^{114}Cd(^{12}C,3nγ),(^{13}C,4nγ) 1982Ze05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174,1 (2021)	15-Apr-2021

1982Ze05: E=50-62 MeV ^{12}C and ^{13}C beams were produced from the heavy-ion accelerator VICKSI of the Hahn-Meitner-Institut in Berlin. Targets were isotopically enriched ^{114}Cd. γ rays were detected with Ge(Li), Si(Li), HPGe and NaI(Tl) detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma(\theta)$, γ(t), $\gamma(\theta$,t,H), recoil-distance. Deduced levels, J, π, $T_{1/2}$, g-factor, quadrupole moment, γ-ray multipolarities, mixing ratios. Comparisons with theoretical calculations.

Other:

^{116}Cd(^{12}C,5nγ): 1970Co05 propose a partial level scheme based on observed γ transitions assigned to ^{123}Xe, but none of the transitions and the proposed levels are seen and confirmed in any of other studies. It could be that those γ rays were incorrectly assigned to ^{123}Xe.

1974BoYA: measured σ(Eγ,θ), $\gamma\gamma$-coin. Deduced levels.

All data are from 1982Ze05, unless otherwise noted.

^{123}Xe Levels

Nuclear moments μ and Q from Time-Differential observation of the Perturbed Angular Distribution (TDPAD) (1982Ze05).

The 180+x level in 1982Ze05 is resolved to be at 185 keV in Adopted Levels and other levels based on it in 1982Ze05 are thus resolved accordingly.

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0	$1/2^{(+)}$		
97.0 *9*	$3/2^{(+)}$		
180.0 *9*	$5/2^{(+)}$		
184.6 *13*	$7/2^{(-)}$	5.2 μs *5*	μ=−0.896 *7*; Q=1.4 *3* (1982Ze05) E(level): 180+x in 1982Ze05. The position of this isomer is proposed by 1981Lu01 in ^{123}Te(^{3}He,3nγ), which is adopted in Adopted Levels. J$^\pi$: spin=7/2 from analysis of the quadrupole modulation spectra (1982Ze05). μ: from g-factor=−0.256 *2* and spin=7/2, without correction for dia-magnetic shielding or Knight shift (TDPAD,1982Ze05). See also 2014StZZ compilation. $T_{1/2}$: from γ(t) of 97γ, 83γ and 180γ in 1982Ze05.
205.6 *17*	$(9/2^-)$	11.8 ns *14*	Q=1.1 *6* (1982Ze05) E(level): 201+x in 1982Ze05. $T_{1/2}$: from 21γ(t) in 1982Ze05. Q: from model independent ratio of Q(9/2$^-$)/Q(7/2$^-$)=0.80 *40* from the analysis of the amplitude reduction and phase shift and Q(9/2$^-$)=1.4 *3* (1982Ze05). But 1.1 *7* is given in 1982Ze05.
251.0 *13*	$(7/2^+)$		
262.6 *20*	$(11/2^-)$	1.5 ns *3*	E(level): 258+x in 1982Ze05.
437.0 *13*	$7/2^{(+)}$		
466.0 *13*	$(7/2^+)$		
517.0 *17*	$(9/2^+)$		
661.6 *22*	$(13/2^-)$		E(level): 657+x in 1982Ze05.
718.6 *22*	$(15/2^-)$	12.5 ps *21*	E(level): 714+x in 1982Ze05.
767.0 *17*	$(11/2^+)$		
1269.6 *24*	$(15/2^-)$		E(level): 1265+x in 1982Ze05.
1293.6 *24*	$(17/2^-)$		E(level): 1289+x in 1982Ze05.
1335.6 *24*	$(19/2^-)$	≤3.5 ps	E(level): 1331+x in 1982Ze05.
2089 *3*	$(23/2^-)$		E(level): 2084+x in 1982Ze05.
2966 *3*	$(27/2^-)$		E(level): 2961+x in 1982Ze05.

[†] From a least-squares fit to γ-ray energies, assuming ΔEγ=1 keV.

Continued on next page (footnotes at end of table)

^{114}Cd(^{12}C,3nγ),(^{13}C,4nγ) 1982Ze05 (continued)

^{123}Xe Levels (continued)

‡ From Adopted Levels. Assignments for excited states are supported by $\gamma(\theta)$ data in 1982Ze05, where available in comments.
# From recoil-distance method (1982Ze05), unless otherwise noted.

$\gamma(^{123}Xe)$

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	Comments
(4.6)	184.6	7/2$^{(-)}$	180.0	5/2$^{(+)}$	[E1]		E_γ: From Adopted Levels, Gammas; not observed and considered as unknown in 1982Ze05.
21	205.6	(9/2$^-$)	184.6	7/2$^{(-)}$			
57	262.6	(11/2$^-$)	205.6	(9/2$^-$)	D+Q	+0.09 *4*	Mult.: A_2=−0.26 *2*.
71	251.0	(7/2$^+$)	180.0	5/2$^{(+)}$	D+Q		Mult.: A_2=−0.20 *5*.
83	180.0	5/2$^{(+)}$	97.0	3/2$^{(+)}$	D+Q		Mult.: A_2=−0.15 *1*.
97	97.0	3/2$^{(+)}$	0	1/2$^{(+)}$	D+Q	+0.11 *4*	Mult.: A_2=−0.07 *1*. δ: or −2.35 *25*.
180	180.0	5/2$^{(+)}$	0	1/2$^{(+)}$	Q		E_γ: From 1982Ze05. Mult.: A_2=+0.16 *2*.
266	517.0	(9/2$^+$)	251.0	(7/2$^+$)	D+Q	<−0.18	Mult.: A_2=−0.66 *24*.
286	466.0	(7/2$^+$)	180.0	5/2$^{(+)}$	D+Q	<0	E_γ: From 1982Ze05. Mult.: A_2=−0.44 *25*.
340	437.0	7/2$^{(+)}$	97.0	3/2$^{(+)}$	Q		Mult.: A_2=+0.24 *16*.
399	661.6	(13/2$^-$)	262.6	(11/2$^-$)	D+Q	<−0.4	Mult.: A_2=−0.76 *15*, A_4=+0.08 *7*.
456	718.6	(15/2$^-$)	262.6	(11/2$^-$)	Q		Mult.: A_2=+0.30 *7*, A_4=−0.15 *6*.
516	767.0	(11/2$^+$)	251.0	(7/2$^+$)	Q		Mult.: A_2=+0.32 *15*, A_4=−0.23 *16*.
608	1269.6	(15/2$^-$)	661.6	(13/2$^-$)			
617	1335.6	(19/2$^-$)	718.6	(15/2$^-$)	Q		Mult.: A_2=+0.23 *4*, A_4=−0.10 *4*.
632	1293.6	(17/2$^-$)	661.6	(13/2$^-$)			
753	2089	(23/2$^-$)	1335.6	(19/2$^-$)			
877	2966	(27/2$^-$)	2089	(23/2$^-$)			

† From the level scheme in Fig.1 of 1982Ze05, unless otherwise noted.
‡ From $\gamma(\theta)$ in 1982Ze05, with ΔJ=1 for D+Q and ΔJ=2 for Q. Since there is no experimental evidence for the assignments of electric or magnetic nature, D for M1 and Q for E2 are quoted here.

Legend

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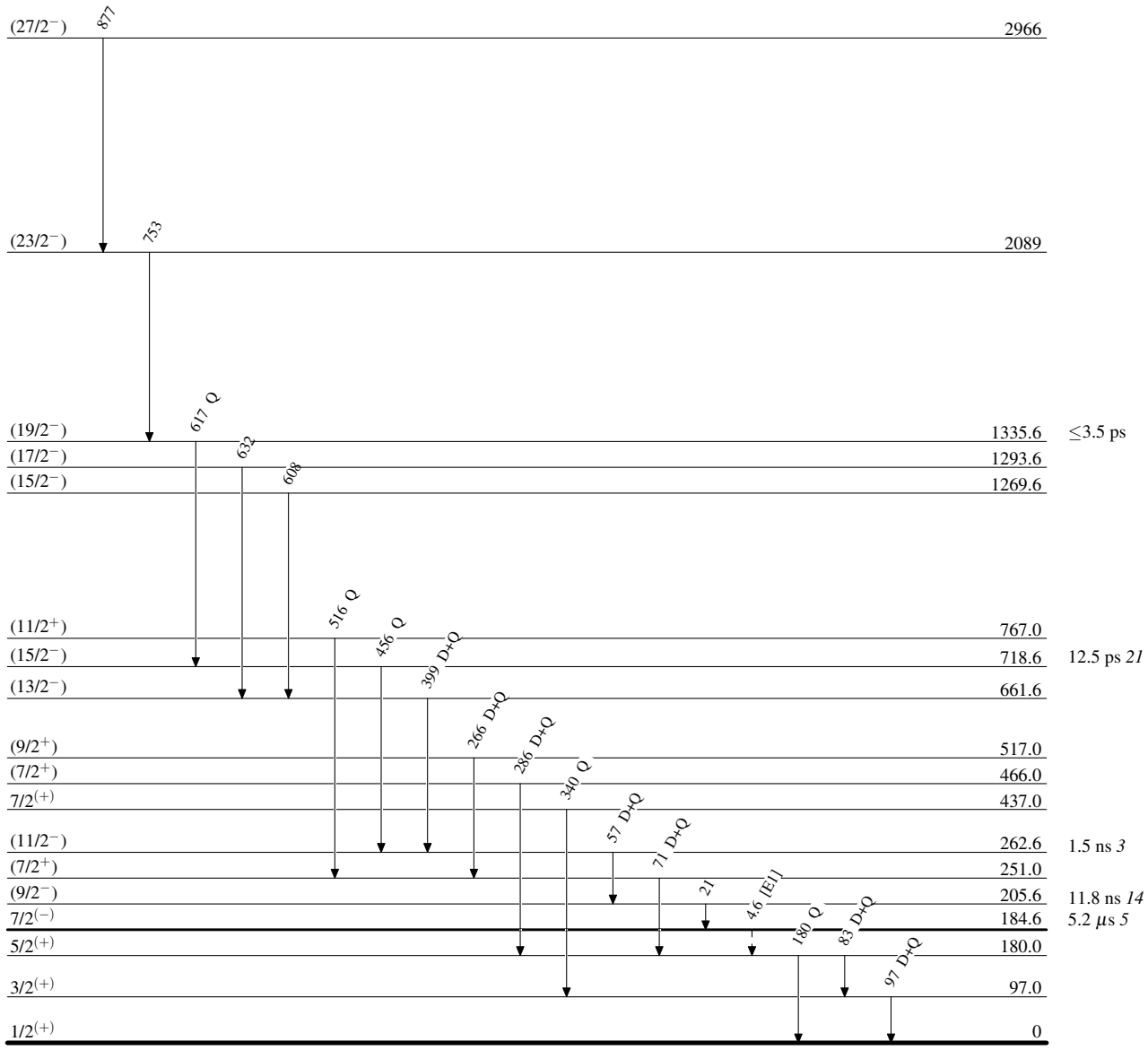
Level Scheme

γ Decay (Uncertain)



$^{123}_{54}Xe_{69}$