

$^{12}\text{C}(^{136}\text{Xe}, ^{140}\text{Ba}\gamma)$  2015St16

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 154, 1 (2018)	20-Nov-2018

Dataset based on unevaluated XUNDL file compiled by C. Smith (ORNL/UTK) and C. D. Nesaraja (ORNL).

**2015St16:** beam of  $^{136}\text{Xe}$ , at LNL's PIAVE/ALPI accelerator, with intensity of 0.5-1.0 pnA and energies of 500 and 546 MeV on a self-supporting target of  $^{\text{nat}}\text{C}$  with a thickness of 0.915 *ll* mg/cm<sup>2</sup>. Used annular double-sided silicon-strip detector (DSSSD) placed 33.4 mm downstream of the target and covered polar angles from  $\theta_{p,<}=25.6^\circ$  to  $\theta_{p,>}=51.8^\circ$  in the laboratory frame for reaction products; and AGATA system consisting of 15 high-purity germanium crystals placed in the backward direction and covering polar angles from  $\theta_{\gamma,<} \approx 74^\circ$  to  $\theta_{\gamma,>} \approx 164^\circ$  for  $\gamma$  rays. Measured  $E_\gamma$  (Doppler corrected), particle- $\gamma$  coin,  $\gamma$ - $\gamma$  coin,  $I_\gamma$ .

 $^{140}\text{Ba}$  Levels

E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	Comments
0.0	0 <sup>+</sup>	
602.4	2 <sup>+</sup>	
1130.6	4 <sup>+</sup>	
1510.7	2 <sup>+</sup>	E(level): population of this state by $\alpha$ transfer is 25.6 19 % relative to the population of the 2 <sub>1</sub> <sup>+</sup> state.
1660.3	6 <sup>+</sup>	
1802.9	3 <sup>-</sup>	
1951.6	3 <sup>+</sup>	
1993.7	2 <sup>+</sup>	E(level): candidate for mixed-symmetry state. Population of this state by $\alpha$ transfer is 10.4 10 % relative to the population of the 2 <sub>1</sub> <sup>+</sup> state, a factor of 3 lower than previously predicted by 2008A123.
2138.2	3 <sup>(+)</sup>	
2204.2	2 <sup>+,3</sup>	
2237.2	2 <sup>+</sup>	
2468.3	(8 <sup>+</sup> )	
2620.3?		E(level): from Fig. 4 in 2015St16.

<sup>†</sup> From the Adopted Levels except as noted.

<sup>‡</sup> From the Adopted Levels.

 $\gamma(^{140}\text{Ba})$ 

$E_\gamma$ <sup>†</sup>	$I_\gamma$ <sup>‡</sup>	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
528.25 <sup>#</sup>	56.3 @ 17	1130.6	4 <sup>+</sup>	602.4	2 <sup>+</sup>	
529.7 <sup>#</sup>	23.4 @ 18	1660.3	6 <sup>+</sup>	1130.6	4 <sup>+</sup>	
602.4	100.0 5	602.4	2 <sup>+</sup>	0.0	0 <sup>+</sup>	
627.5		2138.2	3 <sup>(+)</sup>	1510.7	2 <sup>+</sup>	
672.1		1802.9	3 <sup>-</sup>	1130.6	4 <sup>+</sup>	
808.0		2468.3	(8 <sup>+</sup> )	1660.3	6 <sup>+</sup>	
820.9		1951.6	3 <sup>+</sup>	1130.6	4 <sup>+</sup>	Fig. 4 of 2015St16 gives 820.9 $\gamma$ as from the (3 <sup>+</sup> ) to 2 <sub>2</sub> <sup>+</sup> that does fit these levels but this placement (according to Adopted Levels, Gammas dataset).
908.3	7.6 2	1510.7	2 <sup>+</sup>	602.4	2 <sup>+</sup>	
960.0		2620.3?		1660.3	6 <sup>+</sup>	$E_\gamma$ : measured at 546 MeV beam energy.
1073.9		2204.2	2 <sup>+,3</sup>	1130.6	4 <sup>+</sup>	
1200.3	5.1 2	1802.9	3 <sup>-</sup>	602.4	2 <sup>+</sup>	
1391.3	2.2 1	1993.7	2 <sup>+</sup>	602.4	2 <sup>+</sup>	
1536.2	1.2 1	2138.2	3 <sup>(+)</sup>	602.4	2 <sup>+</sup>	
1634.9	1.9 1	2237.2	2 <sup>+</sup>	602.4	2 <sup>+</sup>	

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$^{12}\text{C}(^{136}\text{Xe},^{140}\text{Ba}\gamma)$  2015St16 (continued) $\gamma(^{140}\text{Ba})$  (continued)

$E_\gamma$ <sup>†</sup>	$I_\gamma$ <sup>‡</sup>	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$
1993.7	0.5 1	1993.7	2 <sup>+</sup>	0.0	0 <sup>+</sup>
2237.3		2237.2	2 <sup>+</sup>	0.0	0 <sup>+</sup>

<sup>†</sup> Measured at 500 MeV beam energy except as noted. Authors have taken the transition energies from [2007Ni07](#).

<sup>‡</sup> Relative intensities from analysis of  $\gamma$ -ray spectra at 546 MeV beam energy. Normalized to 100 at 602  $\gamma$ .

# Unresolved doublet. Resolution after Doppler correction is 4.0 1 at 530 keV.

@ Doublet peak with intensities from analysis of  $\gamma\gamma$  coincidence data from  $I(528\gamma)/I(\text{doublet})= 70.6$  21 % and  $I(\text{doublet})= 79.7$  5.

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Level Scheme

Intensities: Type not specified

Legend

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

