^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ameenah R. Farhan, Balraj Singh	NDS 110, 1917 (2009)	30-Jun-2009

1996Ka24: Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO). The Pitt-FSU detector array with nine Compton-suppressed HPGe detectors was used for γ rays.

^{78}Rb Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0[e]	0^+	395.59[b] 25	$4^{(-)}$	824.9[g] 4	(5^+)	1678.0[c] 5	(8^-)
46.80[c] 16	1^-	398.9[a] 4	$4^{(+)}$	852.9[@] 4	8^+	1744.8[a] 4	$9^{(+)}$
103.20[e] 15	1^+	422.8[@] 4	6^+	872.19[b] 25	$6^{(-)}$	1941.6[&] 4	10^-
111.19[#&] 24	4^-	440.09[c] 23	4^-	949.3[c] 4	6^-	1984.5[b] 4	(9^-)
114.9[@] 4	4^+	475.9[d] 3	4^-	1017.4[d] 4	(6^-)	2023.6[@] 4	11^+
119.70 23	(3^+)	488.79[&] 24	6^-	1080.9[g] 5	(6^+)	2043.6[c] 7	(9^-)
134.10[c] 19	2^-	504.0 5		1114.4[&] 3	8^-	2369.2[&] 4	11^-
160.70[g] 18	2^+	528.80[g] 25	4^+	1114.6[a] 4	$7^{(+)}$	2651.1[@] 5	12^+
232.40[e] 21	$2^{(+)}$	538.3[f] 3	$4^{(+)}$	1165.8[b] 3	$7^{(-)}$	2955.4[&] 7	12^-
263.79[&] 25	5^-	595.29[b] 24	$5^{(-)}$	1219.7[@] 4	9^+	3042.0[@] 5	13^+
270.1[@] 4	5^+	663.5[c] 3	5^-	1239.8[c] 4	7^-	3452.8[&] 8	(13^-)
274.40[c] 21	3^-	667.3[@] 4	7^+	1350.7[a] 4	$8^{(+)}$	3897.1[@] 21	(14^+)
289.90 20		688.9[a] 4	$5^{(+)}$	1357.7[d] 7	(7^-)	4151.4[&] 13	(14^-)
315.4 3	(2^+)	699.5[d] 3	5^-	1454.2 5	(8^+)	4253.7[@] 10	(15^+)
327.49[e] 22	$3^{(+)}$	736.8[a] 4	$6^{(+)}$	1474.3[&] 4	9^-	4730.8[&] 22	(15^-)
334.19[f] 21	$3^{(+)}$	767.1[&] 3	7^-	1603.6[b] 4	$8^{(-)}$	5638.7[@] 14	(17^+)
351.00[g] 25	3^+	785.9[f] 4	$5^{(+)}$	1625.5[@] 4	10^+	7191.8[@] 25	(19^+)

† From least-squares fit to Eγ's.
‡ As proposed by 1996Ka24 based on $\gamma\gamma(\theta)$ data and band associations. Systematics of neighboring nuclides are also used for assignments to bandheads. The assignments are mostly the same in 'Adopted Levels', except that most assignments are given in parentheses there due to lack of strong supporting arguments.
# Corresponds to 5.74-min isomer.
@ Band(A): Yrast πi=+ band. Possible configuration=$\pi g_{9/2}\otimes\nu g_{9/2}$ (1996Ka24) as for neighboring nuclides.
& Band(B): Yrast π=− band.
a Band(C): Band based on 399, $4^{(+)}$.
b Band(D): Band based on 395, $4^{(-)}$.
c Band(E): Band based on 47, 1^-.
d Band(F): Band based on 476, 4^-.
e Band(G): g.s. band.
f Band(H): Band based on 334, $3^{(+)}$.
g Band(I): Band based on 161, 2^+.

$\gamma(^{78}Rb)$

DCO data are for angles of 35° (or 145°) and 90°. Gates were mostly on ΔJ=2, quadrupole transitions. In selected cases gates were selected on ΔJ=1 or 0, dipole transitions. Expected values of DCO′s for gate on ΔJ=2, quadrupole transitions are: 1.0 for ΔJ=2, quadrupole and 0.5 for ΔJ=1, dipole transitions. For gates on ΔJ=1, dipole transitions, expected DCO′s are: 1.0 for ΔJ=1, dipole and 2.0 for ΔJ=2, quadrupole transitions.

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^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24 (continued)

γ(^{78}Rb) (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
(3.7)		114.9	4^+	111.19	4^-		
4.8[&]		119.70	(3^+)	114.9	4^+		
46.8 *2*		46.80	1^-	0.0	0^+		
47.9 *3*		736.8	$6^{(+)}$	688.9	$5^{(+)}$		
57.5 *2*	3.2 *3*	160.70	2^+	103.20	1^+		
(64.2)		111.19	4^-	46.80	1^-		
68.1 *3*	0.4 *2*	395.59	$4^{(-)}$	327.49	$3^{(+)}$		
87.3 *2*	≈16	134.10	2^-	46.80	1^-	D[#]	DCO=0.87 *7*
95.1 *3*	4.4 *4*	327.49	$3^{(+)}$	232.40	$2^{(+)}$		
98.3 *2*	0.4 *1*	232.40	$2^{(+)}$	134.10	2^-		
103.2 *2*	17 *4*	103.20	1^+	0.0	0^+	D[#]	DCO=0.88 *11*
112.6 *3*	3.5 *4*	440.09	4^-	327.49	$3^{(+)}$	D[#]	DCO=0.95 *20*
112.7 *2*	0.4 *1*	232.40	$2^{(+)}$	119.70	(3^+)		
128.8 *2*	2.0 *2*	398.9	$4^{(+)}$	270.1	5^+	D[#]	DCO=1.26 *7*
129.2 *3*	10 *1*	232.40	$2^{(+)}$	103.20	1^+	D[#]	DCO=1.01 *10*
131.8 *2*	1.8 *5*	395.59	$4^{(-)}$	263.79	5^-	D[#]	DCO=0.73 *13*
140.3 *2*	12 *1*	274.40	3^-	134.10	2^-	D[#]	DCO=1.29 *10*
148.4 *3*	1.0 *2*	475.9	4^-	327.49	$3^{(+)}$		
148.9 *3*	≈2	263.79	5^-	114.9	4^+		
152.6 *1*	≈64	263.79	5^-	111.19	4^-	D	DCO=0.41 *3*
152.7 *1*	79 *2*	422.8	6^+	270.1	5^+	D	DCO=0.39 *3*
155.2 *1*	100	270.1	5^+	114.9	4^+	D	DCO=0.40 *2*
155.2 *2*	4.4 *4*	595.29	$5^{(-)}$	440.09	4^-	(D)[#]	DCO=0.72 *8*
160.7 *3*	3.0 *2*	160.70	2^+	0.0	0^+	Q[#]	DCO=1.9 *5*
165.7 *2*	5.0 *4*	440.09	4^-	274.40	3^-	D[#]	DCO=1.17 *12*
173.5 *2*	1.8 *2*	334.19	$3^{(+)}$	160.70	2^+		
177.8 *2*	1.1 *2*	528.80	4^+	351.00	3^+	D[#]	DCO=1.2 *3*
181.3 *4*	1.4 *3*	315.4	(2^+)	134.10	2^-		
185.6 *2*	28 *1*	852.9	8^+	667.3	7^+	D	DCO=0.49 *8*
186.7 *3*		289.90		103.20	1^+		
187.3 *2*	1.3 *2*	538.3	$4^{(+)}$	351.00	3^+		
190.3 *2*	4.2 *3*	351.00	3^+	160.70	2^+	D[#]	DCO=0.99 *14*
193.4 *3*	0.2 *1*	327.49	$3^{(+)}$	134.10	2^-		
194.6 *3*	0.4 *1*	528.80	4^+	334.19	$3^{(+)}$	D[@]	DCO=0.51 *11*
199.7 *2*	3.1 *2*	595.29	$5^{(-)}$	395.59	$4^{(-)}$	D[#]	DCO=0.94 *14*
201.5 *3*	2.5 *4*	475.9	4^-	274.40	3^-	D[#]	DCO=0.99 *16*
204.1 *3*	1.9 *2*	538.3	$4^{(+)}$	334.19	$3^{(+)}$	D[@]	DCO=0.55 *10*
207.8 *3*		327.49	$3^{(+)}$	119.70	(3^+)		
212.2 *3*	5 *1*	315.4	(2^+)	103.20	1^+		
214.1 *4*		504.0		289.90			
214.5 *3*	2.1 *6*	334.19	$3^{(+)}$	119.70	(3^+)	D[#]	DCO=2.0 *3* Mult.: ΔJ=0 transition.
216.3 *3*		327.49	$3^{(+)}$	111.19	4^-		
218.7 *4*	1.0 *3*	488.79	6^-	270.1	5^+	D[#]	DCO=1.30 *18*
223.0 *4*	0.5 *2*	334.19	$3^{(+)}$	111.19	4^-	D[#]	DCO=1.4 *4*
223.4 *3*	3.1 *7*	663.5	5^-	440.09	4^-	D[#]	DCO=1.35 *16*
223.6 *3*	0.6 *2*	699.5	5^-	475.9	4^-	D[#]	DCO=1.12 *24*
225.0 *1*	28 *1*	488.79	6^-	263.79	5^-	D	DCO=0.44 *6*
227.6 *3*	1.6 *5*	274.40	3^-	46.80	1^-		

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^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24 (continued)

γ(^{78}Rb) (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
236.1 *2*	1.1 *2*	1350.7	$8^{(+)}$	1114.6	$7^{(+)}$	D[#]	DCO=0.97 *8*
243.1 *3*		289.90		46.80	1^-		
244.5 *1*	42 *1*	667.3	7^+	422.8	6^+	D	DCO=0.40 *5*
247.6 *5*	1.1 *2*	785.9	$5^{(+)}$	538.3	$4^{(+)}$		
247.8[&] *3*		351.00	3^+	103.20	1^+		
257.1 *3*	0.7 *2*	785.9	$5^{(+)}$	528.80	4^+		
261.7 *3*	0.7 *2*	1114.6	$7^{(+)}$	852.9	8^+	D[#]	DCO=1.14 *11*
266.1 *4*	0.9 *2*	688.9	$5^{(+)}$	422.8	6^+	D[#]	DCO=1.28 *14*
276.9 *1*	4.1 *2*	872.19	$6^{(-)}$	595.29	$5^{(-)}$	D	DCO=0.54 *19*
278.3 *2*	14 *1*	767.1	7^-	488.79	6^-	D	DCO=0.43 *11*
284.0 *2*	3.6 *5*	398.9	$4^{(+)}$	114.9	4^+	(D)	DCO=0.78 *9* Mult.: ΔJ=0 transition.
284.4 *2*	7 *2*	395.59	$4^{(-)}$	111.19	4^-	D[#]	DCO=1.61 *14* Mult.: ΔJ=0 transition.
285.8 *4*	2.1 *5*	949.3	6^-	663.5	5^-	(D)[#]	DCO=0.82 *13*
286.6[&] *3*		824.9	(5^+)	538.3	$4^{(+)}$		
289.9 *3*		289.90		0.0	0^+		
290.0 *3*	2.8 *4*	688.9	$5^{(+)}$	398.9	$4^{(+)}$	(D)[#]	DCO=0.79 *22*
290.5 *3*	1.1 *3*	1239.8	7^-	949.3	6^-	D[#]	DCO=1.3 *4*
293.6 *1*	2.9 *4*	1165.8	$7^{(-)}$	872.19	$6^{(-)}$	D	DCO=0.58 *7*
295.0 *4*	1.4 *3*	1080.9	(6^+)	785.9	$5^{(+)}$		
296.1[&] *4*		824.9	(5^+)	528.80	4^+		
306.0 *3*	0.5 *3*	440.09	4^-	134.10	2^-		
307.9 *1*	26 *1*	422.8	6^+	114.9	4^+	Q	DCO=0.97 *6*
313.8 *3*	1.7 *3*	736.8	$6^{(+)}$	422.8	6^+	(D)	DCO=0.8 *3* Mult.: ΔJ=0 transition.
317.9 *4*	0.5 *1*	1017.4	(6^-)	699.5	5^-		
331.5 *2*	4.9 *4*	595.29	$5^{(-)}$	263.79	5^-	D[#]	DCO=1.9 *3* Mult.: ΔJ=0 transition.
337.9 *3*	1.6 *3*	736.8	$6^{(+)}$	398.9	$4^{(+)}$	Q[#]	DCO=1.9 *4*
339.6 *3*	0.7 *2*	1454.2	(8^+)	1114.6	$7^{(+)}$	(D)[#]	DCO=0.93 *20*
340.3[&] *4*		1357.7	(7^-)	1017.4	(6^-)		
341.8 *4*	1.9 *4*	475.9	4^-	134.10	2^-		
344.3 *4*	0.4 *2*	767.1	7^-	422.8	6^+	D[#]	DCO=1.3 *3*
347.3 *3*	7.9 *8*	1114.4	8^-	767.1	7^-	D	DCO=0.43 *3*
359.9 *3*	6.6 *9*	1474.3	9^-	1114.4	8^-	D	DCO=0.44 *4*
365.6[&] *4*	<0.4	2043.6	(9^-)	1678.0	(8^-)		
366.8 *1*	33 *1*	1219.7	9^+	852.9	8^+	D	DCO=0.42 *5*
368.1 *4*	1.9 *4*	528.80	4^+	160.70	2^+	Q[#]	DCO=2.1 *5*
377.6 *1*	19 *1*	488.79	6^-	111.19	4^-	Q	DCO=1.00 *3*
377.8 *2*	3.0 *3*	1114.6	$7^{(+)}$	736.8	$6^{(+)}$	D[#]	DCO=1.26 *12*
380.9 *4*	0.4 *2*	1984.5	(9^-)	1603.6	$8^{(-)}$		
383.4 *2*	2.2 *2*	872.19	$6^{(-)}$	488.79	6^-	D	DCO=1.02 *12* Mult.: ΔJ=0 transition.
389.1 *4*	0.6 *3*	663.5	5^-	274.40	3^-		
390.9 *3*	4 *1*	3042.0	13^+	2651.1	12^+	D	DCO=0.26 *7*
394.1 *2*	3.6 *5*	1744.8	$9^{(+)}$	1350.7	$8^{(+)}$	D[#]	DCO=1.26 *12*
397.2 *3*	6 *1*	667.3	7^+	270.1	5^+	(Q)	DCO=0.84 *26*
398.1 *2*	21 *2*	2023.6	11^+	1625.5	10^+	D	DCO=0.41 *10*
398.7 *4*	0.2 *1*	1165.8	$7^{(-)}$	767.1	7^-		

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^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24 (continued)

γ(^{78}Rb) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
399.7 *3*	4 *1*	663.5	5^-	263.79	5^-	D	DCO=1.8 *3* Mult.: ΔJ=0 transition.
405.8 *2*	7 *1*	1625.5	10^+	1219.7	9^+	D	DCO=0.49 *11*
425.1 *3*	0.6 *3*	699.5	5^-	274.40	3^-		
427.6 *3*	2.3 *6*	2369.2	11^-	1941.6	10^-	D	DCO=0.50 *7*
430.1 *2*	53 *2*	852.9	8^+	422.8	6^+	Q	DCO=0.95 *8*
437.8 *3*	1.1 *2*	1603.6	$8^{(-)}$	1165.8	$7^{(-)}$	D[#]	DCO=1.08 *12*
438.2 *4*		1678.0	(8^-)	1239.8	7^-		
447.3 *3*	0.6 *2*	1114.6	$7^{(+)}$	667.3	7^+	D[#]	DCO=1.3 *4* Mult.: ΔJ=0 transition.
466.7 *3*	4.8 *7*	736.8	$6^{(+)}$	270.1	5^+	D[#]	DCO=0.81 *6*
467.3 *3*	4.7 *12*	1941.6	10^-	1474.3	9^-	D	DCO=0.40 *5*
473.9 *4*	0.7 *3*	824.9	(5^+)	351.00	3^+		
476.6 *4*	0.6 *1*	872.19	$6^{(-)}$	395.59	$4^{(-)}$		
484.1 *3*	0.9 *3*	595.29	$5^{(-)}$	111.19	4^-		
503.3 *3*	23 *1*	767.1	7^-	263.79	5^-	Q	DCO=1.07 *12*
509.2 *5*		949.3	6^-	440.09	4^-		
528.6 *5*	1.9 *5*	1017.4	(6^-)	488.79	6^-		
541.5 *5*	0.7 *2*	1017.4	(6^-)	475.9	4^-		
552.1 *5*	0.6 *2*	1080.9	(6^+)	528.80	4^+		
552.4 *2*	7 *1*	1219.7	9^+	667.3	7^+	Q	DCO=0.95 *11*
570.5 *3*	1.8 *4*	1165.8	$7^{(-)}$	595.29	$5^{(-)}$	Q[#]	DCO=2.1 *4*
576.3 *5*	0.7 *2*	1239.8	7^-	663.5	5^-		
613.9 *3*	1.0 *3*	1350.7	$8^{(+)}$	736.8	$6^{(+)}$		
625.6 *3*	22 *1*	1114.4	8^-	488.79	6^-	Q	DCO=0.98 *3*
627.5 *3*	1.7 *5*	2651.1	12^+	2023.6	11^+	D	DCO=0.49 *5*
658.2 *6*	1.0 *4*	1357.7	(7^-)	699.5	5^-		
683.4 *3*	3.4 *5*	1350.7	$8^{(+)}$	667.3	7^+	(D)[#]	DCO=0.64 *8*
707.2 *2*	21 *2*	1474.3	9^-	767.1	7^-	Q	DCO=1.07 *17*
717.4 *4*	0.8 *3*	1454.2	(8^+)	736.8	$6^{(+)}$		
728.7 *6*	0.8 *4*	1678.0	(8^-)	949.3	6^-		
731.4 *6*	0.9 *3*	1603.6	$8^{(-)}$	872.19	$6^{(-)}$		
772.6 *2*	37 *3*	1625.5	10^+	852.9	8^+	Q	DCO=0.98 *16*
803.8 *5*	0.9 *3*	2043.6	(9^-)	1239.8	7^-		
803.9 *3*	21 *2*	2023.6	11^+	1219.7	9^+	(Q)	DCO=0.85 *12*
818.7 *4*	1.7 *5*	1984.5	(9^-)	1165.8	$7^{(-)}$		
827.2 *2*	14 *2*	1941.6	10^-	1114.4	8^-	Q	DCO=1.03 *15*
891.9 *4*	2.2 *7*	1744.8	$9^{(+)}$	852.9	8^+	D	DCO=0.65 *18*
894.9 *4*	9 *2*	2369.2	11^-	1474.3	9^-	Q	DCO=0.91 *13*
1013.8 *6*	8 *2*	2955.4	12^-	1941.6	10^-	Q	DCO=0.97 *19*
1018.4 *5*	13 *3*	3042.0	13^+	2023.6	11^+	Q	DCO=0.93 *16*
1025.6 *6*	11 *3*	2651.1	12^+	1625.5	10^+	Q	DCO=1.11 *12*
1077.5 *3*	1.6 *3*	1744.8	$9^{(+)}$	667.3	7^+	Q[#]	DCO=2.3 *4*
1083.6 *7*	6 *2*	3452.8	(13^-)	2369.2	11^-		
1196 *1*	1.6 *6*	4151.4	(14^-)	2955.4	12^-		
1211.7 *8*	9 *3*	4253.7	(15^+)	3042.0	13^+		
1246 *2*	4 *2*	3897.1	(14^+)	2651.1	12^+		
1278 *2*	3 *1*	4730.8	(15^-)	3452.8	(13^-)		
1385 *1*	5 *2*	5638.7	(17^+)	4253.7	(15^+)		
1553 *2*	2 *1*	7191.8	(19^+)	5638.7	(17^+)		

[†] 1996Ka24 give average values determined from two reactions: ^{58}Ni(^{23}Na,2pnγ) and ^{54}Fe(^{28}Si,3pnγ).

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^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24 (continued)

$\gamma(^{78}Rb)$ (continued)

‡ From DCO value with gate on ΔJ=2, Q transitions unless otherwise indicated.
# From DCO, gate is on ΔJ=1, dipole transition.
@ From DCO, gate is on ΔJ=0, dipole transition.
& Placement of transition in the level scheme is uncertain.

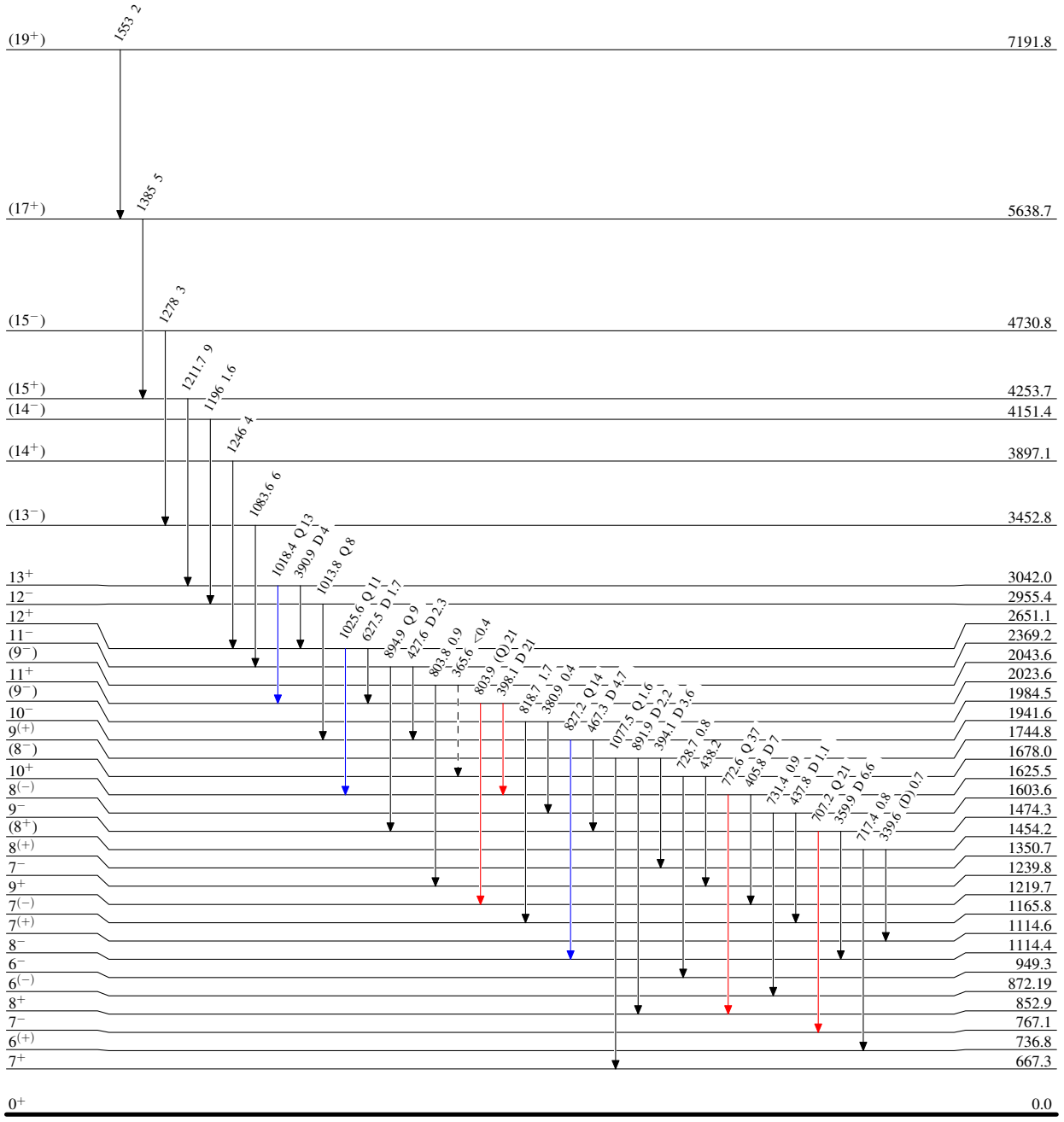
^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24

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)



$^{78}_{37}Rb_{41}$

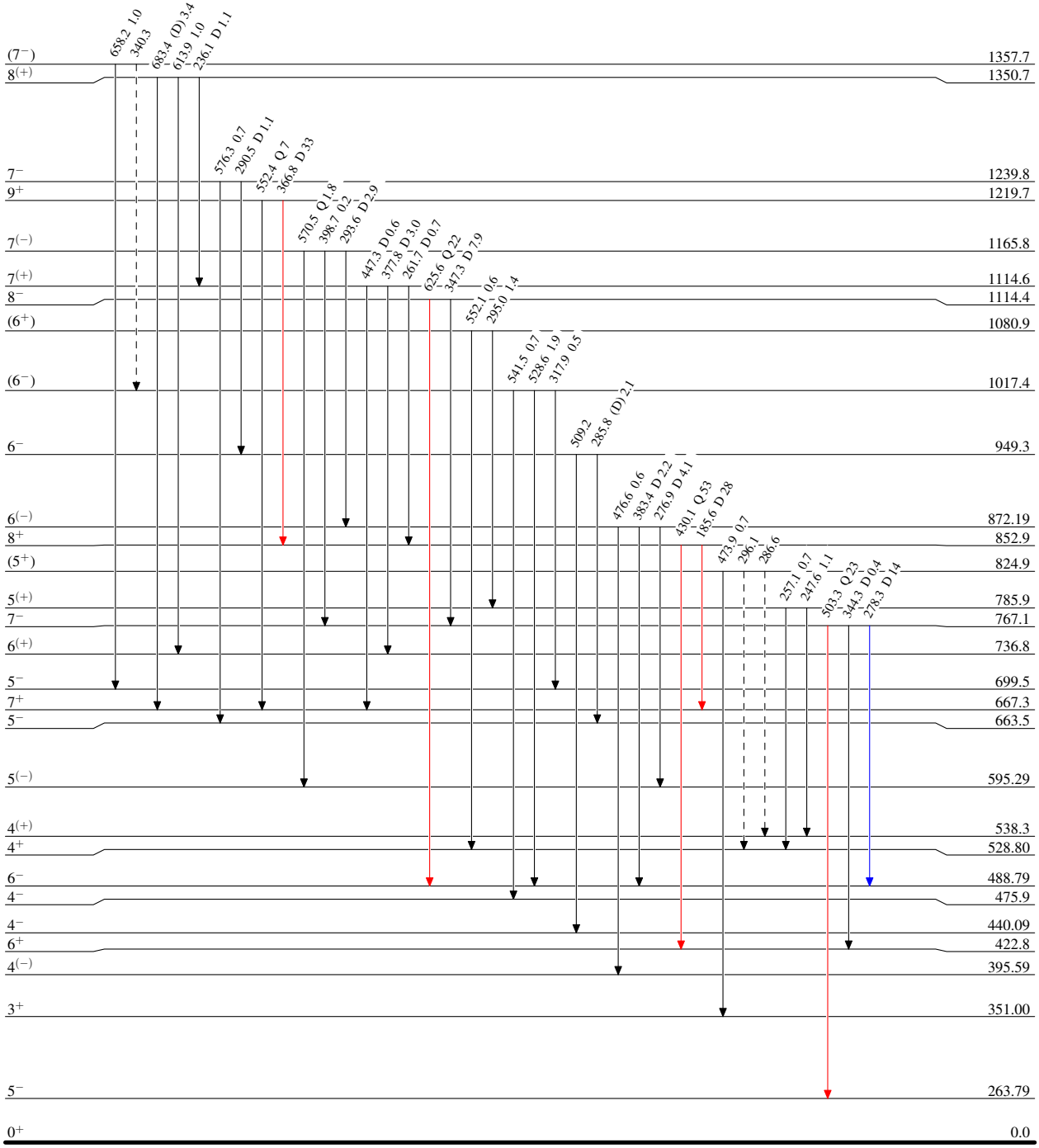
^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24

Level Scheme (continued)

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)

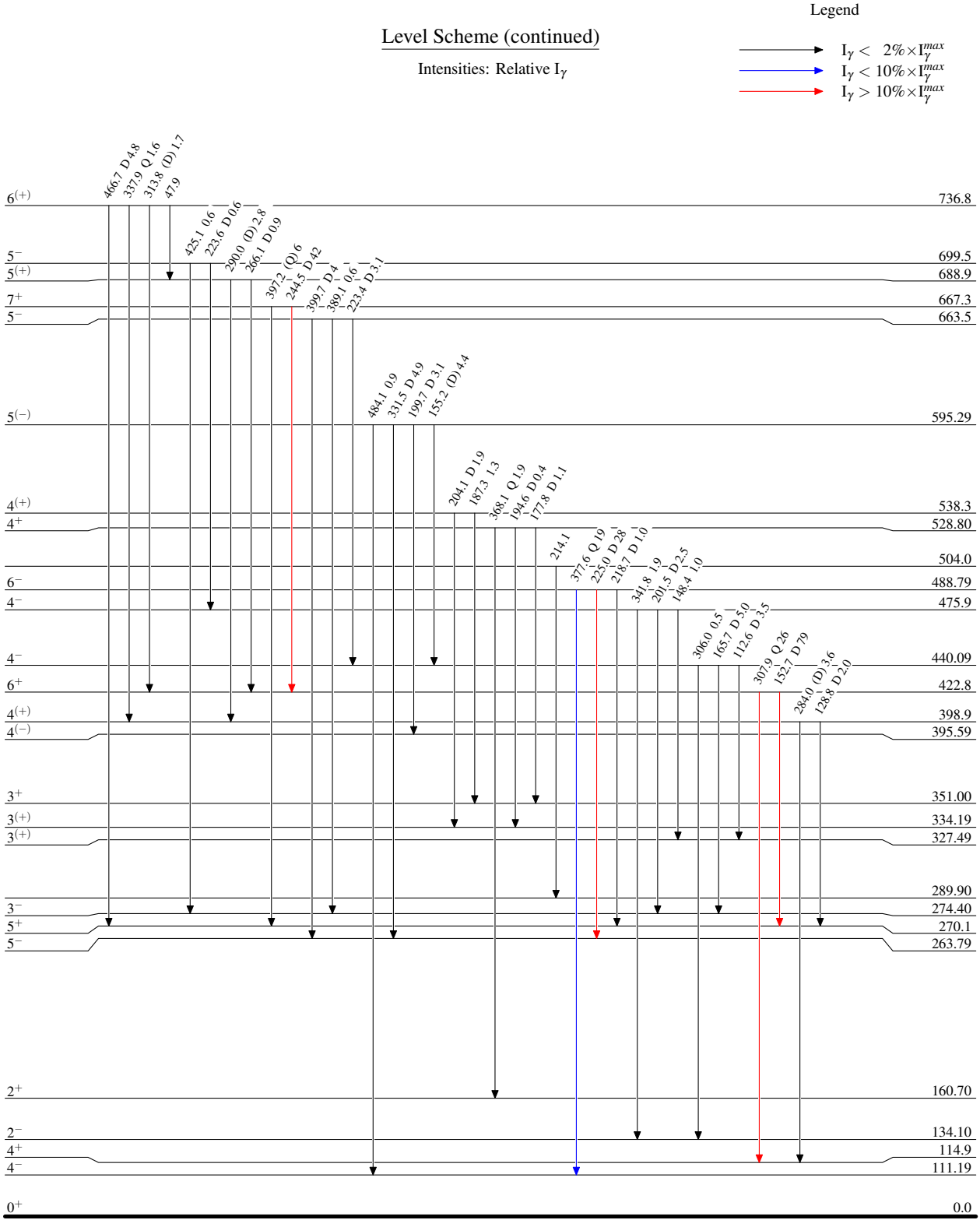


$^{78}_{37}Rb_{41}$

^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24

Level Scheme (continued)

Intensities: Relative I_γ



$^{78}_{37}Rb_{41}$

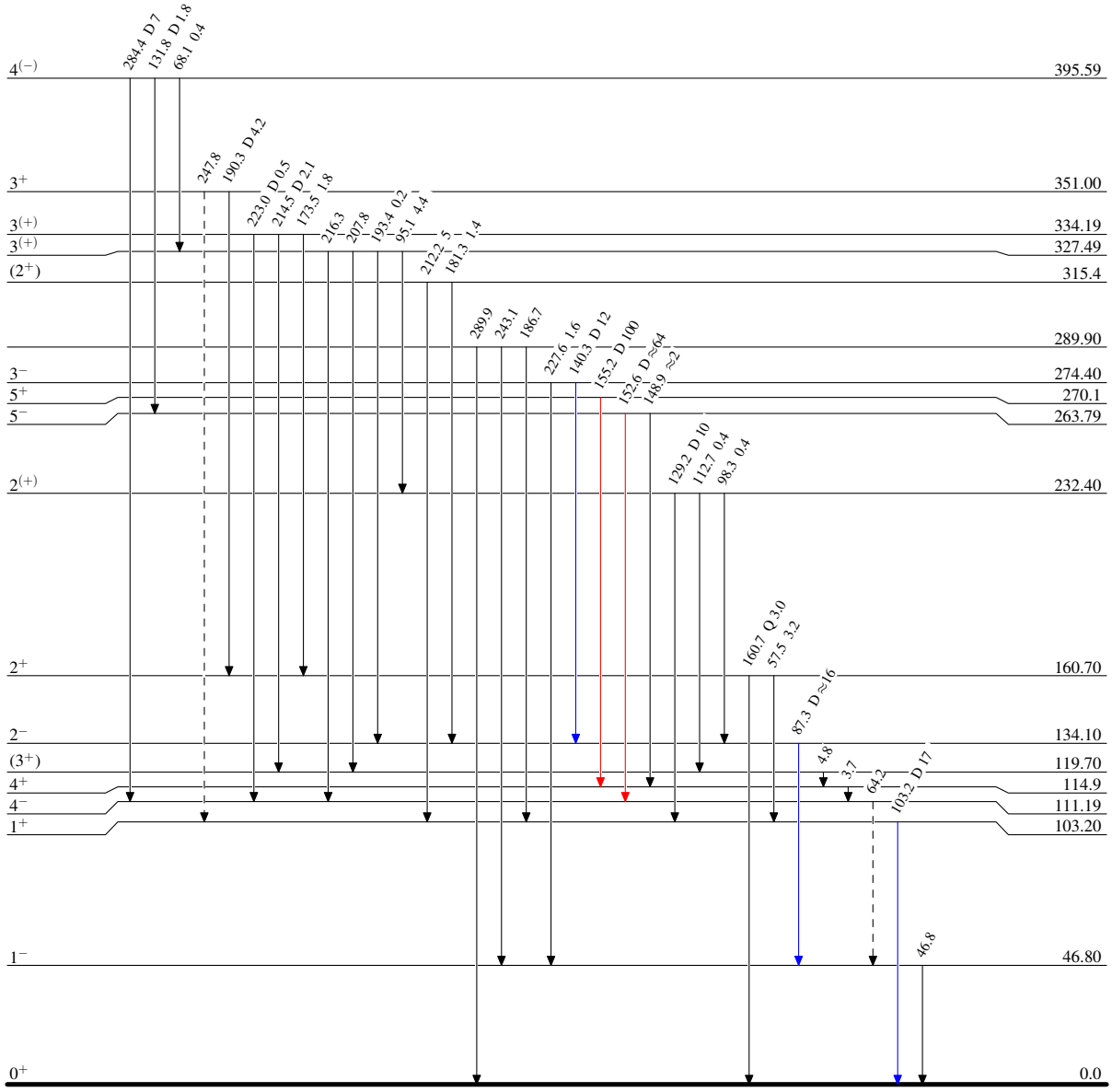
^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24

Level Scheme (continued)

Intensities: Relative I_γ

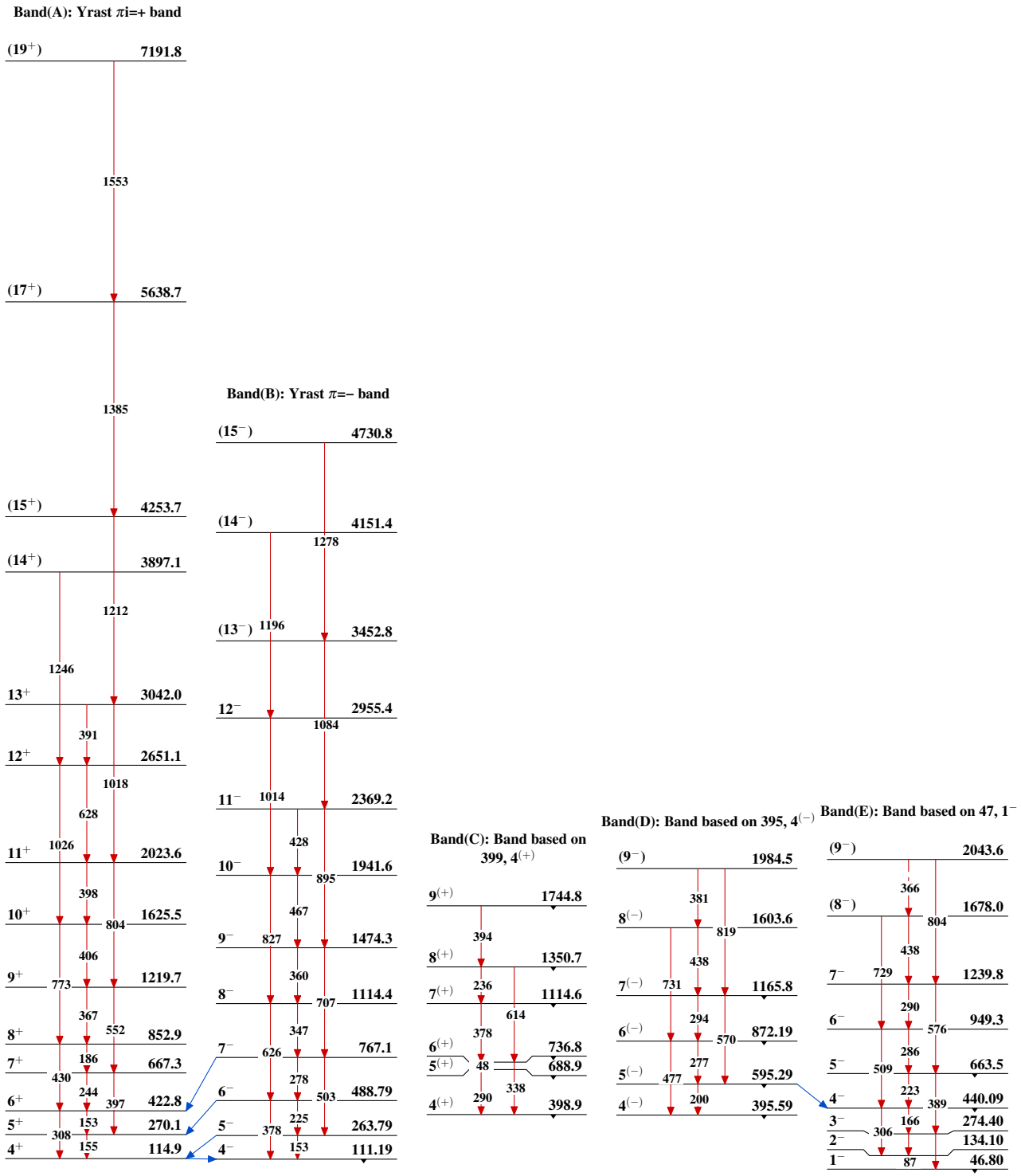
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



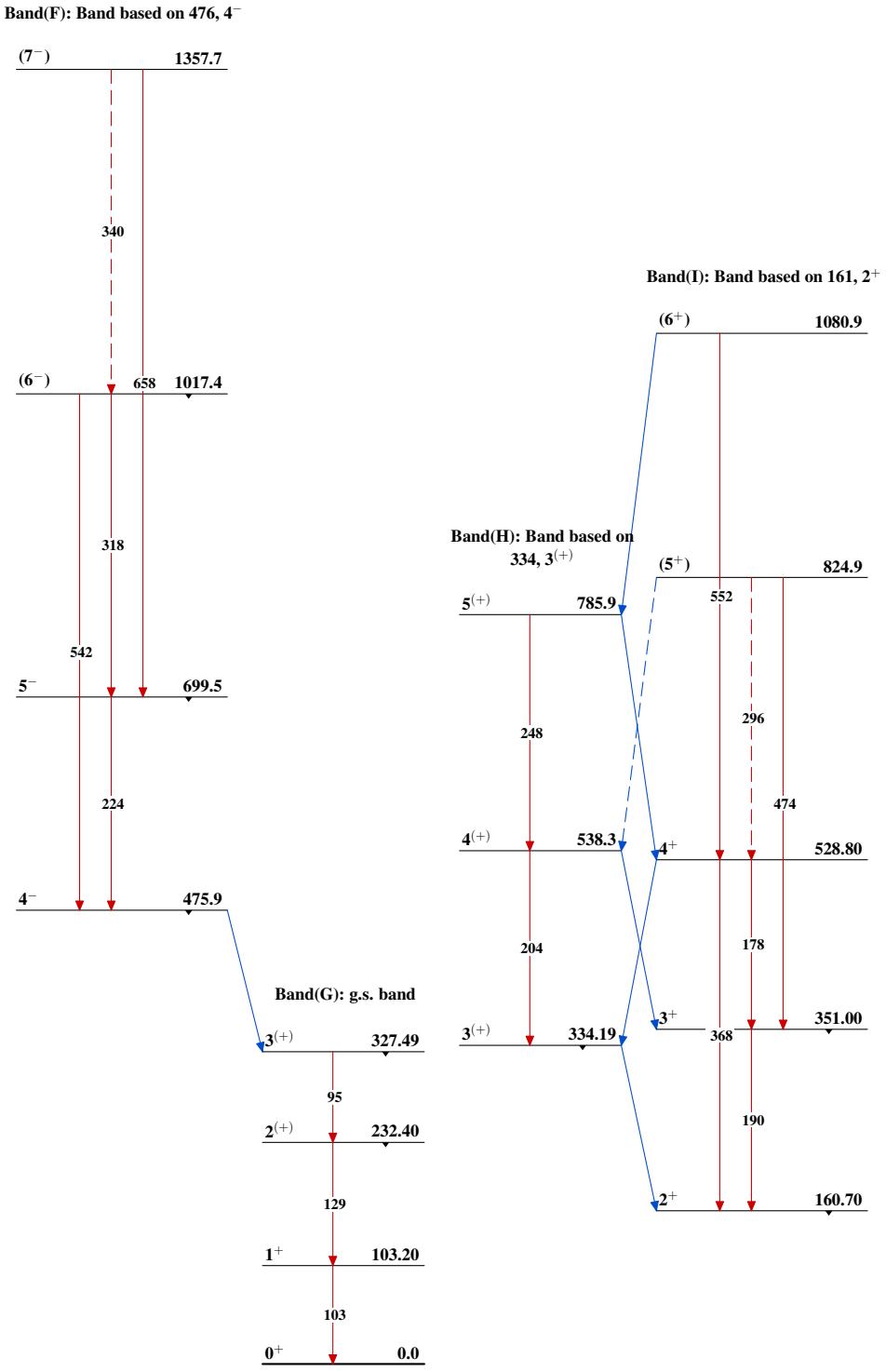
$^{78}_{37}Rb_{41}$

^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24



$^{78}_{37}Rb_{41}$

^{54}Fe(^{28}Si,3pnγ) E=120 MeV 1996Ka24 (continued)



$^{78}_{37}Rb_{41}$