^{70}Ge(α,nγ) 1991Se11,1976Ze05

History

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

1991Se11 (also 1990Se06): E=14-20 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, excitation functions, linear polarization, lifetimes by DSA and γ(t).
1976Ze05: E=10-18 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$, Excit functions.

^{73}Se Levels

Levels at 601.3, 869.7 and 2383.0 proposed by 1976Ze05 have been omitted. The γ rays from these levels have been assigned elsewhere by 1991Se11. None of these levels are reported in other studies.

E(level)[†]	J$^\pi$[#]	T$_{1/2}$[@]	Comments
0.0[g]	9/2$^+$		
25.71[c] *4*	3/2$^-$	39.8 min *17*	T$_{1/2}$: from Adopted Levels. Additional information 1.
26.30[‡] *12*	(3/2$^-$)		
90.62 *8*	(1/2,3/2)$^-$		
151.25[b] *7*	5/2$^-$	0.20 ns *14*	T$_{1/2}$: from γ-RF in 1991Se11.
192.41[e] *8*	(5/2$^+$)	0.97 ns *21*	T$_{1/2}$: from γ-RF in 1991Se11.
295.40[f] *8*	7/2$^+$		
400.34 *10*	(5/2$^-$)		
426.45 *20*	(1/2$^-$,3/2$^-$)		
505.49[c] *8*	7/2$^-$		
574.75 *10*	(5/2$^+$)		
639.22[e] *12*	9/2$^+$		
640.8 *3*	(1/2$^-$,3/2)		
644.81 *22*			
684.93[d] *20*	(5/2$^-$)		
724.61 *11*	(7/2$^+$)		
788.8 *7*	(1/2$^-$,3/2$^-$)		
790.72[a] *16*	5/2$^-$		
804.79[b] *10*	9/2$^-$		
938.6 *10*	(1/2$^-$,3/2$^-$)		
942.72[h] *14*	11/2$^+$	0.97 ps *21*	
971.09[g] *16*	13/2$^+$	0.83 ps *7*	
999.23[f] *15*	11/2$^+$		
1021.6 *10*	(1/2$^-$,3/2$^-$)		
1091.62 *24*			
1091.80 *22*	(9/2)		
1179.59[c] *14*	11/2$^-$		
1230.19[d] *18*	(9/2$^-$)		
1295.0 *4*			
1356.35[a] *18*	9/2$^-$		
1552.48[b] *13*	13/2$^-$	0.83 ps *14*	
1564.47 *23*			
1564.60 *24*	(11/2)		
1572.53[e] *16*	13/2$^+$	1.3[&] ps *4*	
1698.5 *5*			
1862.63[h] *16*	15/2$^+$	0.14 ps *7*	
1883.1 *4*	(11/2$^-$)		

Continued on next page (footnotes at end of table)

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

^{73}Se Levels (continued)

E(level)†	Jπ#	$T_{1/2}$@	E(level)†	Jπ#	$T_{1/2}$@
1932.5 *4*		1.7& ps *4*	2868.5[d] *5*	(17/2⁻)	
2002.44[c] *15*	15/2⁻	0.49 ps *14*	2872.8[h] *5*	(19/2⁺)	0.56& ps *14*
2009.68[d] *19*	(13/2⁻)		2949.90[c] *22*	(19/2⁻)	0.28 ps *14*
2014.3[g] *3*	17/2⁺	0.31 ps *7*	3003.82[a] *19*	(17/2⁻)	0.76& ps *21*
2041.2 *4*	(13/2⁺)		3097.9 *3*	19/2⁻	1.8& ps *6*
2089.95[a] *20*	13/2⁻		3170.4[g] *5*	(21/2⁺)	0.14 ps *7*
2210.00[f] *22*	(15/2⁺)	0.76& ps *21*	3203.0 *5*		0.28& ps *14*
2267.4 *4*			3303.1 *5*		0.42& ps *14*
2432.72[b] *18*	17/2⁻	0.28 ps *14*	3440.6[b] *5*	(21/2⁻)	0.21 ps *10*
2485.6 *4*			3854.5[d] *6*		
2626.4 *5*			4011.8[c] *5*	(23/2⁻)	0.35 ps *21*
2638.5[e] *3*	(17/2⁺)	0.45& ps *14*			

† From least-squares fit to Eγ data.

‡ In $\gamma\gamma$ coin, 1991Se11 could not identify a 26.3γ. In singles a weak peak at 26.3 was seen but this probably included contribution from K x ray(Cd). Estimated Iγ(26.3)/Iγ(166.1)<0.008 suggested a α(exp)>100, which implied mult=Q or higher and corresponding lifetime in μs region. But in γ-RF experiment, lifetime could not be deduced due to poor counting statistics. Another possibility is that this level decays to 25.7 level through a 0.6 keV transition.

From $\gamma(\theta)$, linear-polarizations, and excitation functions, and probable band assignments. See also Adopted Levels.

@ From DSA (1991Se11), unless otherwise noted.

& Effective half-life from DSA (1991Se11).

[a] Band(A): 5/2⁻ band,α=+1/2.

[b] Band(B): ν3/2[301],α=+1/2.

[c] Band(b): ν3/2[301],α=−1/2.

[d] Band(C): 5/2⁻ band,α=+1/2.

[e] Band(D): ν5/2[422],α=+1/2.

[f] Band(d): ν5/2[422],α=−1/2. The members in this band are assigned to $g_{9/2}$, g.s. band in other studies, and in Adopted Levels.

[g] Band(E): $\nu g_{9/2}$,α=+1/2.

[h] Band(e): $\nu g_{9/2}$,α=−1/2.

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

$\gamma(^{73}Se)$

A 175.0γ (Iγ=1) reported by 1976Ze05 only is omitted here, since it is not reported in any other study.
Values of A_2, A_4 and POL are from 1991Se11, unless otherwise noted.

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	δ[b]	α[c]	Comments
(0.6)		26.30	(3/2$^-$)	25.71	3/2$^-$				The decay through 0.6-keV transition is not established. It is only implied from the lack of observation of a 26.4γ to g.s. from Iγ(26.4)/Iγ(166.2)<0.018 (1987He21), <0.008 (1991Se11); and no conversion electrons seen in coin with 166.2γ (1987He21).
(25.71 *4*)		25.71	3/2$^-$	0.0	9/2$^+$	E3		5250 *90*	E$_\gamma$,Mult.: from Adopted Gammas.
60.6[‡e] *1*	1.0[‡] *5*	151.25	5/2$^-$	90.62	(1/2,3/2)$^-$				E$_\gamma$: γ is uncertain since not confirmed in any other study including (^{16}O,2pnγ) work of 1987He21.
64.9[‡] *1*	7[‡] *3*	90.62	(1/2,3/2)$^-$	25.71	3/2$^-$				E$_\gamma$: 65 *1* (1991Se11).
103.0 *2*	≈0.7	295.40	7/2$^+$	192.41	(5/2$^+$)				A$_2$=−0.14 *12* I$_\gamma$: 1.5 *5* (1976Ze05).
105.1 *2*	≈2	505.49	7/2$^-$	400.34	(5/2$^-$)				A$_2$=−0.23 *4*; A$_4$=+0.10 *6* I$_\gamma$: 5.0 *20* (1976Ze05).
125.6 *1*	100 *1*	151.25	5/2$^-$	25.71	3/2$^-$				A$_2$=−0.35 *1*; A$_4$=+0.03 *2* A$_2$=−0.306 *10*; A$_4$=−0.001 *14* (1976Ze05)
166.1 *1*	19 *1*	192.41	(5/2$^+$)	26.30	(3/2$^-$)	D			A$_2$=−0.14 *2*; A$_4$=+0.02 *2* A$_2$=−0.111 *15*; A$_4$=−0.003 *21* (1976Ze05)
192.4 *1*	4.1 *5*	192.41	(5/2$^+$)	0.0	9/2$^+$				I$_\gamma$: 22.5 *4* (1976Ze05). A$_2$=+0.05 *5*; A$_4$=+0.02 *6* A$_2$=+0.36 *11*; A$_4$=+0.22 *14* (1976Ze05) I$_\gamma$: 4.32 *18* (1976Ze05). Note disagreement in A$_2$ and A$_4$ values in the two studies.
249.1[#] *1*	2.5[#] *6*	400.34	(5/2$^-$)	151.25	5/2$^-$				A$_2$=+0.17 *2*; A$_4$=+0.02 *2* I$_\gamma$: 1.7 *3* (1976Ze05).
275.1[‡] *3*	1.0[‡] *3*	426.45	(1/2$^-$,3/2$^-$)	151.25	5/2$^-$				E$_\gamma$: 275 *1* (1991Se11).
279.4 *1*	3.5 *3*	574.75	(5/2$^+$)	295.40	7/2$^+$	D+Q	+0.3 *+4−2*		A$_2$=−0.03 *4*; A$_4$=−0.01 *5* A$_2$=+0.23 *7*; A$_4$=+0.04 *10* (1976Ze05) POL=0.0 *4*. I$_\gamma$: 4.3 *3* (1976Ze05).
290.1 *1*	0.8 *3*	1862.63	15/2$^+$	1572.53	13/2$^+$	(M1+E2)			A$_2$=−0.60 *8*; A$_4$=+0.1 *1*
295.4 *1*	39 *2*	295.40	7/2$^+$	0.0	9/2$^+$	M1+E2	−0.16 *+3−1*		A$_2$=+0.04 *1*; A$_4$=+0.03 *1* A$_2$=+0.114 *16*; A$_4$=−0.005 *22* (1976Ze05) POL=−0.22 *2*. I$_\gamma$: 40.2 *8* (1976Ze05).
299.3 *1*	26 *2*	804.79	9/2$^-$	505.49	7/2$^-$	M1+E2	−0.21 *+3−1*		A$_2$=−0.51 *2*; A$_4$=+0.03 *2* A$_2$=−0.476 *20*; A$_4$=−0.006 *30* (1976Ze05)

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

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

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

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	δ[b]	Comments
								POL=−0.16 *3*. I_γ: 19.7 *4* (1976Ze05).
303.6[a] *2*	2.6 *3*	942.72	$11/2^+$	639.22	$9/2^+$	D		A_2=−0.40 *4*; A_4=+0.02 *5* A_2=−0.25 *18*; A_4=−0.30 *26* (1976Ze05) I_γ: 1.73 *12* (1976Ze05).
336.0[‡] *3*	5.6[‡] *3*	426.45	$(1/2^-,3/2^-)$	90.62	$(1/2,3/2)^-$			A_2=0.00 *17*; A_4=−0.38 *22* (1976Ze05) E_γ: 335 *1* (1991Se11).
344.0[#] *3*	3.4[#] *3*	639.22	$9/2^+$	295.40	$7/2^+$	D+Q	−0.35 *+4−5*	A_2=−0.73 *2*; A_4=+0.12 *2* A_2=−0.79 *25*; A_4=−0.02 *31* (1976Ze05) POL=−0.06 *4*. I_γ: 3.1 *3* (1976Ze05).
354.3 *1*	55 *2*	505.49	$7/2^-$	151.25	$5/2^-$	M1+E2	−0.38 *+3−1*	A_2=−0.60 *2*; A_4=+0.03 *2* A_2=−0.57 *3*; A_4=−0.03 *5* (1976Ze05) POL=−0.05 *1*. I_γ: 47.7 *12* (1976Ze05).
360.3[#] *3*	≤1[#@]	999.23	$11/2^+$	639.22	$9/2^+$			
373.1 *3*	10 *1*	1552.48	$13/2^-$	1179.59	$11/2^-$	M1+E2	−0.17 *+5−6*	A_2=−0.53 *3*; A_4=+0.03 *4* A_2=−0.39 *3*; A_4=−0.08 *4* (1976Ze05) POL=−0.2 *1*. I_γ: 7.52 *18* (1976Ze05).
374.8[d] *3*	≈12[d@]	400.34	$(5/2^-)$	25.71	$3/2^-$			A_2=−0.53 *2*; A_4=+0.02 *2* A_2=−0.474 *15*; A_4=+0.057 *21* (1976Ze05) POL=−0.09 *1*. I_γ: 22.5 *5* (1976Ze05) for doublet.
374.8[d] *3*	≈15[d]	1179.59	$11/2^-$	804.79	$9/2^-$	M1+E2		
382.3 *1*	2.1 *3*	574.75	$(5/2^+)$	192.41	$(5/2^+)$	(M1+E2)	+0.8 *1*	A_2=+0.26 *4*; A_4=−0.10 *5* A_2=−0.17 *41*; A_4=+0.10 *6* (1976Ze05) POL=0.00 *5*. I_γ: 2.5 *4* (1976Ze05).
400.6[‡&] *4*	3.5[‡] *5*	426.45	$(1/2^-,3/2^-)$	25.71	$3/2^-$			I_γ: intensity corrected (by 1976Ze05) for a 401γ in ^{73}As.
404.6 *2*	1.7 *3*	804.79	$9/2^-$	400.34	$(5/2^-)$	(Q)		A_2=+0.27 *3*; A_4=−0.03 *4* δ(O/Q)=+0.04 *+13−6*.
429.1[#] *2*	1.6[#] *2*	724.61	$(7/2^+)$	295.40	$7/2^+$			A_2=+0.31 *4*; A_4=0.00 *5* I_γ: 3.0 *10* (1976Ze05).
430.5 *2*	3.4 *3*	2432.72	$17/2^-$	2002.44	$15/2^-$	M1+E2	−0.16 *+3−4*	A_2=−0.55 *2*; A_4=+0.08 *3* POL=−0.19 *5*.
446.9 *2*	2.3 *3*	639.22	$9/2^+$	192.41	$(5/2^+)$	Q		A_2=+0.28 *3*; A_4=−0.06 *3* δ(O/Q)=−0.01 *+5−4*. I_γ: 1 (1976Ze05).
450.0[a] *1*	6.6 *7*	2002.44	$15/2^-$	1552.48	$13/2^-$	M1+E2	−0.24 *+4−5*	A_2=−0.58 *1*; A_4=+0.08 *1* A_2=−0.46 *24*; A_4=+0.02 *30* (1976Ze05)

$^{73}_{34}Se_{39}$-4

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

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

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	δ[b]	Comments
								POL=−0.11 *4*. I_γ: 3.8 *3* (1976Ze05).
452.4[d] *2*	≈3[d@]	644.81		192.41	(5/2$^+$)			A_2=−0.18 *25*; A_4=−0.11 *32* (1976Ze05) I_γ: 3.6 *3* (1976Ze05).
452.4[d] *2*	≈1[d]	1091.62		639.22	9/2$^+$			
472.8 *1*	1.1 *4*	1564.60	(11/2)	1091.80	(9/2)	D(+Q)	−0.08 *+8−20*	A_2=−0.29 *5*; A_4=+0.07 *6* POL=−0.2 *2*.
479.7 *1*	20 *1*	505.49	7/2$^-$	25.71	3/2$^-$	E2		A_2=+0.27 *2*; A_4=−0.06 *2* A_2=+0.33 *4*; A_4=−0.03 *6* (1976Ze05) POL=+0.44 *3*. I_γ: 16.8 *7* (1976Ze05). δ(M3/E2)=+0.01 *+1−3*.
489.7[‡&] *5*	2.0[‡] *10*	640.8	(1/2$^-$,3/2)	151.25	5/2$^-$			E_γ: reported in ^{73}Br ε decay.
517.3[#] *3*	≈3[#]	2949.90	(19/2$^-$)	2432.72	17/2$^-$			
532.2 *1*	6.1 *3*	724.61	(7/2$^+$)	192.41	(5/2$^+$)	(M1+E2)	−1.1 *2*	A_2=−0.73 *1*; A_4=0.09 *1* A_2=−0.63 *13*; A_4=+0.12 *17* (1976Ze05) POL=+0.18 *4*. I_γ: 6.6 *4* (1976Ze05).
537.6 *3*	≈1	2089.95	13/2$^-$	1552.48	13/2$^-$			POL=0.0 *1*.
545.4 *3*	1.2 *1*	1230.19	(9/2$^-$)	684.93	(5/2$^-$)	(E2+M3)	+0.6 *+3−4*	A_2=+0.30 *5*; A_4=0.00 *6* POL=+0.26 *9*.
550.1[‡] *5*	1[‡]	640.8	(1/2$^-$,3/2)	90.62	(1/2,3/2)$^-$			E_γ: 551 *1* (1991Se11).
551.8 *3*	1.7 *1*	1356.35	9/2$^-$	804.79	9/2$^-$	M1(+E2)	0.0 *3*	A_2=+0.21 *6*; A_4=−0.10 *7* POL=+0.3 *1*.
565.3 *4*	2.3 *2*	1356.35	9/2$^-$	790.72	5/2$^-$	E2		A_2=+0.26 *4*; A_4=−0.05 *5* POL=+0.1 *1*.
571.1[#] *1*	1.1[#] *2*	3003.82	(17/2$^-$)	2432.72	17/2$^-$			POL=−0.1 *1*.
574.0[a] *8*	6 *1*	1572.53	13/2$^+$	999.23	11/2$^+$	M1+E2		A_2=−0.74 *7*; A_4=+0.17 *10* A_2=−0.28 *13*; A_4=+0.11 *18* (1976Ze05) POL=−0.11 *4*. I_γ: 6.2 *3* (1976Ze05).
601.9 *7*	3.5 *9*	1572.53	13/2$^+$	971.09	13/2$^+$	M1+E2	+1.1 *+2−1*	A_2=+0.28 *1* POL=−0.11 *4*.
614.9[‡&] *6*	5.85[‡] *25*	640.8	(1/2$^-$,3/2)	25.71	3/2$^-$			
624.2 *2*	0.9 *2*	2638.5	(17/2$^+$)	2014.3	17/2$^+$			A_2=+0.53 *3*
629.8 *2*	1.4 *2*	1572.53	13/2$^+$	942.72	11/2$^+$	(M1+E2)	+0.2 *1*	A_2=+0.2 *1*; A_4=+0.1 *1* POL=−0.1 *3*.
639.3[d] *3*	≈21[d@]	639.22	9/2$^+$	0.0	9/2$^+$	D+Q	+0.04 *3*	A_2=+0.35 *1*; A_4=+0.02 *2* A_2=+0.39 *4*; A_4=+0.05 *6* (1976Ze05) POL=+0.59 *2*. I_γ: 22.3 *8* (1976Ze05) for doublet.

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

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

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	δ[b]	Comments
639.3[d] *3*	≈3[d]	790.72	5/2$^-$	151.25	5/2$^-$			
653.5 *2*	37.5 *6*	804.79	9/2$^-$	151.25	5/2$^-$	E2		A_2=+0.31 *1*; A_4=−0.08 *1* A_2=+0.36 *4*; A_4=+0.05 *5* (1976Ze05) POL=+0.56 *2*. I_γ: 32.3 *11* (1976Ze05) for doublet. δ(M3/E2)=−0.01 *1*.
658.7[e] *2*	2.5 *2*	684.93	(5/2$^-$)	26.30	(3/2$^-$)	D+Q	−0.35 *+8−9*	A_2=−0.53 *2*; A_4=+0.09 *2* Tentatively placed to feed 26.30 level. POL=−0.08 *7*.
665.2 *3*	2.2 *3*	3097.9	19/2$^-$	2432.72	17/2$^-$	D+Q	−0.4 *1*	A_2=−0.34 *7*; A_4=+0.02 *8* POL=0.0 *1*.
674.1 *2*	29.7 *7*	1179.59	11/2$^-$	505.49	7/2$^-$	E2		A_2=+0.33 *1*; A_4=−0.08 *1* A_2=+0.37 *4*; A_4=−0.01 *5* (1976Ze05) POL=+0.64 *2*. δ(E3/M2)=−0.01 *1*. I_γ: 25.5 *9* (1976Ze05).
698.2[‡] *7*	4.0[‡] *20*	788.8	(1/2$^-$,3/2$^-$)	90.62	(1/2,3/2)$^-$			E_γ: 699 *1* (1991Se11).
703.7 *2*	9.5 *7*	999.23	11/2$^+$	295.40	7/2$^+$	E2		A_2=+0.26 *2*; A_4=−0.04 *2* A_2=+0.51 *16*; A_4=−0.19 *22* (1976Ze05) POL=+0.81 *9*. I_γ: 4.4 *3* (1976Ze05) for doublet. δ(M3/E2)=−0.01 *3*.
724.7[d] *3*	≈5[d@]	724.61	(7/2$^+$)	0.0	9/2$^+$			A_2=−0.29 *2*; A_4=+0.04 *3* A_2=−0.16 *7*; A_4=−0.13 *10* (1976Ze05) POL=−0.15 *3*. I_γ: 11.3 *3* (1976Ze05) for doublet.
724.7[d] *3*	≈6[d]	1230.19	(9/2$^-$)	505.49	7/2$^-$			
733.5 *2*	3.6 *2*	2089.95	13/2$^-$	1356.35	9/2$^-$	E2		A_2=+0.26 *4*; A_4=−0.04 *5* POL=+0.5 *1*. δ(M3/E2)=−0.01 *+5−4*.
747.7 *1*	25.2 *5*	1552.48	13/2$^-$	804.79	9/2$^-$	E2		A_2=+0.29 *1*; A_4=−0.08 *2* A_2=+0.23 *7*; A_4=−0.16 *9* (1976Ze05) POL=+0.54 *1*. I_γ: 20.0 *9* (1976Ze05). δ(M3/E2)=−0.02 *1*.
765.0[#] *2*	≈2[#@]	790.72	5/2$^-$	25.71	3/2$^-$	(M1+E2)	−0.6 *+2−3*	A_2=−0.34 *3*; A_4=+0.10 *4* POL=+0.02 *7*.
779.5 *1*	6.3 *9*	2009.68	(13/2$^-$)	1230.19	(9/2$^-$)	E2		A_2=+0.21 *2*; A_4=−0.09 *2* POL=+0.68 *2*. δ(M3/E2)=−0.03 *+3−1*.
796.4 *2*	7.7 *4*	1091.80	(9/2)	295.40	7/2$^+$	D+Q	−0.40 *+9−14*	A_2=−0.53 *2*; A_4=+0.04 *3*

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

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

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	δ[b]	Comments
								A_2=−0.22 *9*; A_4=+0.04 *11* (1976Ze05) POL=−0.03 *7*. I_γ: 11.9 *6* (1976Ze05) for doublet.
822.8 *2*	18 *2*	2002.44	15/2$^-$	1179.59	11/2$^-$	E2		A_2=+0.33 *2*; A_4=−0.09 *4* A_2=+0.60 *11*; A_4=−0.09 *14* (1976Ze05) POL=+0.78 *3*. I_γ: 9.3 *5* (1976Ze05). δ(M3/E2)=+0.01 *1*.
829.9[da] *3*	≈3[d@]	1230.19	(9/2$^-$)	400.34	(5/2$^-$)			A_2=−0.06 *2*; A_4=−0.06 *2* POL=−0.30 *9*. I_γ: 6.0 *20* (1976Ze05) for the doublet.
829.9[da] *3*	≈2[d@]	2009.68	(13/2$^-$)	1179.59	11/2$^-$			
839.7 *3*	0.6 *1*	1564.47		724.61	(7/2$^+$)			A_2=+0.5 *1*; A_4=−0.2 *1*
848 *1*		938.6	(1/2$^-$,3/2$^-$)	90.62	(1/2,3/2)$^-$			
850.6[#] *3*	3.4[#] *8*	1356.35	9/2$^-$	505.49	7/2$^-$	D+Q	−0.3 *+2−3*	A_2=−0.49 *7*; A_4=+0.06 *9* POL=−0.1 *2*.
858.8[d#] *4*	≈1[d#]	2868.5	(17/2$^-$)	2009.68	(13/2$^-$)			A_2=−0.11 *1*
858.8[d] *4*	≈1[d]	2872.8	(19/2$^+$)	2014.3	17/2$^+$			
863.8[#] *5*	5[#] *1*	1862.63	15/2$^+$	999.23	11/2$^+$	(Q)		A_2=+0.30 *5*
880.1[#] *2*	13[#] *4*	2432.72	17/2$^-$	1552.48	13/2$^-$	E2		A_2=+0.5 *2* POL=+0.28 *4*.
891.4 *2*	8 *2*	1862.63	15/2$^+$	971.09	13/2$^+$	M1+E2	−0.27 *+3−5*	A_2=−0.80 *2* POL=−0.10 *4*.
910.4 *4*	≈2	2089.95	13/2$^-$	1179.59	11/2$^-$			
913.8[#] *4*	[#]	3003.82	(17/2$^-$)	2089.95	13/2$^-$			
919.8 *3*	3.2 *2*	1862.63	15/2$^+$	942.72	11/2$^+$	Q		A_2=+0.21 *5*; A_4=−0.12 *7* POL=+0.3 *3*.
925.4 *3*	3.2 *3*	1564.47		639.22	9/2$^+$			A_2=+0.46 *5*; A_4=+0.17 *6* POL=−0.3 *1*.
931 *1*		1021.6	(1/2$^-$,3/2$^-$)	90.62	(1/2,3/2)$^-$			
933.1[d] *3*	≈4[d@]	1572.53	13/2$^+$	639.22	9/2$^+$			A_2=+0.04 *2*; A_4=−0.07 *2* POL=+0.2 *1*.
933.1[d] *3*	≈2[d]	2485.6		1552.48	13/2$^-$			
942.7 *2*	19 *2*	942.72	11/2$^+$	0.0	9/2$^+$	M1+E2	+2.2 *+2−1*	A_2=+0.51 *3*; A_4=+0.29 *3* POL=−0.32 *3*.
947.4 *2*	5.6 *7*	2949.90	(19/2$^-$)	2002.44	15/2$^-$			POL=+0.32 *6*.
961.4 *3*	3.3 *3*	1932.5		971.09	13/2$^+$			A_2=+0.09 *7*
971.0 *2*	48 *3*	971.09	13/2$^+$	0.0	9/2$^+$	E2		A_2=+0.30 *3*; A_4=−0.08 *4* A_2=+0.40 *5*; A_4=−0.09 *6* (1976Ze05)

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

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

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[b]	δ[b]	Comments
								POL=+0.70 *2*. δ(M3/E2)=+0.03 *3*. I_γ: 44.7 *5* (1976Ze05) for doublet.
973.9 *4*	2.4 *5*	1698.5		724.61	(7/2$^+$)			
986.0 *4*	0.5 *2*	3854.5		2868.5	(17/2$^-$)			
999.6[d] *4*	≈15[d@]	999.23	11/2$^+$	0.0	9/2$^+$	D+Q	−0.07 *+1−3*	A_2=−0.36 *3*; A_4=+0.07 *4* A_2=+0.23 *7*; A_4=+0.04 *10* (1976Ze05) POL=−0.26 *4*. I_γ: 26.5 *4* (1976Ze05) for doublet.
999.6[d] *4*	≈2[d]	1295.0		295.40	7/2$^+$			
1001.4[#] *4*	≈2[#]	3003.82	(17/2$^-$)	2002.44	15/2$^-$			
1007.9[#] *4*	5[#] *1*	3440.6	(21/2$^-$)	2432.72	17/2$^-$	(E2)		A_2=+0.51 *6*
1009.1[#] *7*	4[#] *1*	2872.8	(19/2$^+$)	1862.63	15/2$^+$			A_2=+0.20 *3*
1043.8 *4*	24 *4*	2014.3	17/2$^+$	971.09	13/2$^+$	E2		A_2=+0.23 *3* POL=+0.60 *3*. I_γ: 12.2 *14* (1976Ze05).
1061.9[d#] *4*	≈1[d#@]	2626.4		1564.47				A_2=+0.4 *1*; A_4=−0.1 *1* POL=+0.6 *3*.
1061.9[d] *4*	≈1[d]	4011.8	(23/2$^-$)	2949.90	(19/2$^-$)			
1065.8 *3*	3 *1*	2638.5	(17/2$^+$)	1572.53	13/2$^+$			POL=0.4 *2*.
1078.3[a] *3*	3 *1*	1883.1	(11/2$^-$)	804.79	9/2$^-$	M1(+E2)	+0.06 *+5−6*	A_2=−0.13 *4*; A_4=+0.09 *5* POL=−0.3 *1*. I_γ: 2.7 *7* (1976Ze05).
1095.4 *4*	4.0 *6*	3097.9	19/2$^-$	2002.44	15/2$^-$	E2		A_2=+0.18 *4*; A_4=−0.04 *5* POL=+0.5 *1*. δ(M3/E2)=−0.06 *+10−5*.
1098.5 *3*	2.2 *6*	2041.2	(13/2$^+$)	942.72	11/2$^+$	D		A_2=−0.35 *9*; A_4=+0.1 *1*
1156.1 *4*	4 *1*	3170.4	(21/2$^+$)	2014.3	17/2$^+$			A_2=+0.25 *8*
1188.7[#] *4*	2.0[#] *8*	3203.0		2014.3	17/2$^+$			A_2=+0.52 *6*
1210.7[#] *3*	5[#] *1*	2210.00	(15/2$^+$)	999.23	11/2$^+$			A_2=+0.05 *3*; A_4=+0.02 *4*
1238.4 *4*	2.7 *5*	2210.00	(15/2$^+$)	971.09	13/2$^+$			A_2=+0.6 *1*
1267.6 *3*	4 *1*	2210.00	(15/2$^+$)	942.72	11/2$^+$			A_2=+0.16 *4*; A_4=+0.02 *5*
1288.8 *3*	1.0 *3*	3303.1		2014.3	17/2$^+$	D		A_2=−0.46 *6*
1324.7 *3*	3.1 *5*	2267.4		942.72	11/2$^+$			A_2=−0.50 *5*; A_4=+0.11 *6*

[†] From Eα=20 MeV (1991Se11), unless otherwise stated.

[‡] From 1976Ze05 at 18 MeV. The uncertainty in 1976Ze05 is quoted as 0.1 keV, but a paper on ^{77}Se by the same group (1976Ze03) and using a similar detector system as for ^{73}Se quoted an uncertainty of 0.1%. In the opinion of the evaluator, the latter is more realistic, and thus assigned.

$^{73}_{34}Se_{39}$-8

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)

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

[#] May include contributions from impurities.
[@] Estimated from $\gamma\gamma$ coin (1991Se11).
[&] γ not reported by 1991Se11; but seen in ^{73}Br ε decay.
[a] Placement is adopted from 1991Se11; different placement is proposed in 1976Ze05.
[b] From $\gamma(\theta)$ and/or γ(lin pol); RUL for E2 and M2 used when level lifetime is known.
[c] 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.
[d] Multiply placed with intensity suitably divided.
[e] Placement of transition in the level scheme is uncertain.

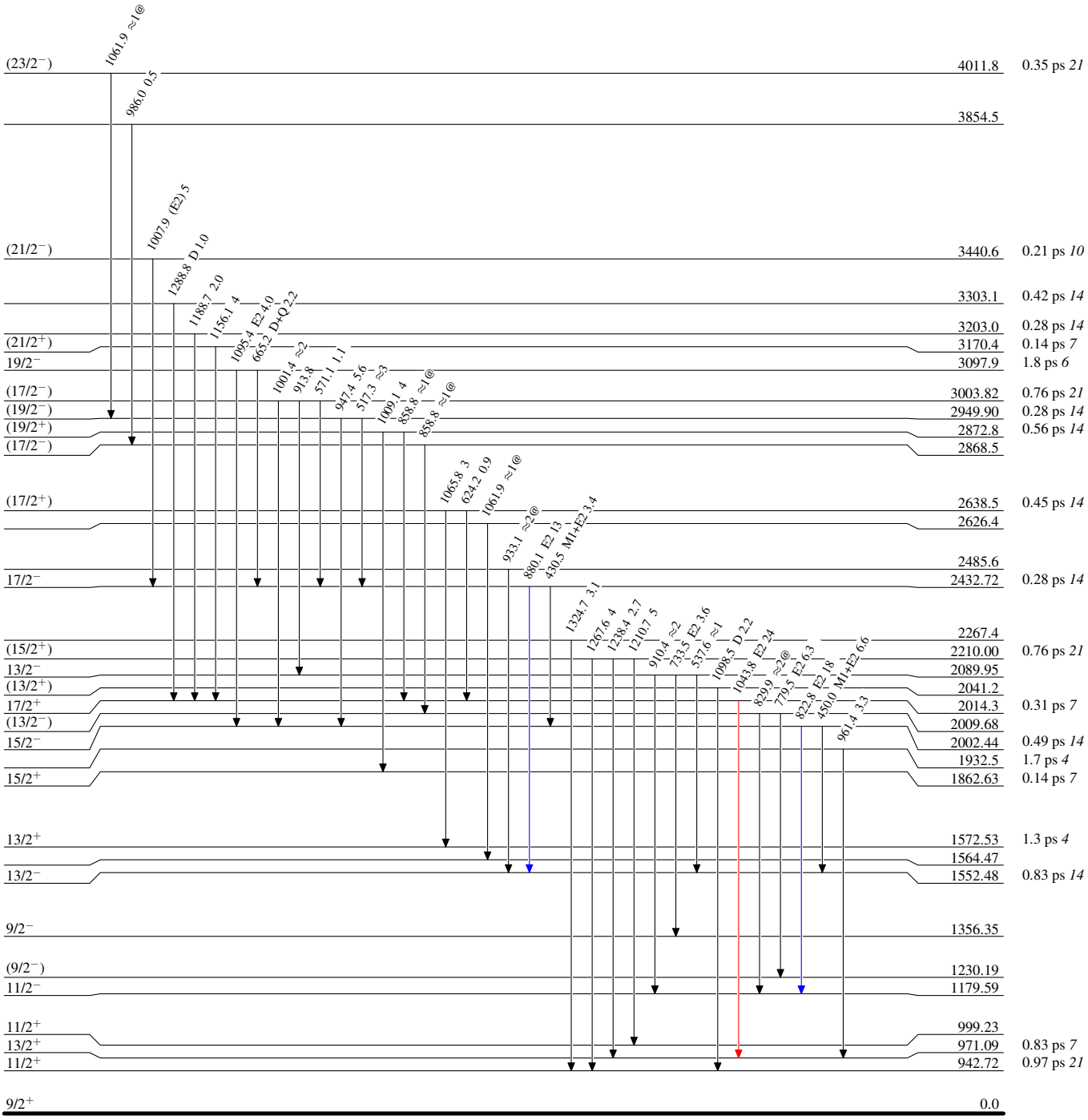
$^{73}_{34}Se_{39}$-9

^{70}Ge(α,nγ) **1991Se11,1976Ze05**

Level Scheme

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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



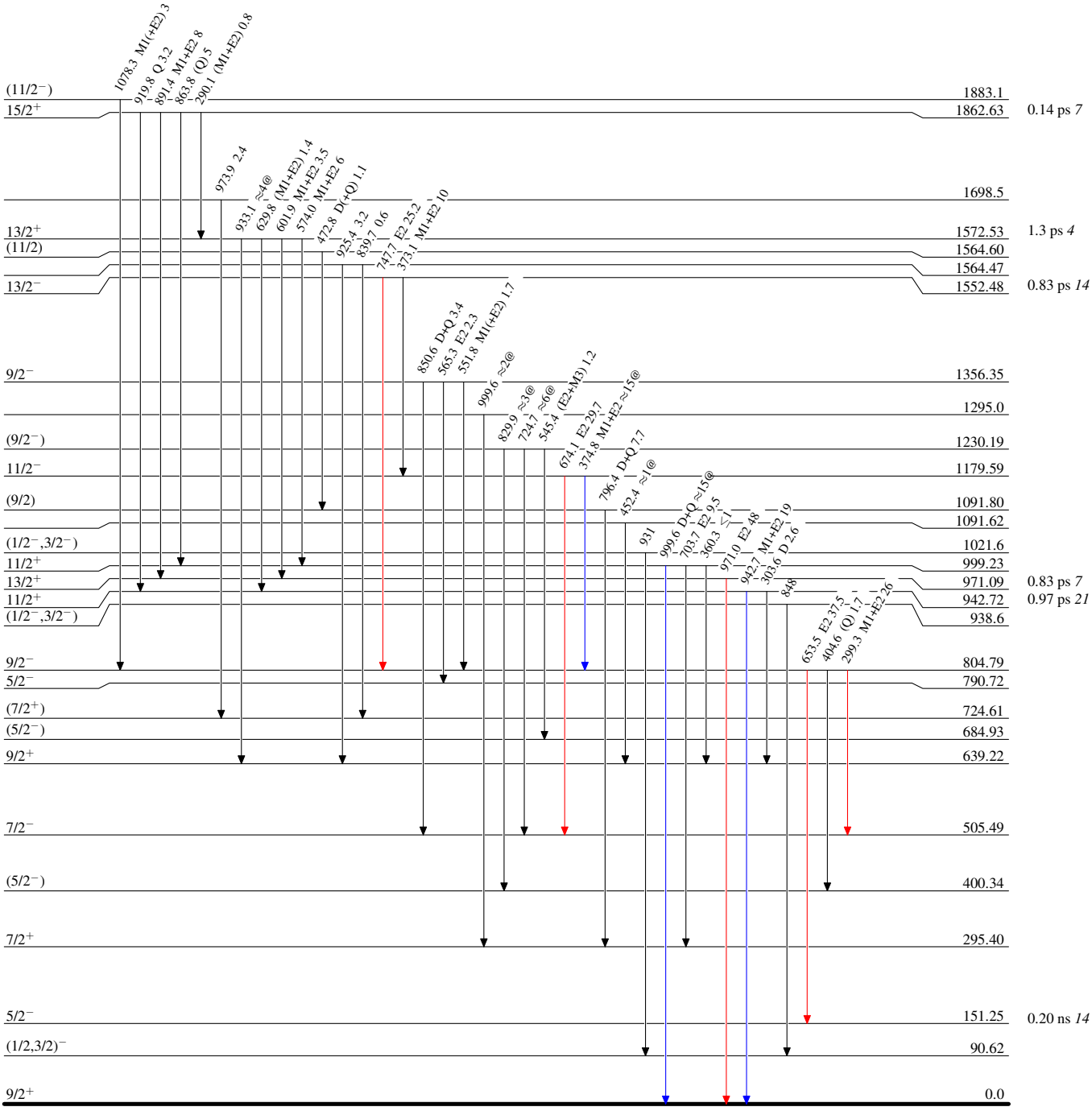
$^{73}_{34}Se_{39}$

^{70}Ge(α,nγ) 1991Se11,1976Ze05

Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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

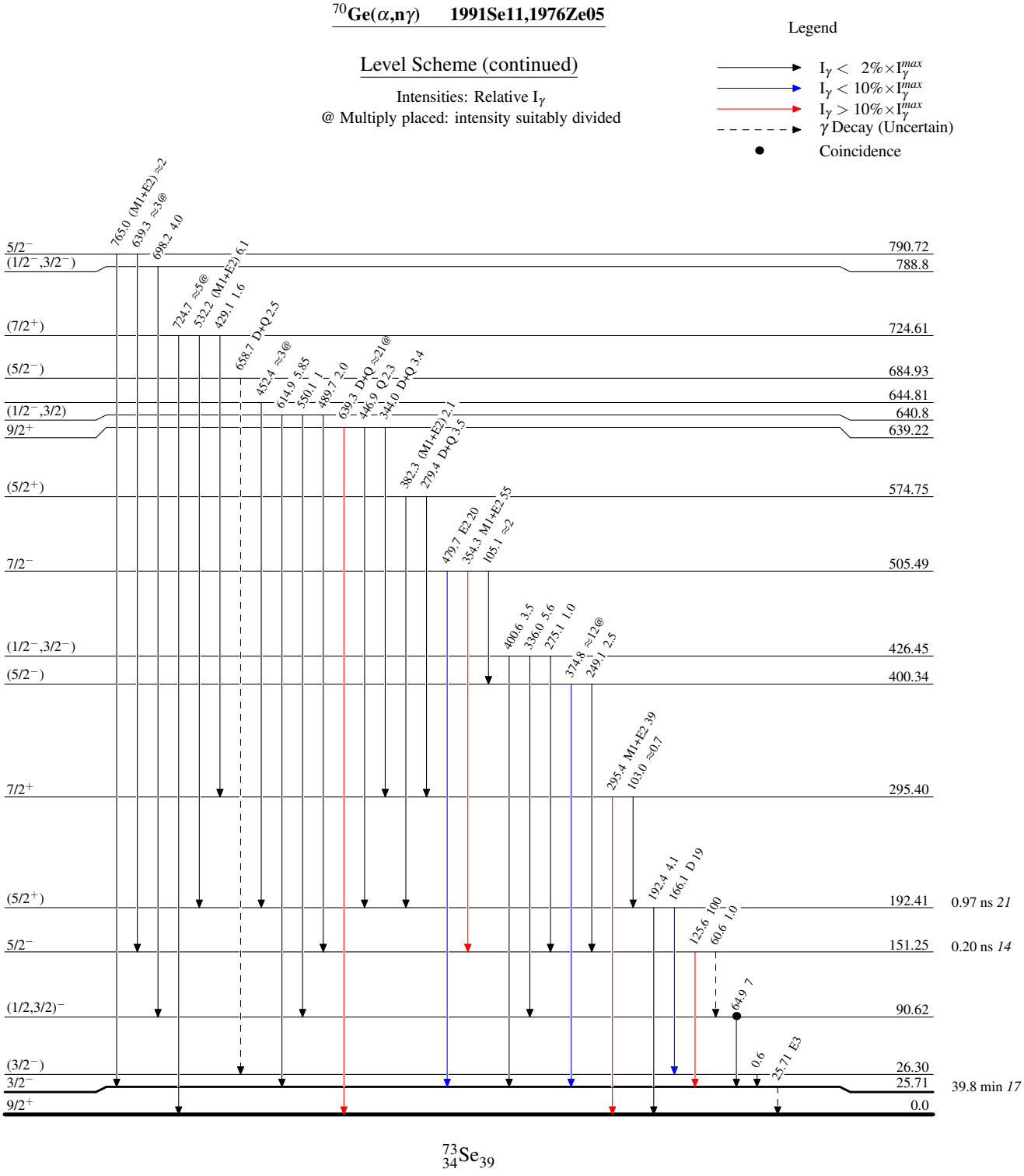


$^{73}_{34}Se_{39}$

^{70}Ge(α,nγ) 1991Se11,1976Ze05

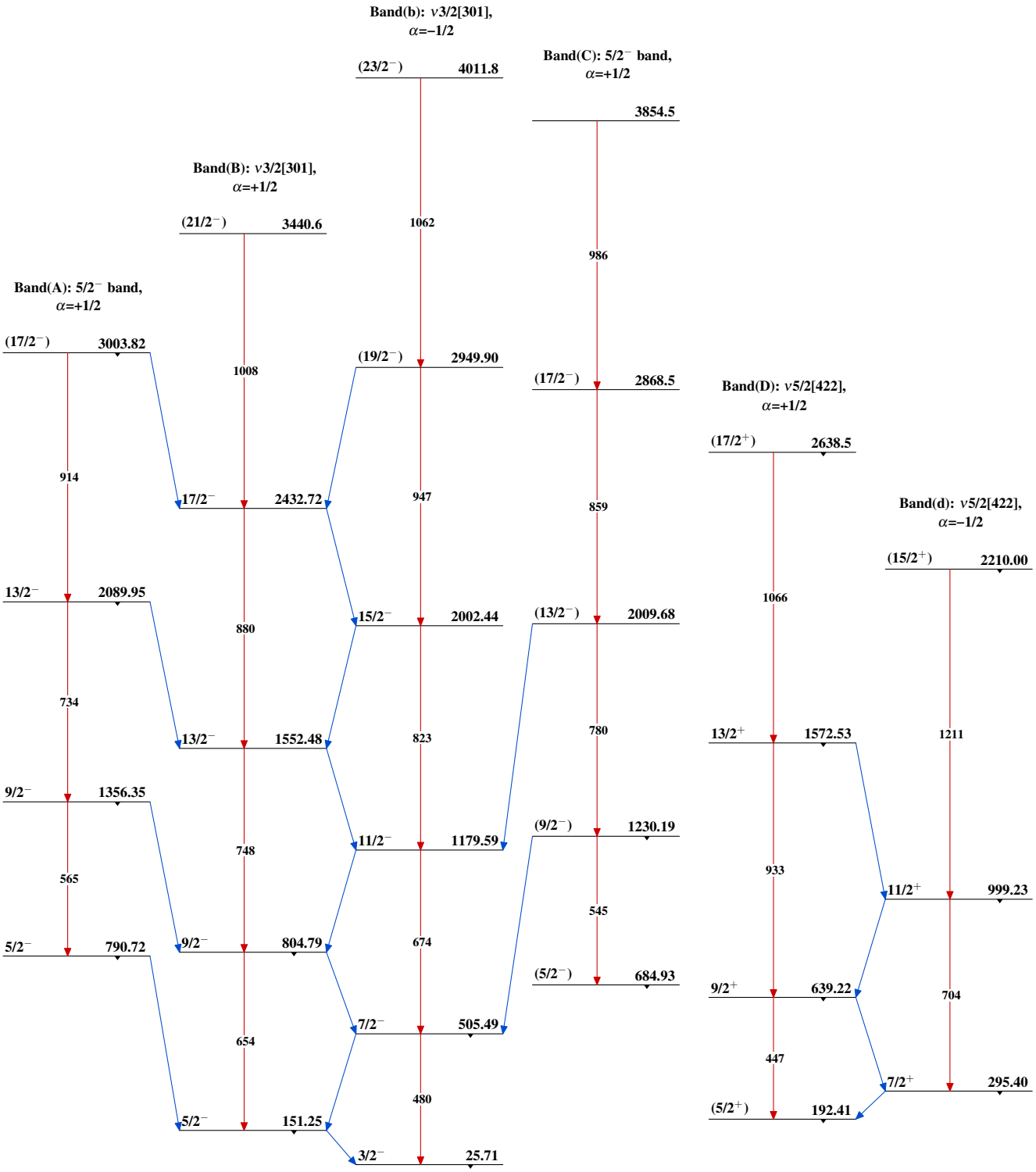
Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided



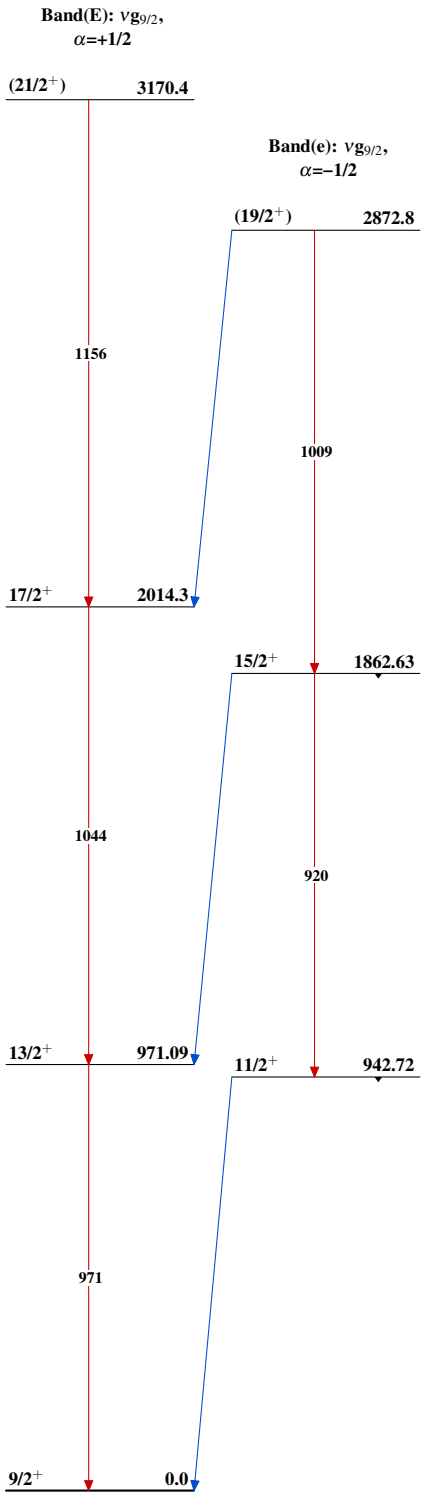
$^{73}_{34}Se_{39}$

^{70}Ge(α,nγ) 1991Se11,1976Ze05



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

^{70}Ge(α,nγ) 1991Se11,1976Ze05 (continued)



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