^{54}Fe(^{16}O,pnγ),^{58}Ni(^{12}C,pnγ) 1997Ba24

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 113, 1735 (2012)	1-Mar-2012

1997Ba24: ^{54}Fe(^{16}O,pnγ), E(^{16}O)=42-63 MeV. Measured Eγ, Iγ, $\gamma\gamma$ and γ-n coincidences, relative excitation function, $\gamma(\theta)$ and γ linear polarization using HPGe detectors, a NE213 liquid scintillator and two-crystal Ge(HP) polarimeter. Evaluator assumes this work generally supersedes previous results presented by the same authors in 1987Ba81 (^{58}Ni(^{12}C,pnγ), E(^{12}C)=30-42 MeV and ^{54}Fe(^{16}O,pnγ), E(^{16}O)=40-52 MeV), 1989Ba87 (^{56}Fe(^{14}N,2nγ), E(^{14}N)=42 MeV), and 1994Ba96 (^{54}Fe(^{16}O,pnγ), E(^{16}O)=45-63 MeV and ^{58}Ni(^{12}C,pnγ), E(^{12}C)=32-45 MeV).

1996Pe04: ^{56}Fe(^{14}N,2nγ), E(^{14}N)=46 MeV; ^{58}Ni(^{12}C,pnγ), E(^{12}C)=36,42, and 45 MeV; and ^{46}Ti(^{25}Mg,p2nγ), E(^{25}Mg)=68 MeV. Measured Eγ, Iγ, $\gamma\gamma$, and γ yield using a HPGe γ-X and a Ge(Li) detector for the (^{14}N,2nγ) and (^{12}C,pnγ) reactions and an array of 19 Compton-suppressed Ge detectors for the (^{25}Mg,p2nγ) reaction.

1986RaZU: ^{54}Fe(^{16}O,pnγ), ^{58}Ni(^{12}C,pnγ) (beam energy not stated). Measured $T_{1/2}$ and g-factor of 2158 isomeric state.

Others: 1976PaZY (E(^{16}O)=41 MeV, E(^{12}C)=32 MeV).

^{68}As Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	3$^+$		
158.14 *7*	3$^+$		J$^\pi$: assigned (4$^+$) in 1996Pe04.
160.80 *10*	2$^{(+)}$		
214.20 *8*	(2,4$^-$)		
313.24 *11*	3$^+$		
354.6 *5*	1$^+$		
363.4 *3*	1$^+$		
424.34 *23*	1$^+$		
549.75 *7*	3$^-$		J$^\pi$: assigned (5$^+$) in 1996Pe04.
582.60 *20*	(1)		
733.57 *17*	(3,5$^-$)		
893.29 *9*	4$^-$		J$^\pi$: assigned (6$^+$) in 1996Pe04.
964.91 *12*	3$^-$		J$^\pi$: assigned (7$^+$) in 1996Pe04 based on excitation function.
1214.22 *22*	(4,5)		
1303.66 *15*	(5)		J$^\pi$: assigned >7 by 1996Pe04 based on excitation function.
1323.03 *15*	(4)		
1427.68 *22*	2$^-$		
1762.1 *5*			
1956.6 *3*			
2057.7 *5*			
2094.01 *21*	(6)		
2158.01 *17*	(6)	37 ns	g=0.23 *2* $T_{1/2}$: from 1986RaZU. g: from TDPAD (2011StZZ,1986RaZU). J$^\pi$: assigned >7 by 1996Pe04 based on excitation function.
2301.5 *5*			
2474.6 *3*	(7,8)		
2932.7[#] *7*			
2939.7[#] *6*			
3170.8[#] *5*			
3183.9[#] *5*			

[†] From a least-squares fit to Eγ, by evaluator. ΔE=0.5 keV assumed when not explicitly stated.

[‡] From $\gamma(\theta)$, linear polarization, and excitation functions in 1997Ba24. Discrepancies with 1996Pe04 are indicated in the comments.

[#] Reported only in 1996Pe04.

^{54}Fe(^{16}O,pnγ),^{58}Ni(^{12}C,pnγ) 1997Ba24 (continued)

γ(^{68}As)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult. @	δ @	Comments
49.8 *5*	0.3 *2*	363.4	1^+	313.24	3^+			
56.1 *3*	0.5 *2*	214.20	$(2,4^-)$	158.14	3^+			I_γ: Other: 1.1.
63.8 *2*	2.6 *6*	2158.01	(6)	2094.01	(6)	D+Q	−0.4 *1*	A_2=+0.10 *4*; A_4=−0.12 *4*. I_γ: Other: 2.6.
71.6 *1*	70.3 *20*	964.91	3^-	893.29	4^-	D+Q	+0.09 *3*	A_2=−0.19 *3*; A_4=+0.04 *4*. I_γ: Other: 80. α(exp)=0.24 *5* (1997Ba24) from intensity imbalance. δ: Other: <0.16 from α(exp).
104.5 *5*	3.8 *10*	1427.68	2^-	1323.03	(4)			
111.1 *2*	7.1 *15*	424.34	1^+	313.24	3^+	E2+M3	+0.86 *15*	A_2=−0.099 *12*; A_4=−0.001 *10*. Mult.: α(exp)=0.43 *10* in ^{68}Se ε decay and comparison to RUL gives E2. Evaluator notes that RUL excludes such a large admixture of M3.
155.1 *1*	3.0 *5*	313.24	3^+	158.14	3^+	D+Q	−0.07 *2*	A_2=+0.21 *5*; A_4=+0.04 *4*.
158.1 *1*	100	158.14	3^+	0.0	3^+	M1+E2	−1.3 *+5−16*	A_2=−0.157 *14*; A_4=−0.045 *17*. α(exp)=0.10 *3* (1989Ba37) from intensity imbalance. δ: from α(exp). Other: −7.87 *28* from $\gamma(\theta)$ (1997Ba24).
160.0	0.6 *3*	893.29	4^-	733.57	$(3,5^-)$			
160.8 *1*	6.3 *4*	160.80	$2^{(+)}$	0.0	3^+	D+Q	−1.5 *3*	A_2=+0.45 *4*; A_4=+0.06 *5*.
183.6 *4*	2.4 *10*	733.57	$(3,5^-)$	549.75	3^-			
193.8 *5*	1.4 *4*	354.6	1^+	160.80	$2^{(+)}$	D+Q		δ: +0.5 or +4.5. A_2=−0.29 *5*; A_4=−0.00 *5*.
202.6 *4*	3.9 *9*	363.4	1^+	160.80	$2^{(+)}$	D+Q		δ: +0.5 or +6.0. A_2=−0.36 *8*; A_4=+0.03 *3*.
205.6 *4*	1.3 *2*	363.4	1^+	158.14	3^+			
214.1 *1*	41.5 *6*	214.20	$(2,4^-)$	0.0	3^+	D+Q	+0.21 *5*	A_2=+0.058 *12*; A_4=+0.03 *4*. I_γ: Other: 22.
231.7 *4*	2.8 *5*	964.91	3^-	733.57	$(3,5^-)$	D+Q	−1.54 *30*	A_2=+0.21 *3*; A_4=+0.04 *3*. I_γ: Other: 3.0.
236.4 *4*	3.3 *5*	549.75	3^-	313.24	3^+			
249.6 *3*	2.5 *9*	1214.22	(4,5)	964.91	3^-			
313.1 *3*	13.0 *10*	313.24	3^+	0.0	3^+	M1+E2	−0.067 *15*	Pol=+0.21 *10*.
316.6 *3*	9.1 *9*	2474.6	(7,8)	2158.01	(6)			A_2=−0.111 *20*; A_4=+0.100 *18*. Pol=−0.49 *13*. I_γ: Other: 8.8.
320.4 *4*	2.1 *7*	1214.22	(4,5)	893.29	4^-			A_2=+0.44 *5*; A_4=+0.06 *6*.
335.4 *1*	16.8 *5*	549.75	3^-	214.20	$(2,4^-)$			A_2=+0.06 *7*; A_4=+0.18 *8*. Pol=−0.20 *18*. I_γ: Other: 7.8.
338.8 *1*	63.2 *7*	1303.66	(5)	964.91	3^-	(Q)	−7.43 *50*	A_2=+0.15 *4*; A_4=+0.05 *5*. I_γ: Other: 39.
343.4 *1*	40.4 *7*	893.29	4^-	549.75	3^-	M1+E2	+0.35 *15*	POL=−0.52 *5*. I_γ: Other: 35.
358.1 *1*	30.6 *8*	1323.03	(4)	964.91	3^-	D+Q	−3.50 *49*	A_2=−0.29 *4*; A_4=+0.25 *4*. I_γ: Other: 26.
391.5 *1*	30.1 *7*	549.75	3^-	158.14	3^+	E1(+M2)	+0.004 *7*	A_2=+0.25 *3*; A_4=+0.021 *19*. Pol=−0.33 *5*. I_γ: Other: 30.
415.3 *2*	5.0 *7*	964.91	3^-	549.75	3^-	M1+E2	−0.85 *25*	Pol=+0.27 *7*. I_γ: Other: 7.1.
439.1 *5*	4.6 *9*	1762.1		1323.03	(4)			

Continued on next page (footnotes at end of table)

^{54}Fe(^{16}O,pnγ),^{58}Ni(^{12}C,pnγ) 1997Ba24 (continued)

γ(^{68}As) (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[@]	Comments
462.8 *2*	10.6 *10*	1427.68	2$^-$	964.91	3$^-$	M1+E2	+0.04 *2*	A_2=−0.23 *4*; A_4=+0.03 *4*. Pol=−0.17 *5*. I_γ: Other: 12.8.
465.1[#]		2939.7		2474.6	(7,8)			
480.5 *5*	1.8 *5*	1214.22	(4,5)	733.57	(3,5$^-$)			
519.5 *2*	14.6 *10*	733.57	(3,5$^-$)	214.20	(2,4$^-$)	D+Q	−1.5 *3*	A_2=−0.64 *4*; A_4=+0.07 *4*. Pol=+0.25 *6*. I_γ: Other: 10.7.
549.9 *1*	11.4 *8*	549.75	3$^-$	0.0	3$^+$	E1+M2	−0.16 *8*	A_2=+0.076 *15*; A_4=+0.021 *24*. Pol=−0.14 *4*. I_γ: Other: 8.9.
582.6 *2*	4.9 *10*	582.60	(1)	0.0	3$^+$			
630.0 *4*	<3.8	2057.7		1427.68	2$^-$			
634.0 *4*	9.1 *15*	1956.6		1323.03	(4)			
679.7 *5*	2.8 *10*	893.29	4$^-$	214.20	(2,4$^-$)			
735.2 *1*	57.0 *5*	893.29	4$^-$	158.14	3$^+$	E1+M2	−5.5 *3*	A_2=−0.192 *21*; A_4=+0.10 *3*. Pol=−0.23 *5*. I_γ: Other: 60.
770.6 *3*	6.1 *10*	2094.01	(6)	1323.03	(4)			
790.3 *3*	8.3 *9*	2094.01	(6)	1303.66	(5)			A_2=+0.22 *5*; A_4=+0.21 *6*. I_γ: Other: 4.2.
[x]801.2 *5*	9.3 *15*							
[x]803.4 *5*	8.0 *13*							
854.4 *1*	21.8 *5*	2158.01	(6)	1303.66	(5)			A_2= +0.03 *3*; A_4=−0.02 *3*. I_γ: Other: 20.
875.0[#]		2932.7		2057.7				
943.6 *5*	3.9 *9*	2158.01	(6)	1214.22	(4,5)			
978.5 *5*	4.1 *9*	2301.5		1323.03	(4)			
991.0[#]		1956.6		964.91	3$^-$			
1012.8[#]		3170.8		2158.01	(6)			
1025.9[#]		3183.9		2158.01	(6)			
[x]1036.9 *5*	8.0 *13*							
[x]1039.5 *5*	9.3 *15*							

[†] From 1997Ba24, except where noted otherwise.

[‡] From 1997Ba24, normalized to Iγ(158γ)=100. Iγ values from the ^{46}Ti(^{25}Mg,p2nγ) reaction at E(^{25}Mg)=68 MeV from 1996Pe04 are given in the comments, when available.

[#] From 1996Pe04; not reported by 1997Ba24.

[@] From $\gamma(\theta)$ and linear polarization, except where noted. δ values depend on the assumed spin assignments of the levels involved, and as such, only those transitions where the spin assignments agree with those in the Adopted Levels have the δ values been included in the adopted gammas.

[x] γ ray not placed in level scheme.

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Level Scheme

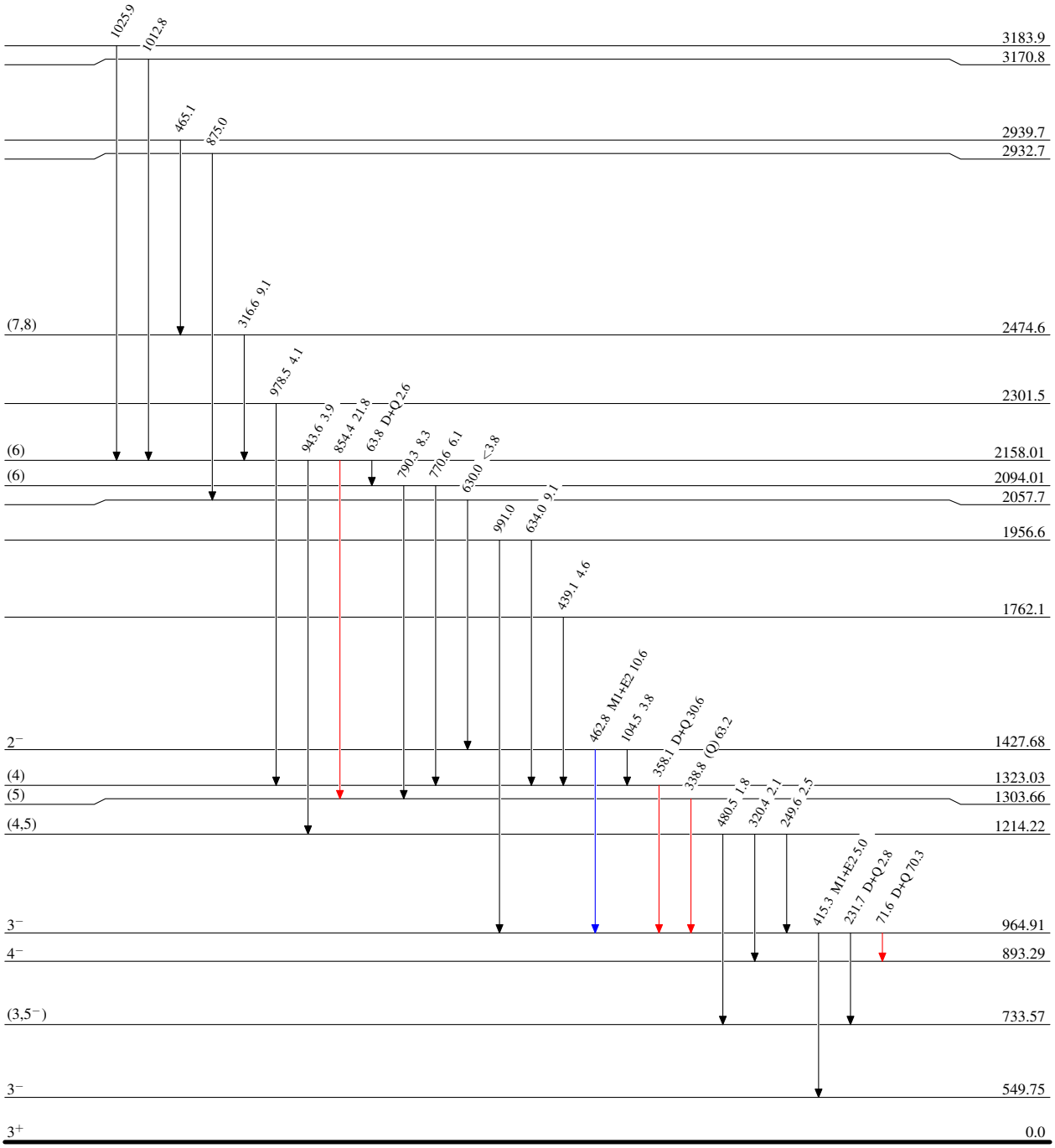
Intensities: Type not specified

Legend

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

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

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

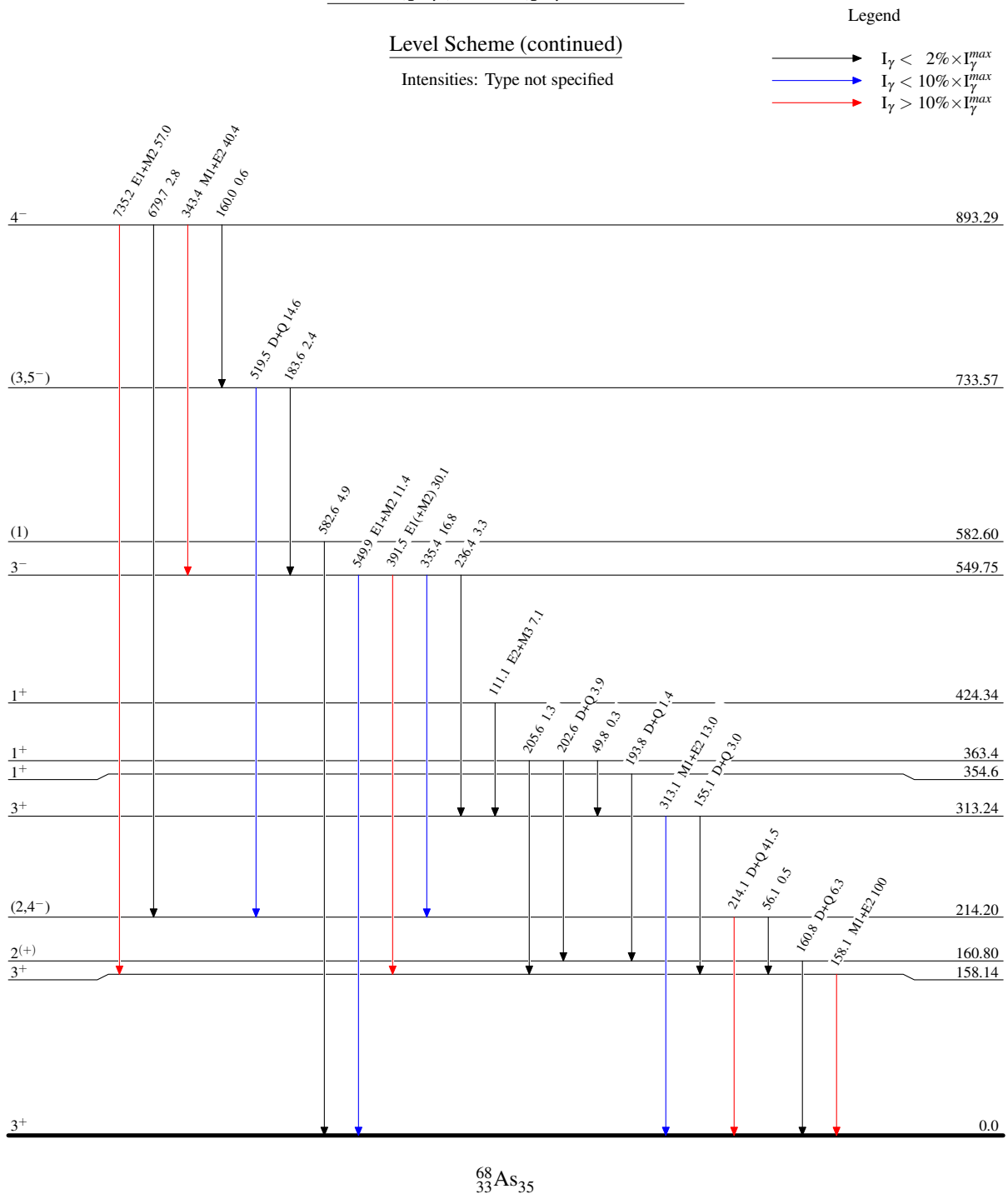


$^{68}_{33}As_{35}$

^{54}Fe(^{16}O,pnγ),^{58}Ni(^{12}C,pnγ) 1997Ba24

Level Scheme (continued)

Intensities: Type not specified



$^{68}_{33}As_{35}$