

$^{230}\text{Th}(\text{p},\alpha)$ 2003Bu12

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

2003Bu12: E=20 MeV. Measured $E\alpha$, $\sigma(E,\theta)$ using an Enge split-pole magnetic spectrograph and a position-sensitive Si detector in the focal plane of the spectrograph. DWBA analysis.

 ^{227}Ac Levels

E(level) [†]	$J^{\pi\ddagger}$	L	$d\sigma/d\Omega$ (mb/sr) [@]	Comments
31 ^b 2	3/2 ⁺ & 5/2 ⁻		0.7 2	E(level): doublet with configurations: $\pi 3/2[651]$ and $\pi 3/2[532]$.
110 ^a 1	9/2 ⁺		1.0 2	
128 ^b 1	9/2 ⁻	5	2.4 3	
210.8 ^a	13/2 ⁺	6	3.7 4	
274 ^e 2	13/2 ⁻ & (5/2 ⁻)		0.4 2	E(level): doublet with configurations: $\pi 5/2[523]$ and $\pi 3/2[532]$.
329 ^{&} 1	3/2 ⁻		2.2 3	
361 ^e 1	1/2 ⁻ & (9/2 ⁻)		1.9 5	E(level): doublet with configurations: $\pi 1/2[530]$ and $\pi 5/2[523]$.
386 ^{&} 2	7/2 ⁻	3	4.2 6	
435 ^{#c} 1	1/2 ⁺ & (5/2 ⁻) [#]	0	5.4 6	E(level): doublet with configurations: $\pi 1/2[530]$ and $\pi 1/2[660]$.
500 3	(3/2 ⁻ , 5/2 ⁻)		0.9 4	
515 1	(3/2 ⁺)	2	4.9 7	
537 ^{#f} 3	(13/2 ⁺) & (3/2 ⁺) [#]		1.8 8	E(level): doublet with configurations: $\pi 5/2[642]$ and $\pi 1/2[660]$.
566 ^{&} 1	(9/2 ⁻) & (3/2 ⁺ , 5/2 ⁺)		2.4 5	E(level): doublet with configuration: $\pi 1/2[530]$ for 9/2 ⁻ ; no configuration given for the second component.
591 ^c 2	(13/2 ⁺)	6	2.0 4	
640 ^d 1	1/2 ⁺	0	21 2	
669 3			1.0 5	
698 ^d 2	3/2 ⁺	2	7.5 9	
725 4			1.2 3	
793 4			0.6 2	
816 4			1.3 3	
869 3			5.6 13	
895 2	(3/2 ⁺)	2	9.1 13	Configuration= $\pi 3/2[402]$.
920 2			2.3 8	
950 4			3.3 8	
992 3			1.7 5	
1076 3			0.6 2	
1117 2			3.7 6	
1148 2			2.2 4	
1183 3			0.9 3	
1215 3			0.8 3	
1274 4			0.8 3	
1311 2			4.1 4	
1385 2			2.5 5	
1438 2			6.2 6	
1483 2			18 2	
1550 2			2.8 8	
1591 2			12 2	
1629 4			10 2	

Continued on next page (footnotes at end of table)

 $^{230}\text{Th}(\text{p},\alpha)$ **2003Bu12 (continued)**

 ^{227}Ac Levels (continued)

[†] Level energies are averages from the spectra taken at angle 6°, 15°, 25° and 35° with photographic plates and are measured relative to the known energy of 210.8-keV level.

[‡] Given as composite configurations where levels are unresolved.

[#] The (p,α) population of this level can be attributed to $\pi 1/2[400]$ (or $\Delta N=2$) admixture in the $\pi 1/2[660]$ band. The $\Delta N=2$ matrix element is estimated as ≈ 80 keV.

[@] Cross section values are at 6°, with an additional uncertainty of $\leq 20\%$ in absolute normalization.

[&] Band(A): $\pi 1/2[530]$.

^a Band(B): $\pi 3/2[651]$.

^b Band(C): $\pi 3/2[532]$.

^c Band(D): $\pi 1/2[660]$.

^d Band(E): $\pi 1/2[400]$.

^e Band(F): $(\pi 5/2[523])$.

^f Band(G): $(\pi 5/2[642])$.

$^{230}\text{Th}(\text{p},\alpha)$ **2003Bu12**Band(E): $\pi 1/2[400]$ $3/2^{+}$ **698** $1/2^{+}$ **640**Band(D): $\pi 1/2[660]$ $(13/2^{+})$ **591** $(13/2^{+})\&(3/2^{+})$ **537**Band(A): $\pi 1/2[530]$ $(9/2^{-})\&(3/2^{+},5/2^{+})$ **566** $1/2^{+}\&(5/2^{-})$ **435** $7/2^{-}$ **386** $1/2^{-}\&(9/2^{-})$ **361** $3/2^{-}$ **329** $1/2^{+}\&(5/2^{-})$ **435**Band(C): $\pi 3/2[532]$ $13/2^{-}\&(5/2^{-})$ **274**Band(B): $\pi 3/2[651]$ $13/2^{+}$ **210.8** $9/2^{-}$ **128** $9/2^{+}$ **110** $3/2^{+}\&5/2^{-}$ **31** $3/2^{+}\&5/2^{-}$ **31**

$^{230}\text{Th}(\text{p},\alpha)$ 2003Bu12 (continued)

Band(G): ($\pi 5/2[642]$)

($13/2^+$)&($3/2^+$) 537

Band(F): ($\pi 5/2[523]$)

$1/2^-$ & ($9/2^-$) 361

$13/2^-$ & ($5/2^-$) 274

$^{227}_{89}\text{Ac}_{138}$