^{72}Ge(p,nγ):set 1 1979Te06,1976Ki12,1975Be32

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 111,1 (2010)	1-May-2009

E=6.5 and 14 MeV, measured $\gamma(\theta)$, $\gamma\gamma$, σ(E(p)) at 6.5 MeV and $T_{1/2}$ $_{1/2}$ values (1979Te06).
E=5.0-6.3 MeV, measured Ice, $\sigma(\theta)$ (1976Ki12).
E=5.2-6.0 MeV, measured $\gamma\gamma$, $\gamma\gamma$-delay, $\gamma(\theta$,H,t), neutron tof spectra. $T_{1/2}$ $_{1/2}$ and g-factor have been determined (1975Be32).
Other: 1974Mo19.
The decay scheme is based mainly on 1979Te06 and 1976Ki12.

^{72}As Levels

E(level)	J^π	$T_{1/2}$ †	Comments
0	2^-		
45.81 *5*	1^+		
213.71 *6*	3^+	85 ns *5*	g=+0.527 *6* (1975Be32) $T_{1/2}$: averaged from 1975Be32 and 1979Te06.
288.43 *6*	$(2)^+$	2 ns *1*	Iγ(288γ)/Iγ(74.7γ)=1.1 *3* at 14 MeV, and 2.6 *7* at 6.5 MeV.
298.21 *12*	(5)		
309.81 *6*	4^-	33 ns *2*	
318.34 *8*	(4^+)	27 ns *1*	Iγ(104γ)/Iγ(318γ)=14 *4* at 14 MeV, but 26 *10* at 6.5 MeV.
356.70 *20*			
362.87 *8*	$5^{(-)}$		
379.91 *11*			
389.89 *18*	$0^+,1^+,2^+$		J^π: 2^+ is favored from cross section enhancement (1976Ki12).
414.35 *6*	$(3)^+$		
438.76 *7*			E(level): probably a doublet from spin consideration of decay mode.
440.00 *8*	$(3)^+$		
482.51 *11*			
484.3?			
501.39 *7*	(2^+)		
514.11 *11*	$(1)^+$		
525.46 *8*	(3^-)		
559.09 *8*			
563.34 *12*	$7^{(-)}$	89 ns *2*	J^π: 7^- from Hauser-Feshbach calculations for (p,nγ) (1979Te06).
565.36 *8*	$1^+,2^+$		E(level): probably a doublet from spin consideration of decay mode.
586.41 *8*	(3)		J^π: from $\gamma(\theta)$, 1979Te06. (1^-) in 1976Ki12 from σ(E(p)).
593.68 *8*	$(4)^-$		
624.76 *9*	$(1^+,2^+,3^+)$		
644.67 *10*			
650.26 *9*			
663.08 *13*			
673.66 *8*	(2)		
708.18 *22*			
729.83 *10*			
732.40 *20*			
743.09 *12*			
745.38 *13*			
747.03 *21*			
794.08 *22*			
800.0 *3*			
802.15 *9*			Iγ(276γ)/Iγ(387γ)=0.39 *4* at 14 MeV, and 1.4 *4* at 6.5 MeV.
813.54 *13*			
828.73 *15*	$(6^+,7^-)$		
834.71 *14*	$6^{(-)}$		
837.93 *12*			
841.52 *9*			

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^{72}Ge(p,nγ):set 1 1979Te06,1976Ki12,1975Be32 (continued)

^{72}As Levels (continued)

E(level)	E(level)	J$^{\pi}$	E(level)
866.95 *11*	982.24 *23*	8$^{(+)}$	1115.8?
903.46 *12*	1034.03 *18*		1179.53 *18*
966.93 *21*	1067.96 *22*		1307.3 *3*

† From delayed coincidences (1979Te06), except where noted.

γ(^{72}As)

For δ values deduced from α measurements, see Adopted Levels.

E$_{\gamma}$[†]	I$_{\gamma}$[†‡]	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$	Mult.[&]	α[a]	Comments
45.8 *1*	125 *3*	45.81	1$^+$	0	2$^-$			
53.1 *1*	72 *2*	362.87	5$^{(-)}$	309.81	4$^-$			
74.7 *1*	4 *1*	288.43	(2)$^+$	213.71	3$^+$			
76.0 *1*	1.2 *1*	438.76		362.87	5$^{(-)}$			
84.5 *1*	1.8 *1*	298.21	(5)	213.71	3$^+$			
96.1 *1*	100	309.81	4$^-$	213.71	3$^+$	D		α(K)exp=0.087 *12*; LM/K=0.106 *23*.
104.6 *1*	20.0 *3*	318.34	(4$^+$)	213.71	3$^+$	(M1)		α(K)exp=0.073 *14*; LM/K=0.13 *4*. Mult.: M1 more probable than E1 from α(exp).
121.6 *1*	0.3 *1*	440.00	(3)$^+$	318.34	(4$^+$)			
123.3 *1*	1.0 *1*	624.76	(1$^+$,2$^+$,3$^+$)	501.39	(2$^+$)	M1+E2		α(K)exp=0.92 *15*; LM/K=0.11 *3*.
144.7 *1*	5.4 *2*	559.09		414.35	(3)$^+$			
149.4 *1*	1.5 *1*	743.09		593.68	(4)$^-$			
167.9 *1*	97 *2*	213.71	3$^+$	45.81	1$^+$	E2	0.116	α(K)=0.1005; α(L)=0.01171 α(K)exp=0.137 *20*; LM/K=0.18 *4*. Mult.: quadrupole from α(exp). M2 ruled out by parity deduced from E1 of 213.7γ and level $T_{1/2}$ 1/2.
179.4 *1*	3.6 *2*	593.68	(4)$^-$	414.35	(3)$^+$			
200.5 *1*	20 *1*	563.34	7$^{(-)}$	362.87	5$^{(-)}$			
205.3 *1*	5 *1*	1034.03		828.73	(6$^+$,7$^-$)			
210.5 *2*	0.8 *3*	650.26		440.00	(3)$^+$			
213.0 *2*	2 *1*	501.39	(2$^+$)	288.43	(2)$^+$			
213.7 *1*	80 *2*	213.71	3$^+$	0	2$^-$	E1	0.00787	α(K)=0.00692; α(L)=0.00071 α(K)exp=0.0077 *11*.
215.5 *2*	7 *1*	525.46	(3$^-$)	309.81	4$^-$			
226.3 *1*	1 *1*	440.00	(3)$^+$	213.71	3$^+$	M1	0.01069	α(K)=0.00937; α(L)=0.00099 α(K)exp=0.0101 *15*. α(K)exp: if 213.7γ is E1.
229.8 *1*	4 *2*	903.46		673.66	(2)			
230.7 *1*	4 *2*	593.68	(4)$^-$	362.87	5$^{(-)}$			
242.6 *1*	24[@] *7*	288.43	(2)$^+$	45.81	1$^+$	M1+E2		I$_{\gamma}$: Iγ(242.6γ)=31−Iγ(242.9γ). α(K)exp=0.0103 *15*; LM/K=0.18 *4*.
242.9 *3*	7[@] *7*	802.15		559.09				I$_{\gamma}$: from Iγ(242.9γ)≤ΣIγ(from 559 level).
265.4 *1*	4.9 *3*	828.73	(6$^+$,7$^-$)	563.34	7$^{(-)}$			
271.4 *1*	4.2 *5*	834.71	6$^{(-)}$	563.34	7$^{(-)}$			
273.3 *2*	2.7 *4*	1307.3		1034.03				
276.6 *1*	3.0 *3*	802.15		525.46	(3$^-$)			
283.8 *3*	<10[@]	673.66	(2)	389.89	0$^+$,1$^+$,2$^+$			

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^{72}Ge(p,nγ):set 1 1979Te06,1976Ki12,1975Be32 (continued)

γ(^{72}As) (continued)

E_γ[†]	I_γ[†‡]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&]	α[a]	Comments
283.9 *1*	<10	593.68	(4)$^-$	309.81	4$^-$	M1+E2		α(K)exp=0.00101 *18*.
288.4 *1*	4.2 *4*	288.43	(2)$^+$	0	2$^-$			
300.2 *1*	13 *1*	663.08		362.87	5$^{(-)}$			
309.9 *1*	<46[@]	309.81	4$^-$	0	2$^-$	E2	0.0125	α(K)=0.01091; α(L)=0.00120 α(K)exp=0.0127 *21*.
310.9 *10*	<46[@]	356.70		45.81	1$^+$			
318.6 *3*	1.4 *4*	318.34	(4$^+$)	0	2$^-$			
332.0 *1*	<1	650.26		318.34	(4$^+$)			
334.1 *1*	1.3 *3*	379.91		45.81	1$^+$			
336.4 *1*	1.0 *3*	624.76	(1$^+$,2$^+$,3$^+$)	288.43	(2)$^+$			
344.1 *2*	10 *1*	389.89	0$^+$,1$^+$,2$^+$	45.81	1$^+$	M1	0.0038	α(K)=0.00334; α(L)=0.00035 α(K)exp=0.0038 *6*; LM/K=0.13 *4*.
345.3 *2*	8.5 *12*	708.18		362.87	5$^{(-)}$			
350.8 *1*	5.8 *12*	1179.53		828.73	(6$^+$,7$^-$)			
356.7 *2*	1.6 *4*	356.70		0	2$^-$			
361.7 *1*	8.9 *4*	650.26		288.43	(2)$^+$			
379.6 *3*	<10.3[@]	794.08		414.35	(3)$^+$			
380.3 *3*	<10.3[@]	743.09		362.87	5$^{(-)}$			
382.5 *1*	5.0 *4*	745.38		362.87	5$^{(-)}$			
387.9 *1*	7.7 *7*	802.15		414.35	(3)$^+$			
392.9 *1*	1.9 *7*	438.76		45.81	1$^+$			
401.4 *1*	5.1 *6*	841.52		440.00	(3)$^+$			
414.6 *1*	37 *1*	414.35	(3)$^+$	0	2$^-$	E1	0.00125	α(K)=0.00110; α(L)=0.00011 α(K)exp=0.00095 *21*.
418.9[bc] *2*	<4.6[b]	903.46		484.3?				
418.9[b] *2*	<4.6[b]	982.24	8$^{(+)}$	563.34	7$^{(-)}$			
420.1 *1*	3.0 *6*	729.83		309.81	4$^-$			
427.3 *1*	3.1 *4*	841.52		414.35	(3)$^+$			
436.7 *1*	12.1 *6*	482.51		45.81	1$^+$			
438.7 *1*	4.4 *9*	438.76		0	2$^-$			
452.5 *2*	1.8 *5*	866.95		414.35	(3)$^+$			
455.5 *1*	4.7 *5*	501.39	(2$^+$)	45.81	1$^+$	D		α(K)exp=0.0014 *3*. Mult.: M1 preferred to E1 by α(K)exp.
458.6 *2*	<0.6	747.03		288.43	(2)$^+$			
465.4[c] *1*	<20[@]	1115.8?		650.26				
465.8 *4*	<20[@]	828.73	(6$^+$,7$^-$)	362.87	5$^{(-)}$			
468.3 *1*	<1.0	514.11	(1)$^+$	45.81	1$^+$	M1+E2		α(K)exp=0.0020 *4*.
471.7 *2*	3 *1*	834.71	6$^{(-)}$	362.87	5$^{(-)}$			
484.3[c] *2*	2 *4*	484.3?		0	2$^-$			
495.2 *1*	2.3 *5*	813.54		318.34	(4$^+$)			
501.4 *1*	5.0 *6*	501.39	(2$^+$)	0	2$^-$			
504.1 *1*	5 *1*	866.95		362.87	5$^{(-)}$			
519.7 *1*	8 *1*	565.36	1$^+$,2$^+$	45.81	1$^+$	M1+E2		α(K)exp=0.0017 *3*.
525.4 *1*	10 *1*	525.46	(3$^-$)	0	2$^-$			
531.5 *3*	<2	841.52		309.81	4$^-$			
533.5[#c] *10*		747.03		213.71	3$^+$			
540.6 *1*	<2	586.41	(3)	45.81	1$^+$			
542.5 *2*	<2	1067.96		525.46	(3$^-$)			
549.5 *1*	2.4 *6*	837.93		288.43	(2)$^+$			
559.1 *1*	8.5 *6*	559.09		0	2$^-$			
565.2 *1*	8.6 *6*	565.36	1$^+$,2$^+$	0	2$^-$			
586.4 *1*	8 *1*	586.41	(3)	0	2$^-$			
598.9 *1*	11 *1*	644.67		45.81	1$^+$			

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^{72}Ge(p,nγ):set 1 1979Te06,1976Ki12,1975Be32 (continued)

γ(^{72}As) (continued)

E_γ[†]	I_γ[†‡]	E_i(level)	J^π_i	E_f	J^π_f	E_γ[†]	I_γ[†‡]	E_i(level)	J^π_i	E_f	J^π_f
615.0 *3*	<1.5	903.46		288.43	(2)$^+$	701.0[#c] *4*		747.03		45.81	1$^+$
627.8 *1*	8 *2*	673.66	(2)	45.81	1$^+$	729.5 *2*	3.9 *7*	729.83		0	2$^-$
644.5 *2*	<1	644.67		0	2$^-$	732.4 *2*	<1	732.40		0	2$^-$
673.7 *1*	5.5 *7*	673.66	(2)	0	2$^-$	794.2 *3*	2.5 *9*	794.08		0	2$^-$
678.5 *2*	<1	966.93		288.43	(2)$^+$	800.0 *3*	<1.0	800.0		0	2$^-$

[†] At E=14 MeV (1979Te06), except as noted.

[‡] An alternate set of Iγ is given for E=6.5 MeV. Discrepancies in branchings between the two sets are pointed out in comments in the levels listing.

[#] Observed in 1976Ki12 only, not seen in 1979Te06.

[@] Part of a doublet.

[&] From α(K)exp, α(exp) (1976Ki12).

[a] 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.

[b] Multiply placed with undivided intensity.

[c] Placement of transition in the level scheme is uncertain.

^{72}Ge(p,nγ):set 1 1979Te06,1976Ki12,1975Be32

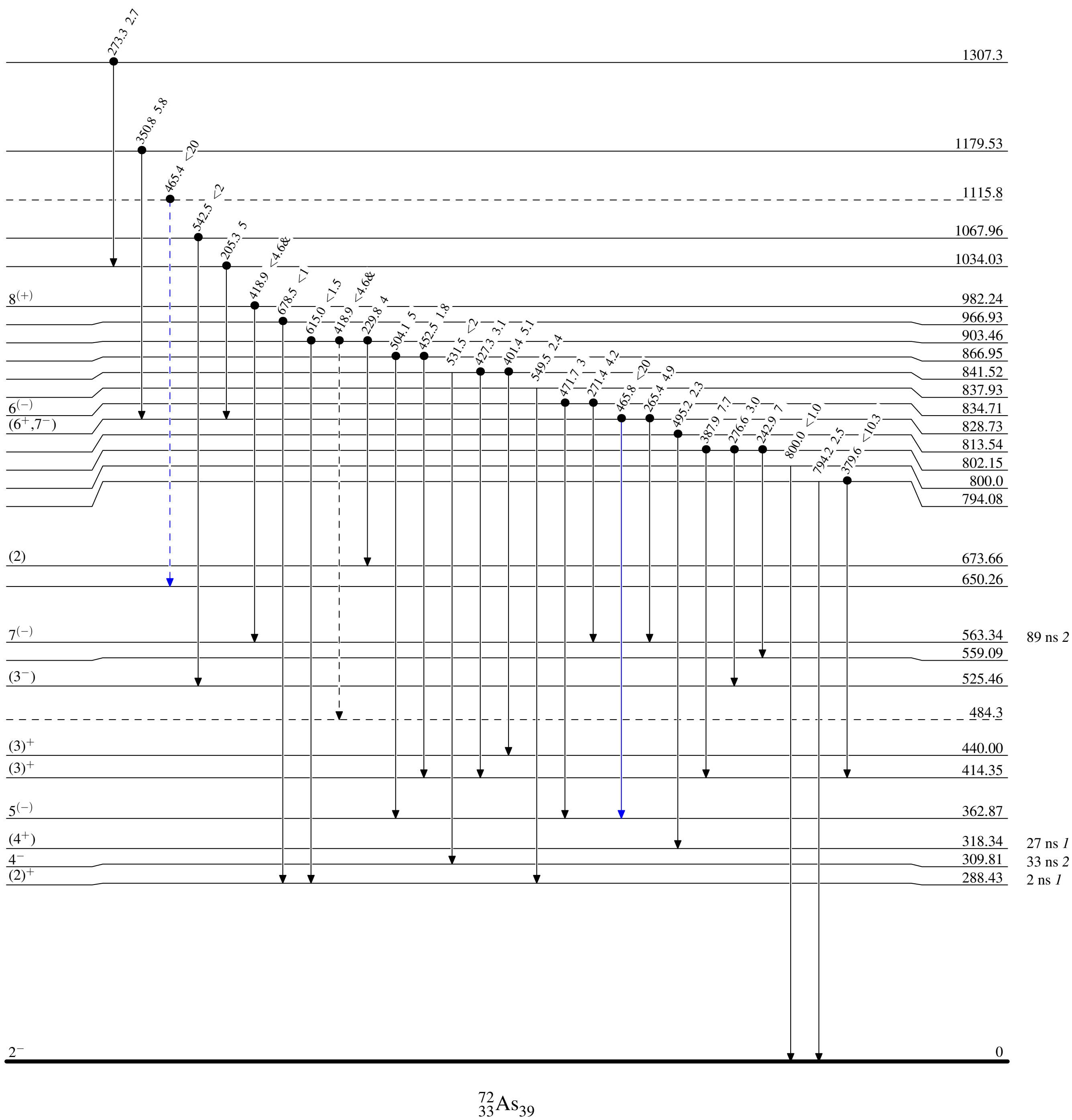
Level Scheme

Intensities: Relative I_γ

& Multiply placed: undivided intensity given

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)
- Coincidence



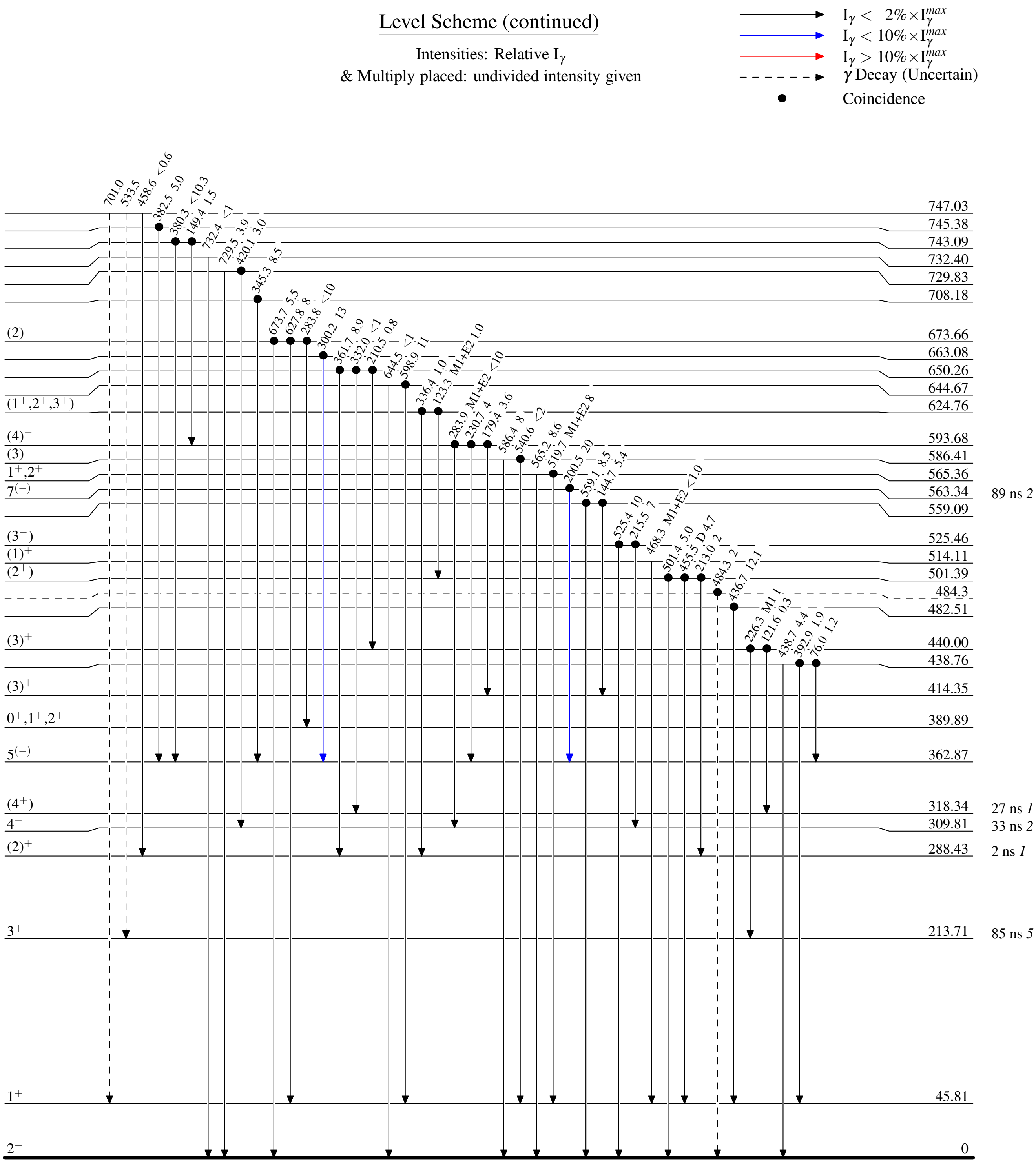
^{72}Ge(p,nγ):set 1 1979Te06,1976Ki12,1975Be32

Level Scheme (continued)

Intensities: Relative I_γ

& Multiply placed: undivided intensity given

Legend



$^{72}_{33}As_{39}$

$^{72}Ge(p,n\gamma)$:set 1 1979Te06,1976Ki12,1975Be32

Level Scheme (continued)

Intensities: Relative I_γ

& Multiply placed: undivided intensity given