^{70}Ge(p,p′γ) 1969Hi01,1985Pa15

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	G. Gürdal, E. A. Mccutchan	NDS 136, 1 (2016)	1-Jul-2016

1986Pa19, 1986Pa23, 1985Pa15, 1983Pa10: E(p)=6.9 MeV; magnetic lens plus Si(Li) electron spectrometer. Measured $T_{1/2}$ with pulsed beam, and Eγ, Iγ, Ice, internal pair production spectrum, γ-p′, ce-p′ coin with various types of ce and γ-ray spectroscopy.
1969Hi01: E(p)=7.0 MeV; Ge(Li) detector at the center of a split NaI(Tl) annulus; measured Eγ, uncertainties not given; energy calibration of γ′s based on ^{70}As decay studies.
1965Mo01, 1966Va09, 1966Va11: E(p)=5-7 MeV; measured γ(θ), details not given.

^{70}Ge Levels

E(level)[†]	Jπ[#]	$T_{1/2}$	Comments
0.0	0^+		
1039.6[‡] *1*	2^+		
1215.8[‡] *6*	0^+	3.7 ns *2*	$T_{1/2}$: electron spectrometer measurement with pulsed cyclotron beam (1985Pa15,1983Pa10).
1708.0[‡] *2*	2^+		Jπ: from depopulating 448.8γ E2 from 4^+ and 599.1γ E2 from 0^+.
2153.0[‡] *3*			
2156.8[‡] *5*	2^+		
2307.1 *4*	0^+	≤40 ps	$T_{1/2}$: by centroid-shift time measurement (1985Pa15).
2451.6[‡] *3*			
2535.4 *4*			
2562.3 *4*			
2806.7 *5*			
2887.1 *7*			
2945.3 *5*			
3046.7 *7*			
3059.2[‡] *4*			
3107.2 *5*			
3181.0 *4*			
3240 *6*			
3293.1 *6*			
3314.7 *6*			
3335.6 *6*			
3482.3 *5*			
3489.1[‡] *4*			
3562.7 *6*			
3590.3 *5*			
3631.7 *5*			
3676.4[‡] *6*			
3708.5 *9*			
3903.9 *7*			
4003.0 *20*			
4096.1 *20*			
4144.7 *20*			

[†] From 1969Hi01 unless indicated otherwise; authors do not give Eγ, ΔEγ from which level energies were determined.
[‡] From ^{70}As decay by authors of 1969Hi01 as given in 1972Al56.
[#] From multipolarities deduced from internal conversion measurements in 1985Pa15, unless otherwise stated.

^{70}Ge(p,p′γ) 1969Hi01,1985Pa15 (continued)

γ(^{70}Ge)

Gammas from levels higher than 3107 not given by 1969Hi01.

X(I,J,K)=B(E0,J(I) to J(J))/B(E2,J(I) to J(K)) from 1985Pa15 are:

J(I)	J(J)	J(K)	E0 transition	E2 transition	X(I,J,K)	
0+''	0+'	2+'	1215.8	176.2	4.2×10^{-3}	*3*
0+'''	0+''	2+'	1091.3	1267.5	1.00 *15*	
0+'''	0+''	2+''	1091.3	599.1	2.9×10^{-2}	*6*
0+'''	0+'	2+'	2307.1	1267.5	2.1×10^{-1}	*5*
0+'''	0+'	2+''	2307.1	599.1	6.0×10^{-3}	*18*

E_i(level)	J_i^π	E_γ	I_γ[#]	E_f	J_f^π	Mult.	$I_{(\gamma+ce)}$[@]	Comments
1039.6	2+	1039.6		0.0	0+	E2[†]		
1215.8	0+	176.2	100	1039.6	2+	E2[†]		
		1215.8		0.0	0+	E0[†]	1.00 *4*	$I_{(\gamma+ce)}$: experimental I(ce(K)) increased by 10% to include L-conversion as determined from 1969Ha61. K-conversion decay branch %=0.91 *4*.
1708.0	2+	492.2		1215.8	0+			
		668.4		1039.6	2+			
		1708		0.0	0+			
2153.0		1113.4		1039.6	2+			
2156.8	2+	448.8	3[&]	1708.0	2+	E2[‡]		
		941	26[&]	1215.8	0+	E2[†]		
		1117.2	63[&]	1039.6	2+	E2[‡]		
		2156.8	8[&]	0.0	0+	E2[‡]		
2307.1	0+	599.1	45 *4*	1708.0	2+	E2[†]		
		1091.3		1215.8	0+	E0[†]	0.007 *11*	$I_{(\gamma+ce)}$: experimental I(ce(K)) increased by 10% to include L-conversion as determined from 1969Ha61. ce(K)(1091γ)/ce(K)(1268γ)=0.59 *8* (1985Pa15).
		1267.5	55 *4*	1039.6	2+	E2[†]		α(K)=0.00018 *1* B(E2)(599γ)/B(E2)(1268γ)=35 *5* (1985Pa15).
		2307.1		0.0	0+	E0[†]	0.022 *5*	$I_{(\gamma+ce)}$: includes pair production. I(e+-)(2307γ)/ce(K)(1268γ)=1.6 *5* (1985Pa15). ce(K)(2307γ)/ce(K)(1268γ)=0.35 *10*; this corresponds to ce(K)(2307γ)/I(1268γ)=6.5×10^{-5} *18* and I(e+-)(2307γ)/I(1268γ)=3.3×10^{-4} *9* (1986PaZR). ce(K)/pair conversion probability=0.20 *8*; which may be compared with a theoretical ratio=0.212 (1986Pa19,1986Pa23).
2451.6		294.8		2156.8	2+			
		298.6		2153.0				
		743.6		1708.0	2+			
		1412		1039.6	2+			
2535.4		1319.6		1215.8	0+			
		1495.8		1039.6	2+			
2562.3		1522.7		1039.6	2+			
2806.7		653.7[a]		2153.0				
		1098.7		1708.0	2+			
2887.1		730.3		2156.8	2+			
2945.3		1237.3		1708.0	2+			
3046.7		240		2806.7				

Continued on next page (footnotes at end of table)

^{70}Ge(p,p′γ) 1969Hi01,1985Pa15 (continued)

γ(^{70}Ge) (continued)

E_i(level)	E_γ	E_f	J^π_f	E_i(level)	E_γ	E_f	J^π_f	E_i(level)	J^π_i	E_γ	E_f	J^π_f
3046.7	595.1	2451.6		3059.2	252.5	2806.7		3059.2		1351.2	1708.0	2^+
	889.9	2156.8	2^+		496.9	2562.3				2019.6	1039.6	2^+
	893.7	2153.0			607.6	2451.6		3107.2		1399.2[a]	1708.0	2^+
	1338.7	1708.0	2^+		902.4	2156.8	2^+			2067.6	1039.6	2^+
	2007.1	1039.6	2^+		906.2	2153.0						

† From internal conversion data (1985Pa15).
‡ Assumed by 1985Pa15.
# Percent photon branching from each level (1985Pa15).
@ Percent branching from each level (1985Pa15).
& Percent photon branching from each level calculated using the relative transition probabilities (1985Pa15).
[a] Placement of transition in the level scheme is uncertain.

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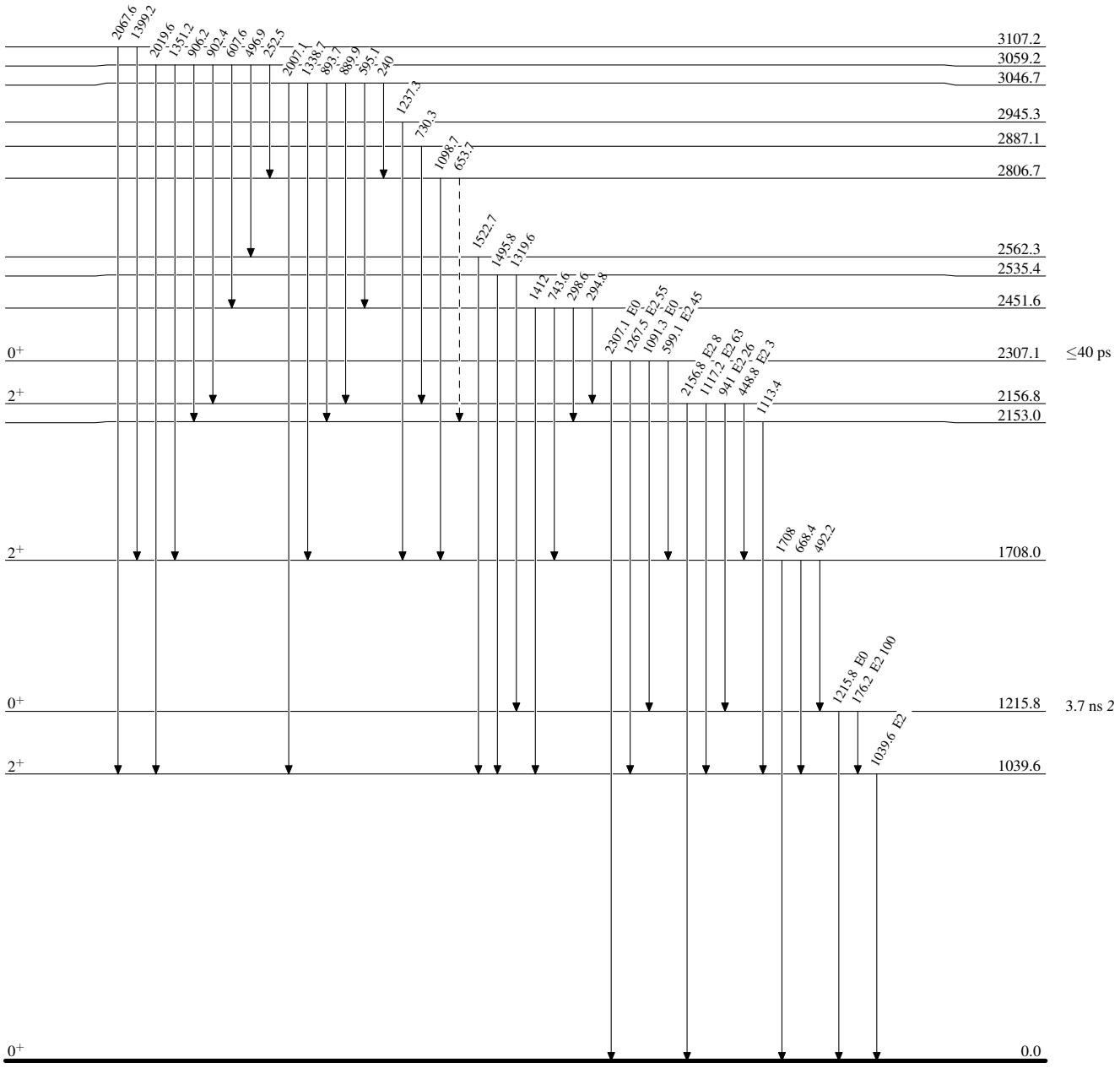
Legend

Level Scheme

Intensities: % photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{70}_{32}Ge_{38}$