

$^{161}\text{Dy}({}^3\text{He}, {}^3\text{He}'\gamma)$ 1987Ra16

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Additional information 1.

1987Ra16: $^{161}\text{Dy}({}^3\text{He}, {}^3\text{He}'\gamma)$, $E({}^3\text{He})=32$ MeV. Enriched (92%) self-supporting metallic target of thickness 2 mg/cm². Scattered particles were detected in four particle telescopes placed at $\theta=40^\circ$ with respect to the beam direction and having a resolution (FWHM) of 300 keV. The deexciting γ 's were detected using four Ge detectors having an energy resolution of 2.2 keV and an efficiency of 20%. Measured particle- γ coincidences and deduced energy-level structure in the region of ≈ 0.9 MeV excitation. Proposed a γ -vibrational character for some of these levels.

 ^{161}Dy Levels

E(level) [†]	J^π [‡]	Relative ${}^3\text{He}'$ intensities [#]	Comments
0.0	$5/2^+$		
43.8	$7/2^+$		
74.6	$3/2^-$		
100.4	$9/2^+$		
131.7	$5/2^-$		
212.9	$7/2^-$		
550.5 [@]	$3/2^+$	≈ 45	
607.5 ^{&}	$1/2^+$	≈ 85	Population of this level in (${}^3\text{He}, {}^3\text{He}'$) indicates the presence of an admixture of the K-2 γ vibration built on the ^{161}Dy g.s.
679.4 ^a	$3/2^+$		
699.5 ^{&}	$3/2^+$	≈ 110	J^π : 1987Ra16 assign this as $J^\pi=1/2^+$ and consider it to be the bandhead of the K-2 γ vibration built on the ^{161}Dy g.s.
730.7 ^a	$5/2^+$	≈ 170	J^π : because of its strong population in (${}^3\text{He}, {}^3\text{He}'$), 1987Ra16 propose that it contains a significant component of the K-2 γ vibration built on the ^{161}Dy g.s.
772.0 ^b	$1/2^+$	≈ 75	J^π : population in (${}^3\text{He}, {}^3\text{He}'$) indicates the presence of an admixture of the K-2 γ vibration built on the ^{161}Dy g.s.
800.5	$3/2^+$	≈ 270	J^π : assigned by 1987Ra16 as the $3/2^+$ member of the K-2 γ vibration built on the ^{161}Dy g.s. (5/2[642]).
899.0 ^c	$9/2^+$	≈ 320	
1005.8		≈ 25	
1026.0		≈ 62	
1198.0		≈ 15	

[†] Values as reported by 1987Ra16.

[‡] From Adopted Values. The J^π values proposed by 1987Ra16 are based primarily on γ -decay modes and nuclear-model considerations. Instances where the adopted values differ from those of 1987Ra16 are pointed out.

[#] The intensity values for the inelastically scattered ${}^3\text{He}$ particles were reported only in graphical form by 1987Ra16. The listed values were obtained by the evaluator from their graph. These values are approximate only and are intended to provide the reader with a qualitative idea of the relative strengths with which the various levels are excited in this reaction.

[@] Band(A): $3/2[402]$ bandhead, with a $3/2[651]$ admixture.

[&] Band(B): $\Delta N=2$ -mixed $1/2[660]+1/2[400]$ bandhead.

^a Band(C): $3/2[651]$ bandhead, with a $3/2[402]$ admixture.

^b Band(D): $1/2[400]$ bandhead, with a $1/2[660]$ admixture.

^c Band(E): K+2 γ vibration built on $5/2[642]$.

$^{161}\text{Dy}(^3\text{He}, ^3\text{He}'\gamma)$ **1987Ra16 (continued)** $\gamma(^{161}\text{Dy})$

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
417.9 2	8 2	550.5	3/2 ⁺	131.7	5/2 ⁻	699.6 1	75 10	699.5	3/2 ⁺	0.0	5/2 ⁺
475.5 2	13 2	550.5	3/2 ⁺	74.6	3/2 ⁻	730.6 3	29 6	730.7	5/2 ⁺	0.0	5/2 ⁺
517.7 3	27 6	730.7	5/2 ⁺	212.9	7/2 ⁻	756.6 1	100 10	800.5	3/2 ⁺	43.8	7/2 ⁺
532.9 3	17 4	607.5	1/2 ⁺	74.6	3/2 ⁻	772.0 1	79 8	772.0	1/2 ⁺	0.0	5/2 ⁺
550.6 2	25 4	550.5	3/2 ⁺	0.0	5/2 ⁺	^x 781.0 3	33 6				
^x 566.3 1	54 10					798.6 1	104 15	899.0	9/2 ⁺	100.4	9/2 ⁺
^x 587.8 2	31 6					800.4 5	100 15	800.5	3/2 ⁺	0.0	5/2 ⁺
599.1 2	31 6	730.7	5/2 ⁺	131.7	5/2 ⁻	855.2 1	154 11	899.0	9/2 ⁺	43.8	7/2 ⁺
607.5 2	73 8	607.5	1/2 ⁺	0.0	5/2 ⁺	899.0 1	79 8	899.0	9/2 ⁺	0.0	5/2 ⁺
624.6 1	44 8	699.5	3/2 ⁺	74.6	3/2 ⁻	^x 981.7 2	42 6				
656.4 2	40 6	730.7	5/2 ⁺	74.6	3/2 ⁻	^x 1005.8 2	29 4				
669.1 2	79 10	800.5	3/2 ⁺	131.7	5/2 ⁻	^x 1026.3 3	21 4				
679.4 9	12 4	679.4	3/2 ⁺	0.0	5/2 ⁺	^x 1045.3 5	8 3				
686.9 1	58 6	730.7	5/2 ⁺	43.8	7/2 ⁺						

[†] Relative values, normalized to 100 for the 756.6 G.

^x γ ray not placed in level scheme.

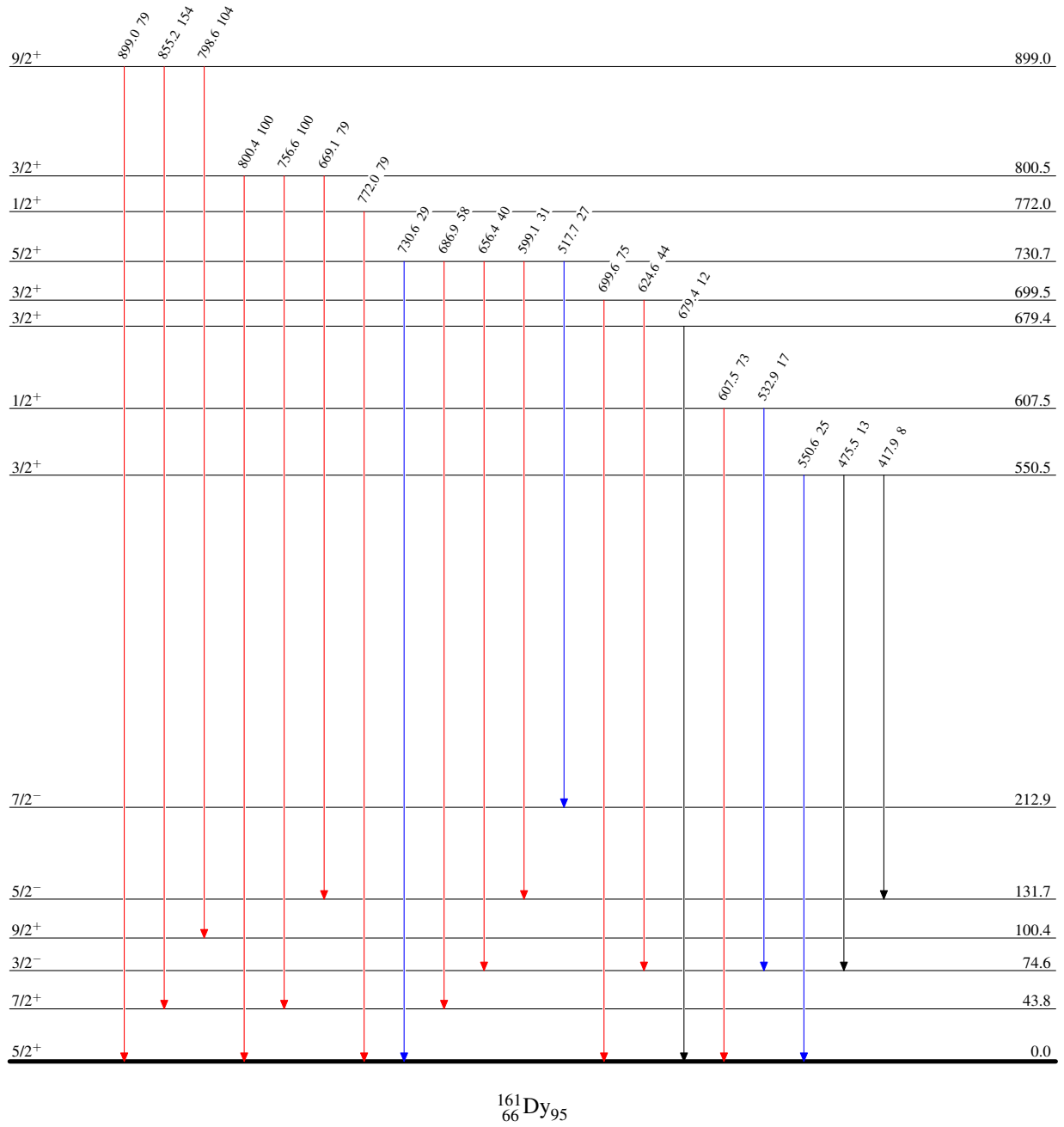
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Level Scheme

Intensities: Relative I_γ

Legend

- \longrightarrow $I_\gamma < 2\% \times I_\gamma^{\max}$
 \longrightarrow $I_\gamma < 10\% \times I_\gamma^{\max}$
 \longrightarrow $I_\gamma > 10\% \times I_\gamma^{\max}$



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