^{161}Dy(t,α)   **2007Bu29**

	Type	Author	History Citation	Literature Cutoff Date
	Full Evaluation	N. Nica	NDS 176, 1 (2021)	1-May-2021

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2007Bu29: E=17 MeV beam provided by McMaster FN Tandem accelerator. Enriched target. The α particles were analyzed by a
  Enge split-pole magnetic spectrograph and spectra were recorded on photographic emulsion plates and with position-sensitive
  semiconductor detector. Resolution (FHWM)=15-19 keV. Measured cross sections and angular distributions from 10° to 45°.
  DWBA analysis of angular distribution data.

$J^{\pi}(^{161}$Dy g.s.)=5/2$^+$.

^{160}Tb Levels

E(level)†	J^{π} $^@$	L$^{\#}$	dσ/dΩ (μb/sr)‡	Comments
64.1^c	4$^+$	2	71 4	dσ/dΩ distribution consistent with J=4, K^{π}=4$^+$.
129$^{\&d}$ $_1$	1$^+$	2	80 4	dσ/dΩ distribution consistent with J=5, K^{π}=4$^+$ and J=1, K^{π}=1$^+$; K^{π}=1$^+$ adopted here for band assignment.
129$^{\&c}$ $_1$	5$^+$	2	80 4	dσ/dΩ distribution consistent with J=5, K^{π}=4$^+$ and J=1, K^{π}=1$^+$ K^{π}=4$^+$ adopted here for band assignment.
167^d $_1$	2$^+$	2	50 3	dσ/dΩ distribution consistent with J=2, K^{π}=1$^+$.
201^d $_1$	3$^+$	2	52 3	dσ/dΩ distribution consistent with J=3, K^{π}=1$^+$.
232$^{\&f}$ $_2$	0$^+$&1$^+$	4	8 1	dσ/dΩ distribution consistent with J=1, K^{π}=0$^+$. Predicted cross section for J=0, K^{π}=0$^+$ is 1/9 that of J=1 state.
265$^{\&d}$ $_1$	4$^+$	2+4	37 2	dσ/dΩ distribution consistent with J=4, K^{π}=1$^+$ and J=2, K^{π}=0$^+$; K^{π}=1$^+$ adopted here for band assignment.
265$^{\&f}$ $_1$	2$^+$	2+4	37 2	dσ/dΩ distribution consistent with J=4, K^{π}=1$^+$ and J=2, K^{π}=0$^+$; K^{π}=0$^+$ adopted here for band assignment.
318^f $_1$	3$^+$	4	26 2	dσ/dΩ distribution consistent with J=3, K^{π}=0$^+$.
378^f $_1$	4$^+$	4	10 1	dσ/dΩ distribution consistent with J=4, K^{π}=0$^+$.
426^e $_1$	5$^+$	4	25 2	dσ/dΩ distribution consistent with J=5, K^{π}=5$^+$.
474 2		5	12 1	
508^{be} $_3$	(6$^+$)^b	(4+5)^a	49 10	
523^{bg} $_2$	(6$^-$)^b	(4+5)^a	58 10	
552 2			17 4	
572^g $_1$	(7$^-$)	5	52 4	
590 3			22 3	
612 2			18 3	
637 3			21 4	
656^g $_1$	(8$^-$)	5	79 4	
688 2		5	21 3	
714 2			10 1	
744 2			10 1	
766 1		5	30 2	
782 2			10 1	
822 2			11 2	
865 3			11 3	
888 3			6 1	
908 3			8 1	E(level): the peak at 40° is mainly contributed by a level from ^{161}Tb.
947 2			11 1	
974 3			8 1	
1004 2			15 2	
1028 1			21 3	
1055 1			19 3	
1081 1			15 2	

^{161}Dy(t,α)   **2007Bu29 (continued)**

^{160}Tb Levels (continued)

E(level)†	dσ/dΩ (μb/sr)‡	E(level)†	dσ/dΩ (μb/sr)‡
1160 *3*	8 *1*	1280 *2*	18 *3*
1192 *1*	30 *2*	1294 *2*	10 *2*
1252 *2*	19 *2*	1346 *3*	19 *2*
		1397 *2*	37 *6*

† Energies measured with reference to 64.1-keV level. Average of values from two independent spectra recorded on photographic plates There may be an additional uncertainty of ≤1 keV at low energies and up to 2 keV near 1.5 MeV excitation energy from calibration procedures.

‡ At 40°. In addition to the statistical uncertainties given here, there is additional 15% normalization uncertainty in absolute cross sections.

From comparison of measured angular distributions with DWBA calculations. Transfer of 3/2[411] proton from d$_{5/2}$ orbital is responsible for L=2, 5/2[413] proton transfer from g$_{7/2}$ orbital for L=4 and 5/2[532] proton transfer from h$_{11/2}$ orbital for L=5. In this mass region 2d$_{5/2}$, 1g$_{7/2}$ and 1h$_{11/2}$ are the only active proton hole states.

@ From angular distributions, DWBA and Nilsson-model calculations which give predicted cross sections for members in a band (so called "fingerprint" method).

& Doublet, combined cross section is listed.

^{a} Combined angular distribution for 508+523 group.

^{b} The shape of the angular distribution for 508+523 group is consistent with J=6, K^π=5$^+$, but the total measured cross section is about four times larger than the predicted value. Probably there are additional levels in this energy region.

^{c} Band(A): K^π=4$^+$. Configuration=(ν5/2[642] + π3/2[411]). Configuration=(ν3/2[521] + π5/2[532]) proposed in rotor+particle model calculations of 1987Be51 is not supported by experimental findings of 2007Bu29, such a configuration is not expected to be populated in (t,α) reaction.

^{d} Band(a): K^π=1$^+$. Configuration=(ν5/2[642] − π3/2[411]). See comment for K^π=4$^+$ band.

^{e} Band(B): K^π=5$^+$. Configuration=(ν5/2[642] + π5/2[413]).

^{f} Band(b): K^π=0$^+$. Configuration=(ν5/2[642] − π5/2[413]).

^{g} Band(C): K^π=(5$^-$). Coriolis-mixed band of configurations=(ν5/2[642]+π5/2[532]) and (ν5/2[642]+π7/2[523]).

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Band(C): K^{π}=(5$^-$)

(8$^-$)   656

(7$^-$)   572

Band(B): K^{π}=5$^+$

(6$^-$)   523

(6$^+$)   508

5$^+$ 426

Band(b): K^{π}=0$^+$

4$^+$ 378

3$^+$ 318

Band(a): K^{π}=1$^+$

4$^+$ 265

2$^+$ 265

0$^+$&1$^+$ 232

3$^+$ 201

2$^+$ 167

Band(A): K^{π}=4$^+$

5$^+$ 129   1$^+$ 129

4$^+$ 64.1

$^{160}_{65}$Tb$_{95}$