^{164}Er(pol t,α) 1981Bu03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich, Balraj Singh	NDS 111, 1211 (2010)	12-Apr-2010

Additional information 1.

E= 17 MeV. 1981Bu03: 67.2% enriched target. Measured $\sigma(\theta)$ and Ay(θ); beam polarization ≈0.71 to 0.81. θ=5° to 45°, in 5° steps. FWHM=20. DWBA predictions, Nilsson model with pairing and Coriolis-mixing effects included.

Bands: see the Adopted Levels for parameter values. See 1981Bu03 for results from a more detailed calculation including quadrupole deformation, Coriolis, and pairing effects.

Cross section values at 30°

Level	dσ/dΩ (μb/sr)
≈ 0	13
≈ 100	13
222	220
306	57
360	66
390	225
440	115
≈ 498	17
≈ 529	35
≈ 587	
≈ 612	16
712	46
878	21
972	125
1089	19
1115	14
1190	60
1231	16
1294	12
1400	163
1442	23
1632	35
1733	78

^{163}Ho Levels

E(level)	J$^{\pi}$ †	L ‡	S #	Comments
0 [i]	7/2$^-$	3	0.04	Predicted S=0.02.
≈100 [i]	9/2$^-$	5	0.12	Predicted S=0.01.
222 [i] *4*	11/2$^-$	5	1.5	Predicted S=0.96.
306 [@&] *4*	3/2+(&1/2$^+$)	2	0.24	S: assuming $\sigma(\theta)$ primarily due to 3/2$^+$ member. Predicted S=0.13 for 3/2$^+$.
360 [a] *4*	3/2$^+$	2	0.55	Predicted S=0.05. Large discrepancy between experimental and predicted value is unexplained (1981Bu03).
390 [&] *4*	5/2$^+$	2	0.85	Predicted S=0.55.
440 [@b] *4*	7/2$^+$&5/2$^+$	4+2	0.44+0.21	7/2$^+$,1/2[411] may be obscured by this doublet. S: from simultaneous analysis of $\sigma(\theta)$ and A(θ) at each angle. ΔS(7/2$^+$)=0.05, ΔS(5/2$^+$)=0.10 estimated from the scatter in values at each angle. Predicted S=0.29 for 7/2$^+$, 0.38 for 5/2$^+$.
≈498 [c]	(5/2$^-$)		≤0.05	Predicted S=0.05.
≈529 [@i]	7/2+(&15/2$^-$)	4(+7)	0.28	J$^{\pi}$: Ay(θ) small when compared to DWBA; consistent with results for Ay(θ) of 7/2$^+$,3/2[411] for (pol t,α) in neighboring nuclides.

Continued on next page (footnotes at end of table)

^{164}Er(pol t,α) 1981Bu03 (continued)

^{163}Ho Levels (continued)

E(level)	Jπ[†]	L[‡]	S[#]	Comments
				Predicted S=0.22 for 7/2+.
≈587[c]	(3/2−)		≈(0.04)	Predicted S=0.01.
≈612[c]	(9/2−)		0.16	Predicted S=0.15.
712[d] *4*	5/2+	2	0.17	Predicted S=0.05.
878[e] *4*	5/2+	2	0.07	Predicted S=0.05.
972[e] *4*	7/2+	4	1.07	Predicted S=0.91.
1089[e] *4*	9/2+	4	0.13	Predicted S=0.04.
1115[f] *4*	5/2−	3	0.04	Predicted S<0.01.
1190[f] *4*	7/2−	3	0.15	Predicted S=0.09.
1231 *4*				
1294[f] *4*	9/2−	5	≤0.13	Predicted S=0.01.
1400[f] *4*	11/2−	5	1.4	Predicted S=1.04.
1442[g] *4*	11/2−	5	0.19	Predicted S=0.31.
1632[h] *4*	(1/2+)	(0)	(0.18)	Jπ,L: σ(θ) not consistent with DWBA but similar behavior has been observed in other cases for the π1/2[420] band. Ay(θ) is small, as predicted and observed in other cases. Predicted S=0.16.
1733[@h] *4*	5/2+(&3/2+)	2	(0.24)	Predicted S=0.38 for 5/2+.

[†] From DWBA comparison to Ay(θ) and L-transfer.
[‡] From DWBA comparison to σ(θ).
[#] Nuclear structure factor ($C^2_{j,l}V^2a^2$), where C=expansion coefficient, V=fullness parameter, a=mixing amplitude. In DWBA calculations, N=23 in the formula dσ/dω(exp)=2NSdσ/dω(DWBA). Uncertainties in absolute cross sections are ≈20%, but choice of optical model parameters may produce variations of ≈30%.
[@] Multiplet.
[&] Band(A): π1/2[411] band.
[a] Band(B): π3/2[411] band.
[b] Band(C): π7/2[404] band.
[c] Band(D): π1/2[541] band.
[d] Band(E): π5/2[402] band.
[e] Band(F): π5/2[413] band. Previous work confirmed and extended by identification of strongly populated 7/2+ member with distinctive negative analyzing power.
[f] Band(G): π5/2[532] band. Characterized by the distinctive strongly populated 11/2− member. 7/2− member is also populated significantly and the forward peaking of σ(θ) compared to DWBA calculations is similar to that observed for the corresponding state in other nuclei (*e.g.* ^{165}Ho and ^{153}Pm). 5/2− and 9/2− members are weakly populated.
[g] Band(H): π9/2[514] band (?).
[h] Band(I): π1/2[420] band (?) Assigned on the basis of (pol t,α) cross section patterns for ^{151,153}Pm and ^{155,157,159}Eu. The proposed 5/2+,3/2+ doublet has σ(θ) indicative of L=2 and Ay(θ) is consistent with this interpretation.
[i] Band(J): π7/2[523] band.

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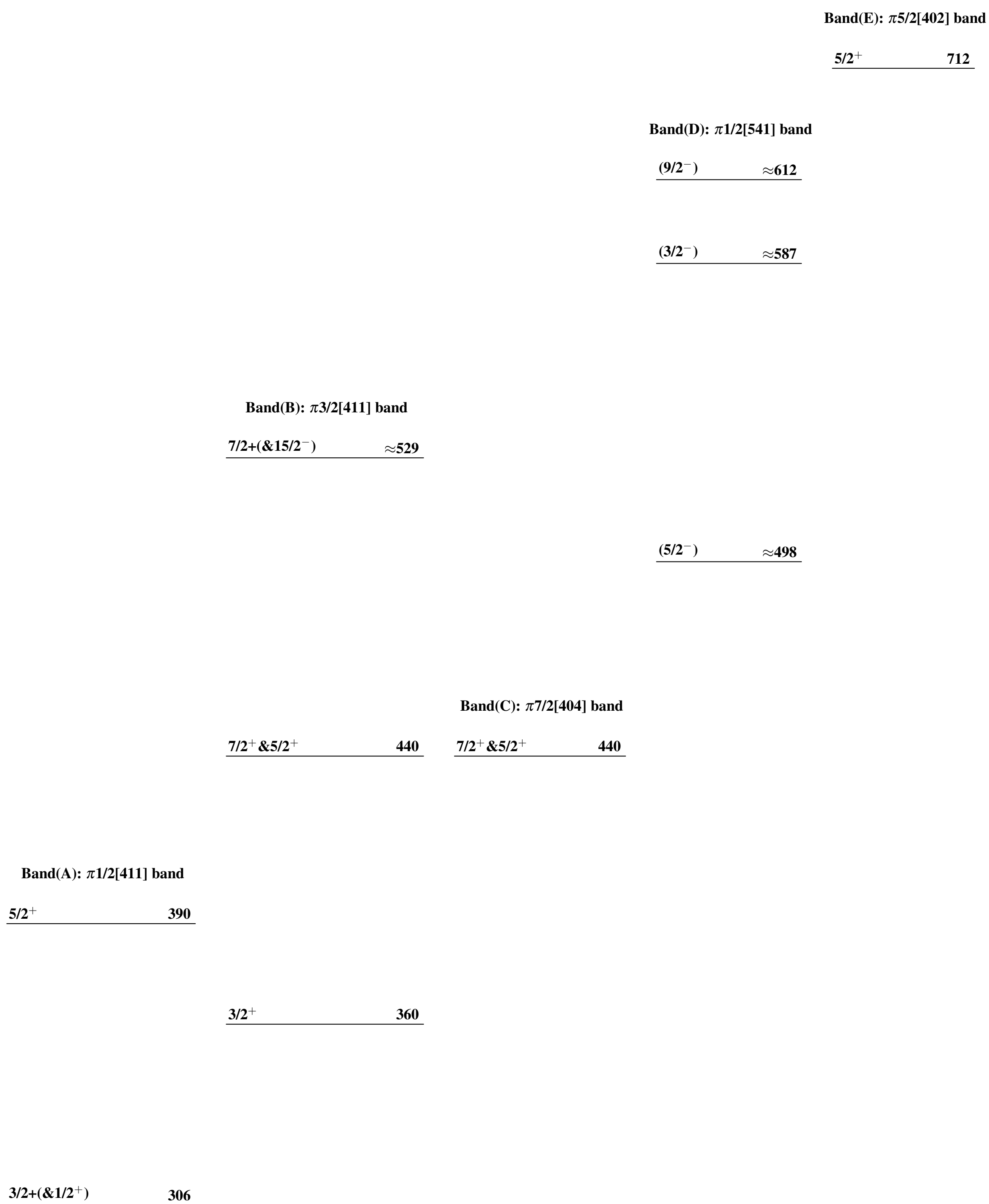
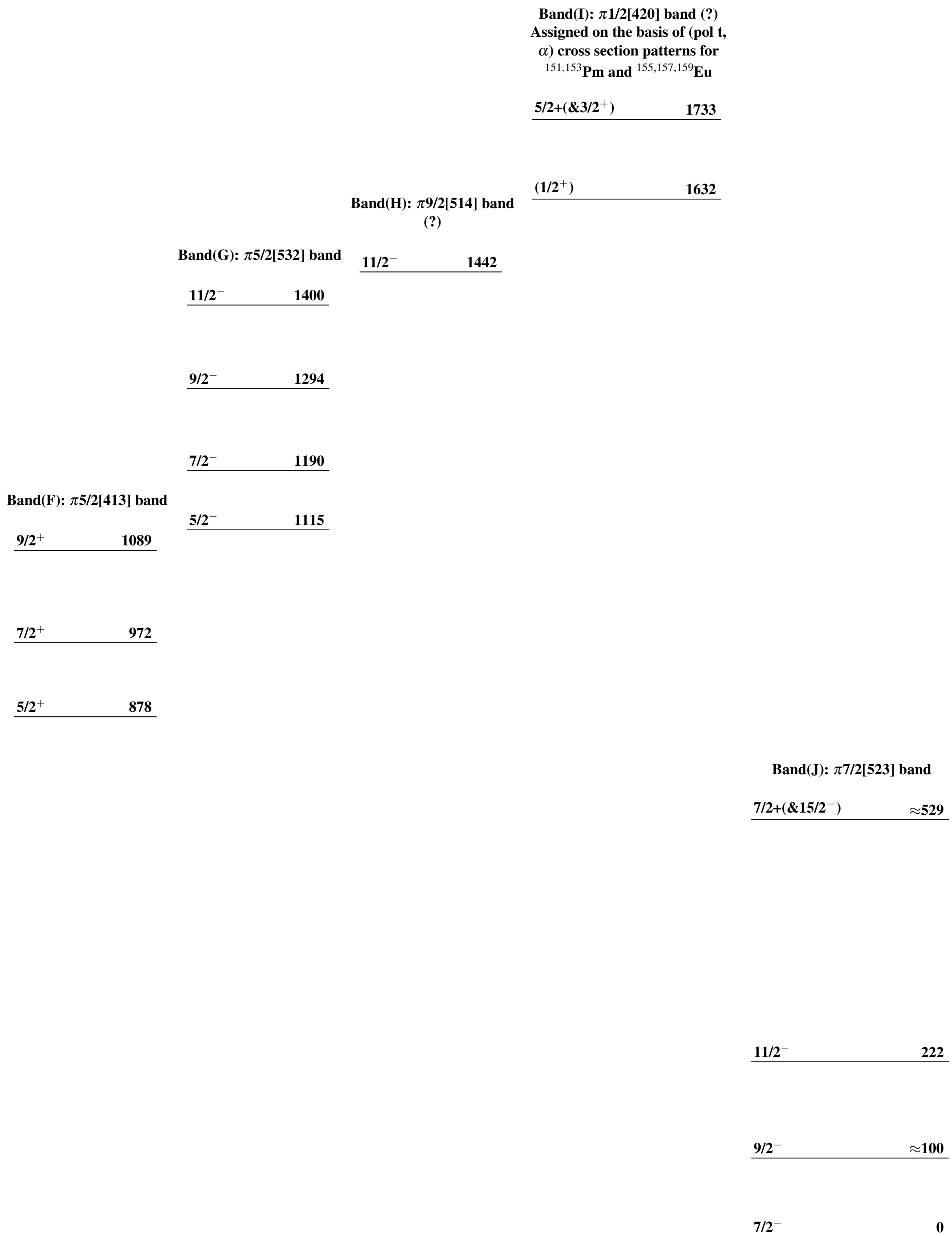


$^{163}_{67}Ho_{96}$

^{164}Er(pol t,α) 1981Bu03 (continued)



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