^{58}Ni(^{19}F,3pnγ) 1983Li16,1999Lo17

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 158, 1 (2019)	16-May-2019

1983Li16: E=56-68 MeV. Measured Eγ, Iγ, γ excit, $\gamma\gamma$, $\gamma(\theta)$, lifetimes by recoil-distance method (RDM). Neutron multiplicity technique.

1999Lo17: E=70 MeV. Measured lifetimes by Doppler-shift attenuation method (DSAM) using up to six EUROBALL cluster detectors, each cluster containing seven Ge crystals.

^{73}Se Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0[&]	9/2$^+$		
25.71[@] *4*	3/2$^-$	39.8 min *17*	T$_{1/2}$: from Adopted Levels.
90.6 *10*	(1/2,3/2)$^-$		
151.20[@] *5*	5/2$^-$		
505.87[@] *5*	7/2$^-$		
805.38[@] *6*	9/2$^-$	3.9 ps *7*	
972.57[&] *3*	13/2$^+$	1.3 ps *3*	
1180.75[@] *6*	11/2$^-$	2.5 ps *3*	
1554.52[@] *6*	13/2$^-$	1.32 ps *14*	
2004.78[@] *6*	15/2$^-$	0.8 ps *4*	
2017.70[&] *4*	17/2$^+$	0.18 ps *4*	
2436.18[@] *10*	17/2$^-$	0.44 ps *8*	
2954[@] *1*	(19/2$^-$)	0.20 ps *6*	
3175.73[&] *17*	(21/2$^+$)	0.139 ps *35*	
3445[@] *1*	(21/2$^-$)	0.125 ps *21*	
4017[@] *2*	(23/2$^-$)	0.104 ps *14*	
4390.7[&] *11*	(25/2$^+$)	0.062 ps *21*	
4594[@] *2*	(25/2$^-$)	0.062 ps *21*	
5223[@] *2*	(27/2$^-$)	0.069 ps *14*	
5640[&] *1*	(29/2$^+$)	0.118 ps *14*	
5858[@] *2*	(29/2$^-$)	0.055 ps *14*	
5895? *2*			E(level): level reported by 1983Li16 only.
6529[@] *2*	(31/2$^-$)	0.069 ps *14*	
7020[&] *2*	(33/2$^+$)	0.090 ps *7*	T$_{1/2}$: effective half-life from DSAM (1999Lo17).
7239[@] *2*	(33/2$^-$)	0.139 ps *14*	T$_{1/2}$: effective half-life from DSAM (1999Lo17).
7958[@] *2*	(35/2$^-$)	0.236 ps *21*	T$_{1/2}$: effective half-life from DSAM (1999Lo17).

[†] From least-squares fit to Eγ data. Levels above 25/2$^+$ in the positive-parity band and above 17/2$^-$ in the negative-parity band are from Fig. 3 of 1999Lo17. Uncertainty in Eγ is assumed 1 keV when not stated.

[‡] From $\gamma(\theta)$, slopes of γ-excit functions and level lifetimes. See also Adopted Levels.

[#] From RDM (1983Li16) for levels up to 2004, 15/2$^-$, unless otherwise noted. Above this, values are from DSAM (1999Lo17).

[@] Band(A): ν3/2[301] band. β=0.3.

[&] Band(B): $\nu g_{9/2}$ decoupled band. $\beta\approx$0.22.

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$\gamma(^{73}Se)$

A_2 and A_4 under comments are from $\gamma(\theta)$ in 1983Li16.

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	α[@]	Comments
(25.71 *4*)		25.71	$3/2^-$	0.0	$9/2^+$	E3		5250 *90*	E_γ,Mult.: from Adopted Gammas.
64.9		90.6	$(1/2,3/2)^-$	25.71	$3/2^-$				E_γ: from 1976Ze05.
125.5		151.20	$5/2^-$	25.71	$3/2^-$				
299.63 *5*	51.8 *26*	805.38	$9/2^-$	505.87	$7/2^-$	M1+E2	−0.82 *+37−29*		A_2=−0.41 *5*; A_4=+0.04 *6*
354.701 *17*	100.0 *36*	505.87	$7/2^-$	151.20	$5/2^-$	(M1+E2)	−0.59 *14*		A_2=−0.48 *3*; A_4=+0.04 *4*
373.61 *4*	26.5 *19*	1554.52	$13/2^-$	1180.75	$11/2^-$	D+Q	−0.066 *18*		A_2=−0.37 *3*; A_4=+0.08 *3*
375.38 *4*	59.6 *21*	1180.75	$11/2^-$	805.38	$9/2^-$	D+Q	+0.082 *18*		A_2=−0.159 *25*; A_4=+0.08 *3*
431		2436.18	$17/2^-$	2004.78	$15/2^-$				
450.204 *18*	23.4 *23*	2004.78	$15/2^-$	1554.52	$13/2^-$	D+Q	−0.038 *23*		A_2=−0.17 *6*; A_4=+0.14 *7*
480.160 *23*	38 *7*	505.87	$7/2^-$	25.71	$3/2^-$	Q			A_2=+0.19 *4*; A_4=−0.15 *5*
491		3445	$(21/2^-)$	2954	$(19/2^-)$				
518		2954	$(19/2^-)$	2436.18	$17/2^-$				
654.126 *25*	128.7 *11*	805.38	$9/2^-$	151.20	$5/2^-$	E2[#]			A_2=+0.309 *24*; A_4=−0.14 *3* B(E2)↓=0.076 *12*
675.02 *6*	124.4 *26*	1180.75	$11/2^-$	505.87	$7/2^-$	(E2)[#]			A_2=+0.31 *7*; A_4=−0.05 *8* B(E2)↓=0.085 *11*
748.98 *6*	56.5 *21*	1554.52	$13/2^-$	805.38	$9/2^-$	E2[#]			A_2=+0.33 *5*; A_4=−0.12 *6* B(E2)↓=0.122 *18*
824.110 *25*	54.8 *26*	2004.78	$15/2^-$	1180.75	$11/2^-$	E2[#]			A_2=+0.32 *6*; A_4=−0.15 *7* B(E2)↓=0.134 *79*
881.65 *7*	28.6 *34*	2436.18	$17/2^-$	1554.52	$13/2^-$				
948		2954	$(19/2^-)$	2004.78	$15/2^-$				
972.56 *3*	150.5 *12*	972.57	$13/2^+$	0.0	$9/2^+$	(E2)[#]			A_2=+0.257 *24*; A_4=−0.03 *3*
1009		3445	$(21/2^-)$	2436.18	$17/2^-$				
1045.120 *24*	85.7 *34*	2017.70	$17/2^+$	972.57	$13/2^+$	E2[#]			A_2=+0.30 *6*; A_4=−0.20 *7*
1063		4017	$(23/2^-)$	2954	$(19/2^-)$				
1149		4594	$(25/2^-)$	3445	$(21/2^-)$				
1158.02 *16*	28.6 *14*	3175.73	$(21/2^+)$	2017.70	$17/2^+$	E2[#]			
1206		5223	$(27/2^-)$	4017	$(23/2^-)$				
1215		4390.7	$(25/2^+)$	3175.73	$(21/2^+)$				
1249		5640	$(29/2^+)$	4390.7	$(25/2^+)$				
1264		5858	$(29/2^-)$	4594	$(25/2^-)$				
1306		6529	$(31/2^-)$	5223	$(27/2^-)$				
1380		7020	$(33/2^+)$	5640	$(29/2^+)$				
1381		7239	$(33/2^-)$	5858	$(29/2^-)$				
1429		7958	$(35/2^-)$	6529	$(31/2^-)$				
1504[&]		5895?		4390.7	$(25/2^+)$				E_γ: reported by 1983Li16 only.

^{58}Ni(^{19}F,3pnγ) 1983Li16,1999Lo17 (continued)

$\gamma(^{73}Se)$ (continued)

† From 1983Li16 for levels up to $25/2^+$ in the positive-parity band and up to $17/2^-$ in the negative-parity band. Values above these spins are from figure 3 in 1999Lo17.
‡ From $\gamma(\theta)$ in 1983Li16, except where noted otherwise.
# Q from $\gamma(\theta)$, comparison to RUL excludes M2.
@ 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.
& Placement of transition in the level scheme is uncertain.

$^{73}_{34}Se_{39}$-3

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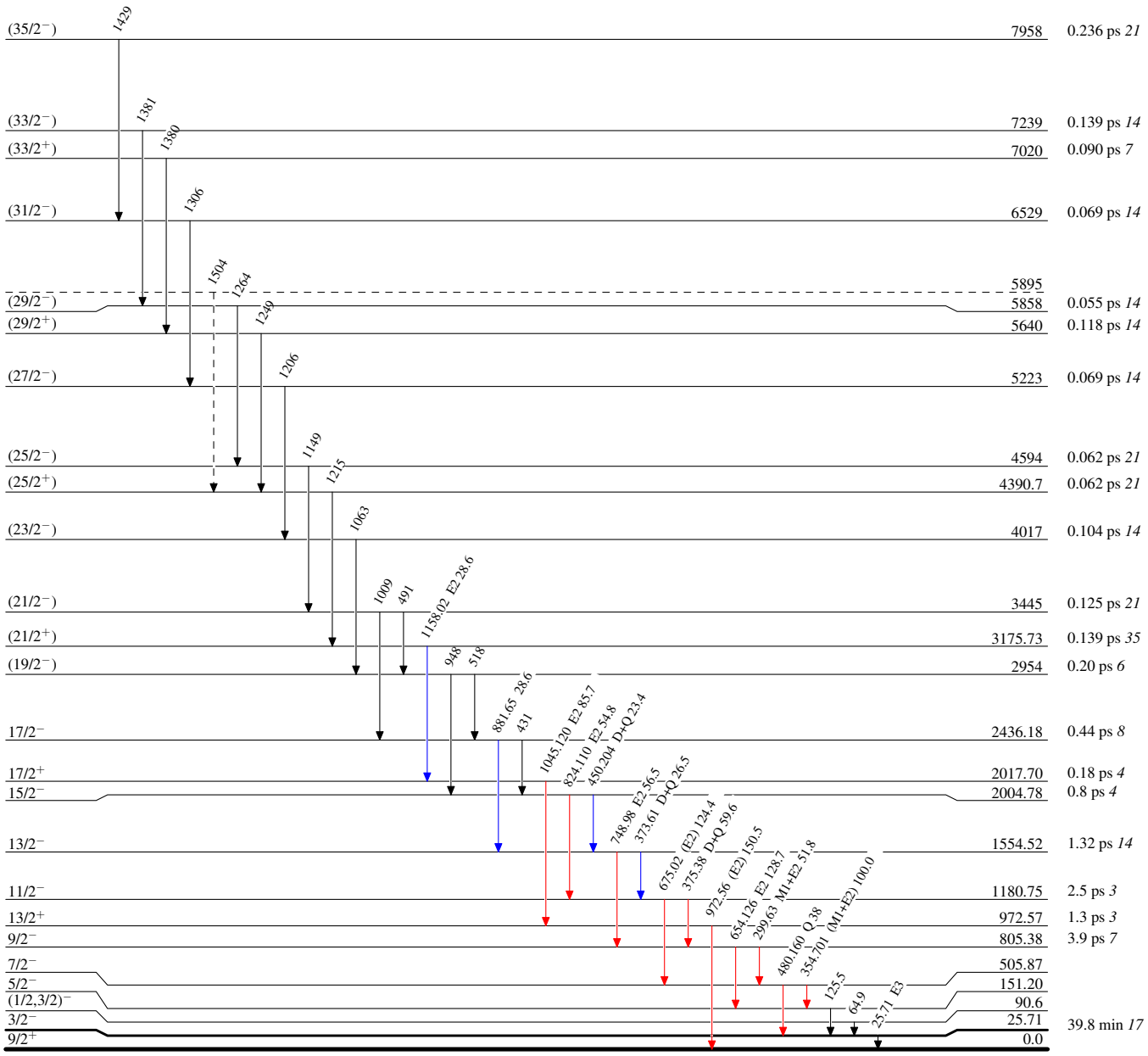
Level Scheme

Intensities: Relative I_γ

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)



$^{73}_{34}Se_{39}$

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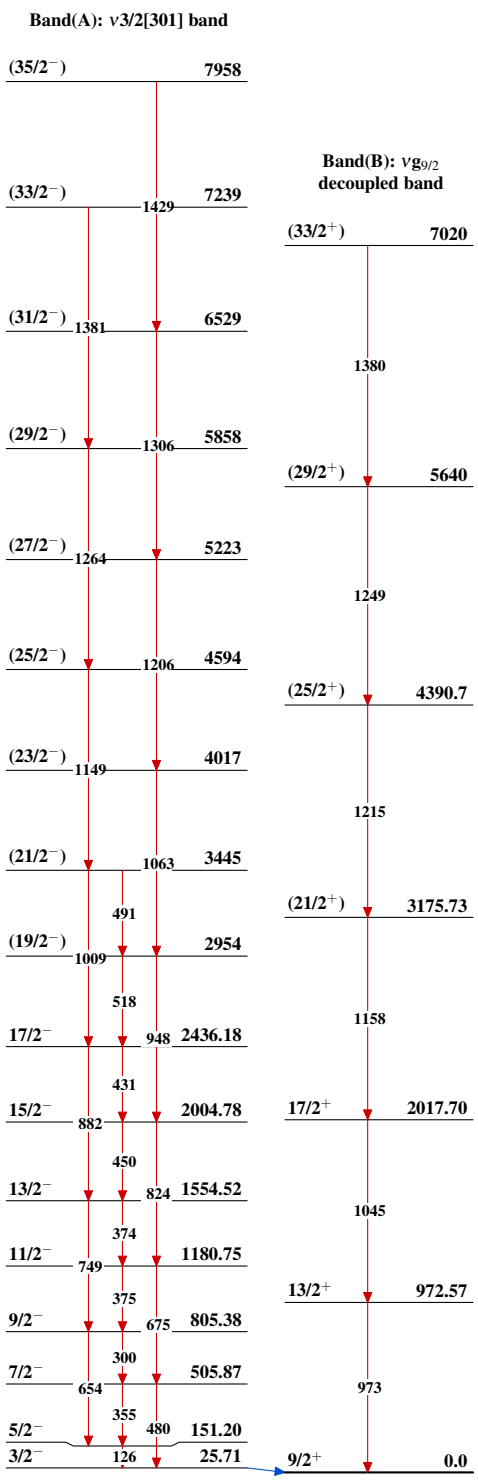

$^{73}_{34}Se_{39}$