^{9}Be(^{124}Xe,Xγ) 2010Bl13,2017Pa35,2019Ha26

History

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

2010Bl13, 2011Bo32: E(^{124}Xe)=850 MeV/nucleon from accelerator complex at GSI facility. Target=4 g/cm^2 ^{9}Be. Residues such as ^{98}Cd were separated using FRS separator and delayed gamma rays from isomeric activity studied. Measured Eγ, Iγ, $\gamma\gamma$-coin, (particle)γ-coin using RISING array of 15 EUROBALL cluster detectors and a variety of particle detectors. Deduced levels, J, π, $T_{1/2}$, transition strengths. Comparisons with shell-model calculations.

2017Pa35: E(^{124}Xe)=345 MeV/nucleon beam incident on a 740 mg/cm^2 thick ^{9}Be target at the RIKEN-RIBF facility. The identification of the nuclide of interest was made through the BigRIPS separator and the ZeroDegree spectrometer by determining the atomic number and the mass-to-charge ratio of the ion using the tof-Bρ-ΔE method. The secondary beam was stopped in the double-sided silicon strip detector of the WAS3ABi spectrometer. The γ rays were detected by EURICA array comprising of 84 HPGe detectors. Measured Eγ, Iγ, $\gamma\gamma$(t). Deduced half-lives, isomeric ratios, transition strengths. Comparisons with available data and shell-model calculations.

2019Ha26: same experimental arrangement at RIBF-RIKEN as in 2017Pa35. Measured half-life of the (4$^+$) isomer at 107 keV by γ(t), and isomeric ratio. Deduced B(E2) for 107-keV transition.

^{98}Cd Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0[#]	0$^+$		
1395[#]	(2$^+$)		
2083[#]	(4$^+$)		
2281[#]	(6$^+$)	13 ns *2*	$T_{1/2}$: from (147γ)(198γ+688γ+1395γ)(t) (2017Pa35).
2428[#]	(8$^+$)	154 ns *16*	$T_{1/2}$: value is from Table I in 2017Pa35, but $T_{1/2}$=149 ns *14* is also quoted in text. Measured isomeric ratio R=58% *7* (2019Ha26), 97% *36* (2017Pa35).
6585	(10$^+$)		Core-excited state as intrepreted by 2017Pa35.
6635	(12$^+$)	224 ns *5*	Core-excited state as intrepreted by 2017Pa35 and earlier authors. $T_{1/2}$: from $\gamma\gamma$(t) in 2017Pa35, but the gating γ-ray transitions were not given by the authors. Others: 0.21 μs *2* (2019Ha26, γ(t)); 0.23 μs *8* from a single exponential fit to 4157γ(t) (2010Bl13). Measured isomeric ratio R=18% *4* (2019Ha26), 10% *1* (2017Pa35).

[†] From 2010Bl13 based on Eγ data.
[‡] From the Adopted Levels.
[#] Seq.(A): Yrast cascade.

γ(^{98}Cd)

E$_\gamma$[†]	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	α[#]	I$_{(\gamma+ce)}$[‡]	Comments
(49 *2*)	0.60 *16*	6635	(12$^+$)	6585	(10$^+$)	[E2]	19 *4*	12 *2*	α(K)=9.8 *12*; α(L)=7.5 *17*; α(M)=1.5 *4*; α(N)=0.25 *6*; α(O)=0.00166 *19* B(E2)(W.u.)=1.99 *25* in 2017Pa35 is based on Eγ=49.2 *2* and corresponding conversion coefficient. Based on Eγ=49 *2*, value is 2.0 *9* in the Adopted dataset. E$_\gamma$: this γ is not observed in 2017Pa35, its energy of 49.2 *2* given by the authors was deduced from the difference in energy of the 4207.0 *1* and 4157.9 *2* with statistical uncertainty. Inclusion of the systematic uncertainty gives Eγ=49 *2* keV (priv. comm.

Continued on next page (footnotes at end of table)

^{9}Be(^{124}Xe,Xγ) 2010Bl13,2017Pa35,2019Ha26 (continued)

γ(^{98}Cd) (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	$I_{(\gamma+ce)}$[‡]	Comments
									Dec 14, 2019 from J. Park, first author of 2017Pa35). $I_{(\gamma+ce)}$: from the observed ratio Iγ(4158γ)/Iγ(4207γ), and equating the intensity of the 4158γ with the transition intensity of the 49-keV γ ray (priv. comm. Dec 14, 2019 from J. Park, first author of 2017Pa35). I_γ: deduced from I(γ+ce) and α.
147		2428	(8^+)	2281	(6^+)				
198		2281	(6^+)	2083	(4^+)				
688		2083	(4^+)	1395	(2^+)				
1395		1395	(2^+)	0	0^+				
4158 *2*		6585	(10^+)	2428	(8^+)				E_γ: 4157.9 *2* with statistical uncertainty, and 4158 *2* with systematic uncertainty considered (priv. comm. Dec 14, 2019 from J. Park, first author of 2017Pa35). Other: 4157 *3* (2010Bl13).
4207 *2*	88 *2*	6635	(12^+)	2428	(8^+)	[E4]	0.00016	88 *2*	B(E4)(W.u.)=3.03 *8* (2017Pa35) E_γ: 4207.0 *1* with statistical uncertainty, and 4207 *2* with systematic uncertainty considered (priv. comm. Dec 14, 2019 from J. Park, first author of 2017Pa35).

[†] From 2010Bl13.
[‡] From 2017Pa35.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

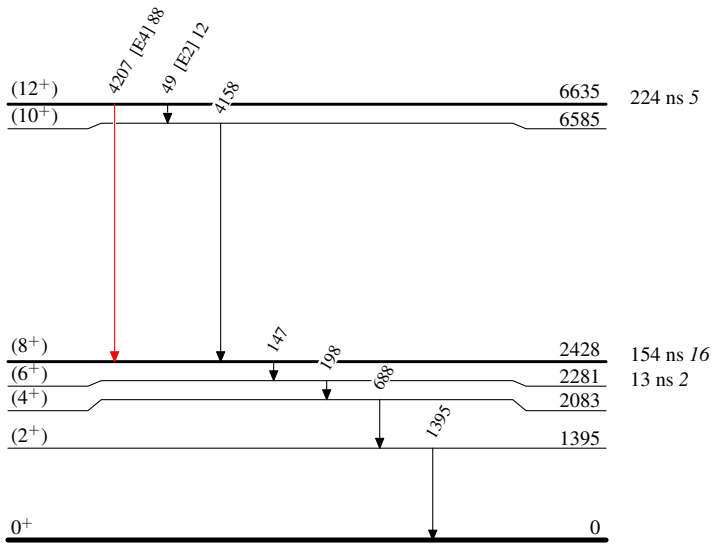
^{9}Be(^{124}Xe,Xγ) 2010Bl13,2017Pa35,2019Ha26

Level Scheme

Intensities: Relative $I_{(\gamma+ce)}$

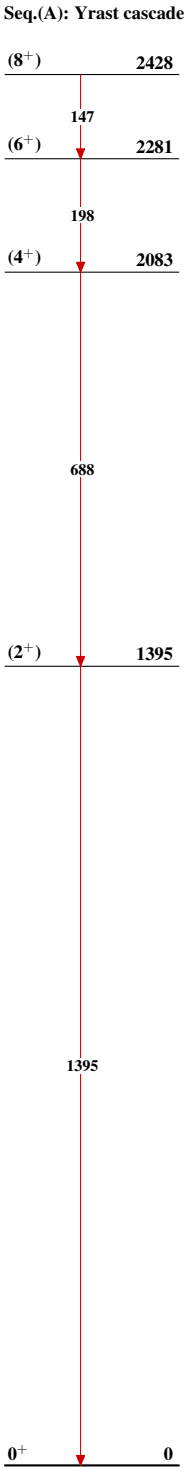
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



$^{98}_{48}Cd_{50}$

^{9}Be(^{124}Xe,Xγ) 2010Bl13,2017Pa35,2019Ha26



$^{98}_{48}Cd_{50}$