

<sup>9</sup>Be(<sup>238</sup>U,F $\gamma$ ) **2017Ha12**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli		NDS 145, 25 (2017)	1-Jul-2017

Based on XUNDL.

Compiled by B. Singh (McMaster), March 5, 2017.

**2017Ha12:** 6.2 MeV/nucleon <sup>238</sup>U beam was obtained from GANIL accelerator facility. Target was 2.3 mg/cm<sup>2</sup> thick <sup>9</sup>Be. The fission fragments were mostly produced by fusion-fission reactions, and to some extent through transfer-fission reactions. The fission fragments were identified in mass and atomic number using the VAMOS++ spectrometer, and prompt  $\gamma$  rays were detected by EXOGAM array. Measured  $E_\gamma$ ,  $I_\gamma$ , (fragment) $\gamma$ -coin, level lifetimes by recoil-distance Doppler-shift method using a plunger device. Comparison of the experimental results with predictions of the triaxial particle-rotor model calculations.

In the present experiment  $\Delta J=1$  transitions in the ground-state band were observed up to spin 19/2<sup>+</sup> (see spectral Fig. 5 in the paper).

<sup>99</sup>Y Levels

E(level)	J $^\pi$ <sup>†</sup>	T <sub>1/2</sub> <sup>‡</sup>	Comments
0.0 <sup>#</sup>	5/2 <sup>+</sup>		
125.1 <sup>#</sup>	7/2 <sup>+</sup>	57 ps 10	T <sub>1/2</sub> : from <sup>99</sup> Y Adopted Levels.
283.7 <sup>#</sup>	9/2 <sup>+</sup>	18.6 ps 13	T <sub>1/2</sub> : measured mean lifetime $\tau=26.9$ ps 19. g <sub>K</sub> -g <sub>R</sub> =0.97 +4-3, Q <sub>0</sub> =5.00 +23-22 (2017Ha12).
482.2 <sup>#</sup>	11/2 <sup>+</sup>	4.30 ps 42	T <sub>1/2</sub> : measured mean lifetime $\tau=6.2$ ps 6. g <sub>K</sub> -g <sub>R</sub> =1.25 +7-6, Q <sub>0</sub> =5.90 +34-30 (2017Ha12).
706.1 <sup>#</sup>	13/2 <sup>+</sup>	2.50 ps 21	T <sub>1/2</sub> : measured mean lifetime $\tau=3.6$ ps 3. g <sub>K</sub> -g <sub>R</sub> =1.27 +6-5, Q <sub>0</sub> =4.96 +25-23 (2017Ha12).
975.7 <sup>#</sup>	15/2 <sup>+</sup>	2.29 ps 62	T <sub>1/2</sub> : measured mean lifetime $\tau=3.3$ ps 9. g <sub>K</sub> -g <sub>R</sub> =0.92 +16-11, Q <sub>0</sub> =3.65 +65-43 (2017Ha12).
1259.2 <sup>#</sup>	17/2 <sup>+</sup>		
1595.8 <sup>#</sup>	19/2 <sup>+</sup>		

<sup>†</sup> As listed in level-scheme Fig. 6 and spectral Fig. 5 of 2017Ha12.

<sup>‡</sup> From recoil-distance Doppler-shift method (2017Ha12), unless otherwise stated.

<sup>#</sup> Band(A):  $\pi 5/2[422]$  g.s. band.

$\gamma$ (<sup>99</sup>Y)

E <sub>i</sub> (level)	J $^\pi$ <sub>i</sub>	E $\gamma$ <sup>†</sup>	E <sub>f</sub>	J $^\pi$ <sub>f</sub>	Mult.	$\delta$ <sup>#</sup>	$\alpha$ <sup>‡</sup>	Comments
125.1	7/2 <sup>+</sup>	125.1	0.0	5/2 <sup>+</sup>				
283.7	9/2 <sup>+</sup>	158.6	125.1	7/2 <sup>+</sup>	[M1+E2]	0.173 6	0.0560 9	$\alpha(K)=0.0491$ 8; $\alpha(L)=0.00573$ 9; $\alpha(M)=0.000980$ 15 $\alpha(N)=0.0001307$ 20; $\alpha(O)=8.71 \times 10^{-6}$ 13 $\delta^2(E2/M1)=0.030$ 2 (deduced by 2017Ha12 from $\gamma$ -ray branching ratios).
		283.7	0.0	5/2 <sup>+</sup>	[E2]		0.0248	$\alpha(K)=0.0216$ 3; $\alpha(L)=0.00265$ 4; $\alpha(M)=0.000453$ 7 $\alpha(N)=5.93 \times 10^{-5}$ 9; $\alpha(O)=3.58 \times 10^{-6}$ 5
482.2	11/2 <sup>+</sup>	198.5	283.7	9/2 <sup>+</sup>	[M1+E2]	0.161 6	0.0301	$\alpha(K)=0.0265$ 4; $\alpha(L)=0.00303$ 5; $\alpha(M)=0.000519$ 8 $\alpha(N)=6.95 \times 10^{-5}$ 11; $\alpha(O)=4.71 \times 10^{-6}$ 7 $\delta^2(E2/M1)=0.026$ 2 (deduced by 2017Ha12 from $\gamma$ -ray branching ratios).
		357.2	125.1	7/2 <sup>+</sup>	[E2]		0.01137	$\alpha(K)=0.00996$ 14; $\alpha(L)=0.001185$ 17; $\alpha(M)=0.000202$ 3 $\alpha(N)=2.67 \times 10^{-5}$ 4; $\alpha(O)=1.674 \times 10^{-6}$ 24

Continued on next page (footnotes at end of table)

${}^9\text{Be}({}^{238}\text{U}, \text{F}\gamma)$  2017Ha12 (continued) $\gamma({}^{99}\text{Y})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult.	$\delta^\#$	$\alpha^\ddagger$	Comments
706.1	13/2 <sup>+</sup>	223.9	482.2	11/2 <sup>+</sup>	[M1+E2]	0.127 +3-4	0.0215	$\alpha(\text{K})=0.0190$ 3; $\alpha(\text{L})=0.00215$ 3; $\alpha(\text{M})=0.000368$ 6 $\alpha(\text{N})=4.93\times 10^{-5}$ 7; $\alpha(\text{O})=3.38\times 10^{-6}$ 5 $\delta^2(\text{E2/M1})=0.016$ 1 (deduced by 2017Ha12 from $\gamma$ -ray branching ratios).
		422.3	283.7	9/2 <sup>+</sup>	[E2]		0.00662	$\alpha(\text{K})=0.00581$ 9; $\alpha(\text{L})=0.000678$ 10; $\alpha(\text{M})=0.0001159$ 17 $\alpha(\text{N})=1.534\times 10^{-5}$ 22; $\alpha(\text{O})=9.85\times 10^{-7}$ 14
975.7	15/2 <sup>+</sup>	269.6	706.1	13/2 <sup>+</sup>	[M1+E2]	0.134 7	0.01334	$\alpha(\text{K})=0.01176$ 17; $\alpha(\text{L})=0.001324$ 19; $\alpha(\text{M})=0.000227$ 4 $\alpha(\text{N})=3.04\times 10^{-5}$ 5; $\alpha(\text{O})=2.09\times 10^{-6}$ 3 $\delta^2(\text{E2/M1})=0.018$ 2 (deduced by 2017Ha12 from $\gamma$ -ray branching ratios).
		493.5	482.2	11/2 <sup>+</sup>	[E2]		0.00409	$\alpha(\text{K})=0.00359$ 5; $\alpha(\text{L})=0.000414$ 6; $\alpha(\text{M})=7.06\times 10^{-5}$ 10 $\alpha(\text{N})=9.38\times 10^{-6}$ 14; $\alpha(\text{O})=6.14\times 10^{-7}$ 9
1259.2	17/2 <sup>+</sup>	283.5	975.7	15/2 <sup>+</sup>				
1595.8	19/2 <sup>+</sup>	336.3	1259.2	17/2 <sup>+</sup>				

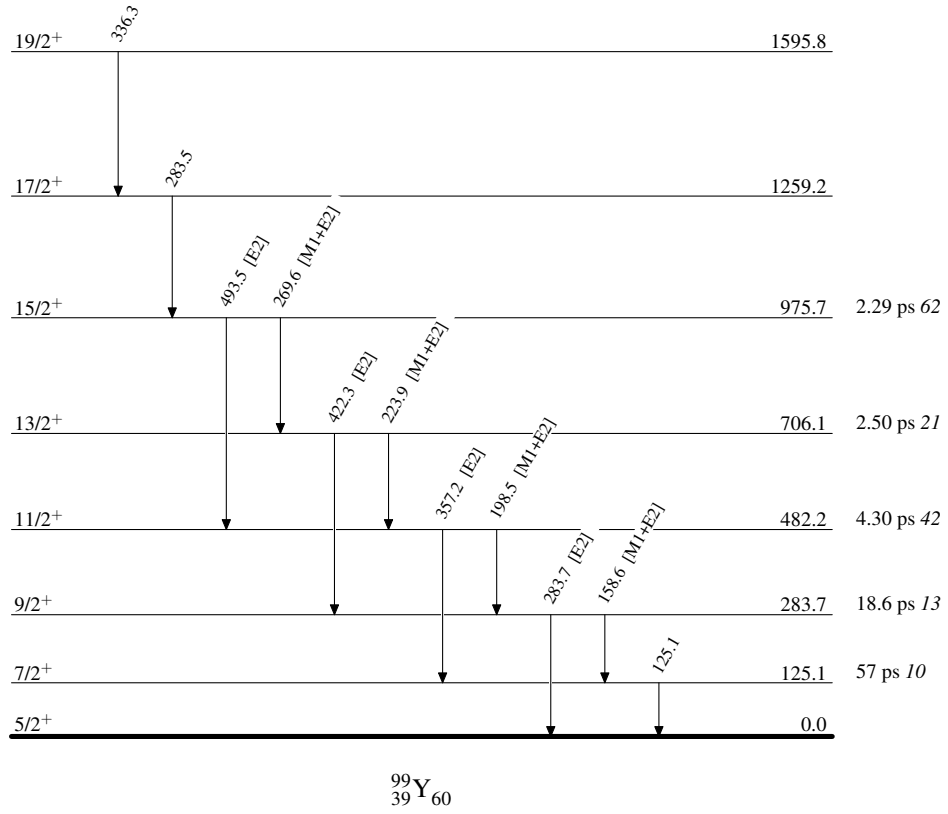
<sup>†</sup> Nominal values from  ${}^{99}\text{Y}$  Adopted Levels, Gammas.

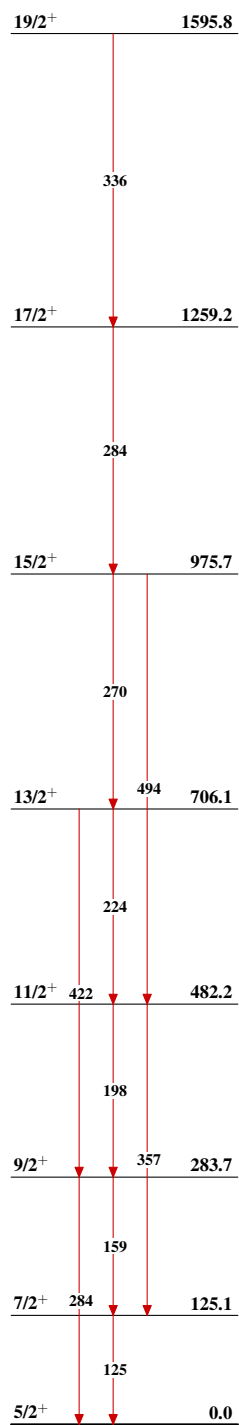
<sup>‡</sup> Additional information 1.

<sup>#</sup> If No value given it was assumed  $\delta=1.00$  for E2/M1,  $\delta=1.00$  for E3/M2 and  $\delta=0.10$  for the other multiplicities.

${}^9\text{Be}({}^{238}\text{U},\text{F}\gamma)$  2017Ha12

## Level Scheme



${}^9\text{Be}({}^{238}\text{U}, \text{F}\gamma)$  2017Ha12Band(A):  $\pi 5/2[422]$  g.s. band ${}^{99}_{39}\text{Y}_{60}$