2^-$	
85[a]	$7/2^+$	
110[a]	$9/2^+$	
127[&]	$9/2^-$	
160?[‡] *5*		
187[a]	$11/2^+$	
199[&]	$11/2^-$	
211[a]	$13/2^+$	
227?		E(level): from (α,t).
244?[‡] *5*		E(level): observed only at θ=45° and 75°.
271[#&]	$13/2^-$	
273[#b]	$(5/2^-)$	
305[c]	$(5/2^+)$	
320[b] *5*	$(7/2^-)$	
330[d]	$3/2^-$	
377[b] *6*	$(9/2^-)$	
387[d]	$7/2^-$	
404 *5*	$(9/2^+)$	
427[#e]	$5/2^+$	
435[#e]	$1/2^+$	
438[#d]	$5/2^-$	
469[e]	$9/2^+$	
501		
515		
523[c] *8*	$(13/2^+)$	
537[e]	$3/2^+$	5/2[642] assignment in Adopted Levels.
563		
589[e] *3*	$(13/2^+)$	
639		
657[#e]	$7/2^+$	
698		
790		
860		
875		
1068 *5*		
1093 *4*		

[†] Energies were obtained by fixing known levels in the deuteron spectrum within ±1 keV. 1988Ma18 also state that uncertainties are <2 keV for well-resolved peaks but are greater for weak or poorly resolved peaks. Levels listed with energy uncertainties were newly proposed by 1988Ma18.

[‡] Weak evidence for the population of level.

[#] Unresolved doublets: 27 and 30 keV with a mean energy of 27 keV 271 and 273 keV with a mean energy of 272 keV; 437 and 438 keV with a mean energy of 437 keV. Mean energies are from Table I in 1988Ma18.

[@] From 1988Ma18 based on comparison of experimental and theoretical cross sections for band members (fingerprint method) in (α,t) reaction. See also Adopted Levels for assignments of octupole parity doublet bands.

[&] Band(A): π3/2[532] band.

[a] Band(B): π3/2[651] band.

Continued on next page (footnotes at end of table)

^{226}Ra(^{3}He,d) 1988Ma18 (continued)

^{227}Ac Levels (continued)

[b] Band(C): π5/2[523] band.
[c] Band(D): π5/2[642] band.
[d] Band(E): π1/2[530] band.
[e] Band(F): π1/2[660] band.

^{226}Ra(^{3}He,d) 1988Ma18

Band(F): π1/2[660] band

7/2+ 657

(13/2+) 589

Band(D): π5/2[642] band

3/2+ 537

(13/2+) 523

9/2+ 469

Band(E): π1/2[530] band

5/2− 438

1/2+ 435

5/2+ 427

Band(C): π5/2[523] band

7/2− 387

(9/2−) 377

3/2− 330

(7/2−) 320

(5/2+) 305

Band(A): π3/2[532] band

13/2− 271

(5/2−) 273

Band(B): π3/2[651] band

13/2+ 211

11/2− 199

11/2+ 187

9/2− 127

9/2+ 110

7/2+ 85

7/2− 74

5/2+ 46

5/2− 30

3/2+ 27

3/2− 0

$^{227}_{89}Ac_{138}$