

⁹⁹Ru(d,3nγ) 1983Be63

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh		NDS 164, 1 (2020)	15-Feb-2020

1983Be63: E=20-28 MeV deuteron beams were produced from the Buenos Aires Synchrocyclotron. Target was 96% enriched ⁹⁹Ru. γ rays were detected with two coaxial detectors (FWHM=2.3 and 3 keV). Measured E_γ, γγ-coin. Deduced levels. **1983Be63** report data mainly from ⁹⁶Ru(α,pnγ). See that dataset for details.

All data are from **1983Be63**, unless otherwise noted.

Note that the level scheme here (from 841 level) as proposed in **1983Be63** is based on the assumption of the 841γ proceeding to the (2)⁺ ground state, while level energies and spins in Adopted Levels are based on the placement of 841γ to a level at E=56 with J^π=(5⁺) proposed by **2014Ku04** based on a significantly-extended level scheme measured with the ⁷⁵As(²⁸Si,2p3nγ) reaction, and therefore are higher by 56 keV and 3 units, respectively.

⁹⁸Rh Levels

E(level)	J ^π	Comments
0.0?	(2) ⁺	The ground state would not be seen if 841γ proceeds to the isomer.
106.8?† 3	(3) ⁺ †	
112.5?† 3	1 ⁺ †	
174.4?† 3	(1 ⁺ ,2 ⁺)†	
841.3‡ 3	(4 ⁺)‡	
1567.1‡ 5	(6 ⁺)‡	
2561.4‡ 6	(8 ⁺)‡	
3541.3‡ 6	(10 ⁺)‡	
3805.0 7		

† Level suggested (by evaluators) from unplaced γ rays in **1983Be63** compared with ⁹⁸Pd ε decay results.

‡ From (α,pnγ) data of **1983Be63**, based on their γ(θ) and the placement of 841γ to (2)⁺ ground state. Level energies and spins in Adopted Levels are based on the placement of 841γ to a level at E=56 with J^π=(5⁺) and are higher by 56 keV and 3 units, respectively.

γ(⁹⁸Rh)

E _γ †	E _i (level)	J _i ^π	E _f	J _f ^π	Comments
67.7# @ 3	174.4?	(1 ⁺ ,2 ⁺)	106.8?	(3) ⁺	
106.8# @ 3	106.8?	(3) ⁺	0.0?	(2) ⁺	
112.5# @ 3	112.5?	1 ⁺	0.0?	(2) ⁺	
^x 116.8 3					
174.4# @ 3	174.4?	(1 ⁺ ,2 ⁺)	0.0?	(2) ⁺	
^x 206.4 3					
^x 226.3 3					
^x 234.7 3					
263.1	3805.0		3541.3	(10 ⁺)	
^x 302.2 ‡					
^x 303.7 ‡					
^x 514.4 3					
725.8 3	1567.1	(6 ⁺)	841.3	(4 ⁺)	
841.3 3	841.3	(4 ⁺)	0.0?	(2) ⁺	1983Be63 deduced that 841γ mainly proceeds to the g.s. based on their argument that for each 841γ there were 3.0 ε decays of g.s. but only 0.21 decay of ⁹⁸ Rh 3.6-min isomer, from intensity balance of prompt and delayed

Continued on next page (footnotes at end of table)

${}^{99}\text{Ru}(\text{d},3\text{n}\gamma)$ 1983Be63 (continued) $\gamma({}^{98}\text{Rh})$ (continued)

E_γ [†]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
979.9 3	3541.3	(10 ⁺)	2561.4	(8 ⁺)	intensities. However, this argument does not take into account that the isomer decays mostly to the g.s. by $\%IT=89$ reported in 1978Ki17 in ${}^{98}\text{Pd}$ ε decay. In Adopted Gammas, this γ has been placed to a level at 56 keV with $J^\pi=(5)^+$, proposed by 2014Ku04 in ${}^{75}\text{As}({}^{28}\text{Si},2\text{p}3\text{n}\gamma)$ based on a more detailed level scheme.
994.3 3	2561.4	(8 ⁺)	1567.1	(6 ⁺)	

[†] Read from Fig.3 of 1983Be63 for $E_d=27.5$ MeV. Placements here are from 1983Be63 assuming 841γ proceeds to the ground state, while a placement of 841γ to a level at 56 keV has been adopted in Adopted Gammas. Values are the same as those in $(\alpha,\text{pn}\gamma)$ also from 1983Be63, so only one of the two sets of energy values are used in Adopted Gammas when needed.

[‡] Unresolved 302.2+303.7 doublet (1983Be63).

[#] Placements are suggested by evaluators based on those of γ rays of similar energies in ${}^{98}\text{Pd}$ ε decay. These γ rays are unplaced by 1983Be63.

[@] Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

Legend

$^{99}\text{Ru}(d,3n\gamma) \quad ^{1983}\text{Be63}$

Level Scheme

-----► γ Decay (Uncertain)
● Coincidence

