^{162}Er(d,p) 1969Tj01

History

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

Additional information 1.

1969Tj01: E= 12.1 MeV. Measured differential cross sections at 60°, 90° and 125°, FWHM≈ 12 keV, DWBA calculations.

1984Pe03: coupled-channel analysis of l=5 neutron transfer to $\nu 11/2^-[505]$ bandheads; deduce occupation numbers from comparison of experimental data of 1969Tj01 with theory.

1969Ka24: Coriolis-coupling analysis of (d,p) cross sections.

^{163}Er Levels

Band assignments by 1969Tj01 are based on "finger-print" method of comparison of experimental differential cross sections with those calculated from DWBA for members within a rotational band. Note that experimental differential cross sections at 90° listed by 1969Tj01 in tables for bands differ somewhat from those in their master table for E(level) and cross section data at 60°, 90° and 125°.

E(level)[†]	Jπ[‡]	dσ/dΩ μb/sr (90°)[#]	Comments
0[b]	5/2⁻	11	
≈67[c]	5/2⁺	≈1	Jπ: from Adopted Levels. 1969Tj01 tentatively propose this as 7/2⁺ member, but 7/2⁺ is inconsistent with γ-ray data.
82[b] 3	7/2⁻	19	
102[d] 3	3/2⁻	34	
119[c] 3	(9/2⁺)	25	Jπ: σ(θ) consistent with 9/2⁺,ν5/2[642], although the experimental cross section is somewhat larger than predicted.
159[ad] 3	(5/2⁻)	≈1	The 5/2⁻ member of the ν3/2[521] band is not predicted to be populated with an observable intensity. The observed weak group may be due to Coriolis coupling between the ν3/2[521] and ν5/2[523] orbitals.
188[b] 3	9/2⁻	19	
247[d] 3	7/2⁻	153	
344[e] 3	1/2⁻	103	Jπ: this level may be mixed with the K-2 γ-vibrations built on the levels with the following configurations: ν3/2[521] and ν5/2[523] (1971Bu16,1969Tj01).
404[e] 3	3/2⁻	23	
439[e] 3	5/2⁻	38	
461 3	3/2⁺[@]	33	Jπ: weaker population in (d,p) than in (d,t) implies a hole state, thus supporting ν3/2[402].
495[d] 3	11/2⁻	6	
541 3	1/2⁺[@]	35	Jπ: weaker population in (d,p) than in (d,t) implies a hole state, thus supporting ν1/2[400]. Expected to be mixed with ν1/2[660] by a ΔN=2 interaction.
570[e] 3	7/2⁻	64	
609[&f] 3	(5/2⁻)	7	
636[e] 3	9/2⁻	8	
699[f] 3	(7/2⁻)	156	σ(θ) pattern is consistent with L=3, possibly 7/2⁻, but measured cross section is only 44% of the predicted value.
757 3		6	
779 3		11	
≈805[af]	(9/2⁻)	≈2	
827 3		10	
841 3		28	
854[&g] 3	(3/2⁻)	21	Jπ: σ(θ) indicates low L-transfer and cross section is consistent with that

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^{162}Er(d,p) 1969Tj01 (continued)

^{163}Er Levels (continued)

E(level)[†]	Jπ[‡]	dσ/dΩ μb/sr (90°)[#]	Comments
			predicted for 3/2⁻,ν1/2[530].
872[ag] 3	(5/2⁻)	8	
979 3		16	
1029 5		3	
1055 5		5	
1074[&h] 5	(1/2⁻)	5	
1098[h] 5	3/2⁻	143	
1164 5		15	
1183[h] 5	5/2⁻	44	
1204 5		7	
1245[h] 5	7/2⁻	19	
1277 5		24	
1316 5		31	
1344 5		79	
1395[h] 5	9/2⁻	5	
1433 5		40	
1485 5		52	
1529 5		40	
1562 5		45	
1635 5		22	
1671 5		19	
1686 5		37	
1717 5		12	
1759 5		41	
1784 5		25	
1803 5		23	
1817 5		21	
1856 5		18	
1871 5		12	
1900 5		18	
1920 5		30	
1938 5		49	
1959 5		29	
1971 5		22	
1984 5		13	
2019 5		40	
2031 5		38	
2051 5		51	
2077 5		102	
2096 5		27	
2113 5		36	
2135 5		37	
2148 5		34	
2165 5		29	
2183 5		34	
2200 5		22	

[†] ΔE=3 for E(level)< 1 MeV and 5 for others as in 1967Tj01.

[‡] From 1969Tj01, based on a comparison of measured differential cross sections with those calculated from DWBA within a rotational band ("finger-print" method). See also Adopted Levels.

[#] 1969Tj01 also give values for θ=60° and 125°.

[@] From systematics of odd-A Gd nuclides. Additional measurements of σ(5°) for ^{165}Er and ^{167}Er show that the L=0 level,

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^{162}Er(d,p) 1969Tj01 (continued)

^{163}Er Levels (continued)

corresponding to $1/2^+,\nu 1/2[400]$, lies above the $3/2^+,\nu 3/2[402]$ level.

[&] Orbital assignment is tentative due to lack of energy resolution or the intensity of the peak.

[a] Orbital assignment is tentative because experimental cross section is considerably different from the predicted value.

[b] Band(A): $\nu 5/2[523]$ band. Predicted/experimental $d\sigma/d\Omega$ (90°) for 5/2, 7/2, 9/2, and 11/2 members, respectively are: 44/17, 45/29, 63/29, and 5/0. Relative predicted/experimental ($C^2_{j,l}$) coefficients respectively are: 0.07/0.07, 0.08/0.11, 0.79/0.82, 0.06/0. A=11.9.

[c] Band(B): $\nu 5/2[642]$ band.

[d] Band(C): $\nu 3/2[521]$ band. A=12.1.

[e] Band(D): $\nu 1/2[521]$ band. Predicted/experimental $d\sigma/d\Omega$ (90°) for 1/2, 3/2, 5/2, 7/2, 9/2, and 11/2 members, respectively are: 377/164, 38/37, 107/50, 136/94, 21/11, and 4/9. Relative predicted/experimental ($C^2_{j,l}$) coefficients respectively are: 0.25/0.17, 0.02/0.04, 0.18/0.14, 0.23/0.25, 0.27/0.22, 0.05/0.18. A=13.2, a=0.41.

[f] Band(E): $\nu 5/2[512]$ band. Predicted/experimental $d\sigma/d\Omega$ (90°) for 5/2, 7/2, 9/2, and 11/2 members, respectively are: 6/9, 463/204, 11/≈3, and 5/0. Relative predicted/experimental ($C^2_{j,l}$) coefficients respectively are: 0.01/0.04, 0.79/0.87, 0.14/0.09, 0.06/0. A=12.6.

[g] Band(F): $\nu 1/2[530]$ band. A=8.9, a=0.53.

[h] Band(G): $\nu 1/2[510]$ band. Predicted/experimental $d\sigma/d\Omega$ (90°) for 1/2, 3/2, 5/2, 7/2, 9/2, and 11/2 members, respectively are: 13/6, 615/174, 172/50, 113/22, 6/5, and 1/0. Relative predicted/experimental ($C^2_{j,l}$) coefficients respectively are: 0.01/0.01, 0.40/0.38, 0.29/0.28, 0.19/0.12, 0.09/0.21, 0.01/0. A=12.9, a=−0.32.

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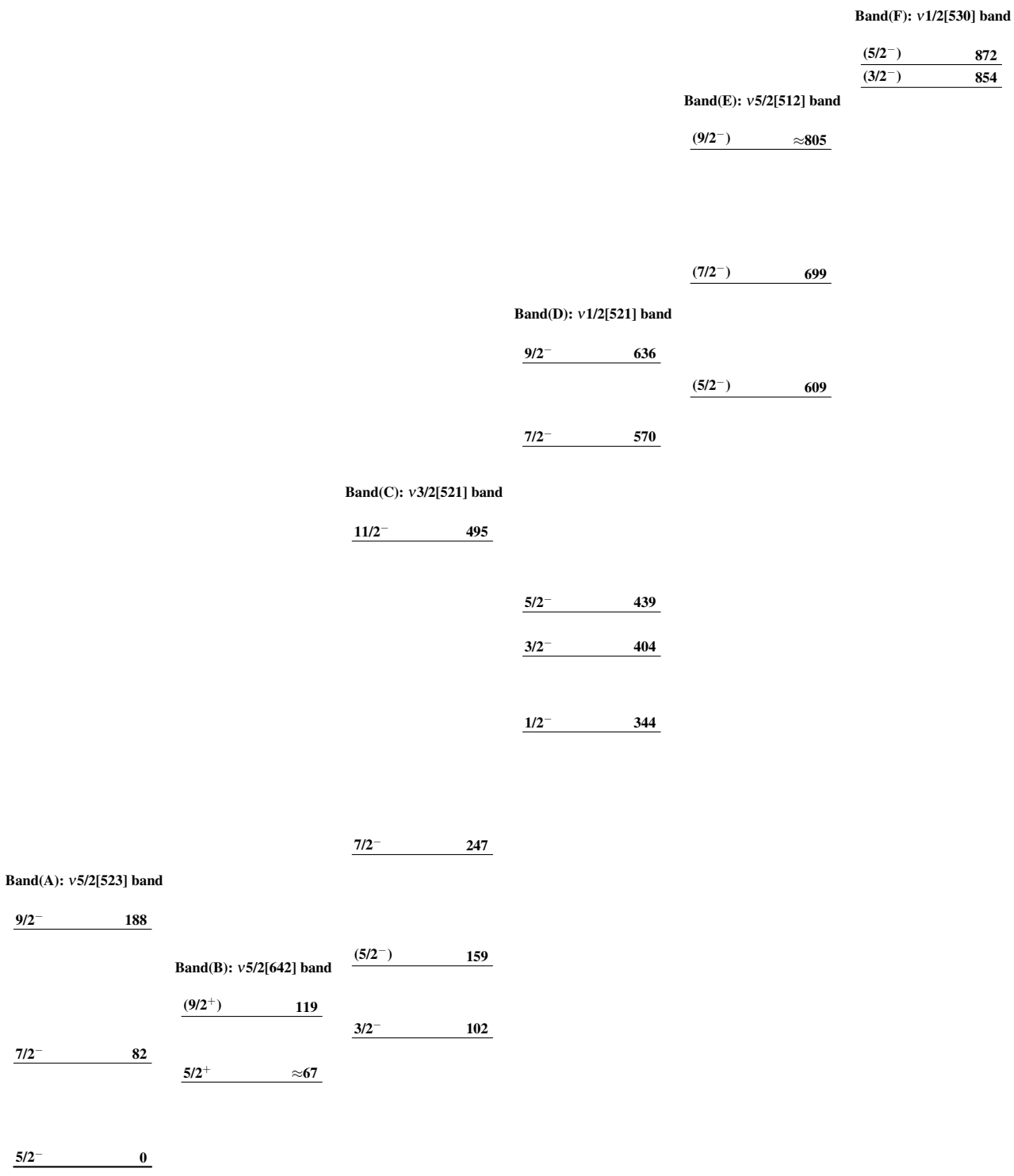

$^{163}_{68}Er_{95}$

^{162}Er(d,p) 1969Tj01 (continued)

Band(G): ν1/2[510] band

9/2$^-$ 1395

7/2$^-$ 1245

5/2$^-$ 1183

3/2$^-$ 1098

(1/2$^-$) 1074

$^{163}_{68}Er_{95}$