Adopted Levels, Gammas

History

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

Q(β^-)=−1.06×10^4 *syst*; S(n)=13442 *11*; S(p)=5632 *8*; Q(α)=−3267 *8* 2012Wa38
Note: Current evaluation has used the following Q record −10650 syst 13442 *11* 5632 8 −3267 *8* 2009AuZZ,2003Au03.
ΔQ(β^-)=400 (syst,2009AuZZ). S(2n)=25070 *40*, s(2p)=8738 *8* (2009AuZZ, 2003Au03).
Values in 2003Au03: S(n)=13441 *12*, S(p)=5638 *11*; others are same as in 2009AuZZ.
Q(β^-): 2007WeZX estimate −10940 *200* from ^{78}Y half-life and *ft* value from systematics of 0^+ to 0^+ superallowed β transitions.
Mass measurements: 1994Tr08.
Isotope shifts, mean-square radius: 1990Bu12, 1988Si06, 1987Ea01. Theory and syst: 1996Li25, 1994Bu06, 1992Ne09.
1986Ni07: ^{54}Fe(^{28}Si,X) at E=75-145 MeV, measured γ-ray multiplicity, evaporation residue σ(E).
Structure calculations (rotational band, identical bands, etc): 1997Pe18, 1994Na09, 1983Bu09, 1979Bu20.
Additional information 1.

^{78}Sr Levels

Cross Reference (XREF) Flags

- A ^{78}Y ε decay (53 ms)
- B ^{78}Y ε decay (5.8 s)
- C ^{58}Ni(^{28}Si,2$\alpha\gamma$)

E(level)†	J$^\pi$‡	T$_{1/2}$#	XREF	Comments
0.0&	0^+	160 s *8*	ABC	%ε+%β^+=100 <r^2>$^{1/2}$=4.255 fm *4* (2004An14 evaluation). T$_{1/2}$: weighted average of 168 s *12* (1997Mu02, timing of 46.8γ), 159 s *8* (1992Gr09, timing of 103.5γ) and 150 s *18* (1982Li17, timing of x-rays and γ-rays). Other: 170 s *30* (quoted by 1992Gr09 from H. Grawe et al., 1981 Ann Rep HMI B373, 89 (1982)). Note that 1982Li17 quote an uncertainty of 18 s in the abstract but 12 s in the text with no decay plot shown. Additional information 2. Isotope shift and mean-square radius determined (1990Bu12).
277.60& *10*	2^+	155 ps *19*	BC	J$^\pi$: ΔJ=2, E2 γ to g.s.
780.80& *15*	4^+	5.1 ps *5*	BC	J$^\pi$: ΔJ=2, E2 γ to 2^+.
1477.6?a *10*			C	
1493.19& *25*	6^+		C	J$^\pi$: ΔJ=2 γ to 4^+.
1903.3 *8*			C	
2243.6?a *15*			C	
2310.5?d *8*	(3^-)		C	J$^\pi$: γ to 4^+; possible bandhead of an octupole band.
2388.4& *4*	8^+		C	J$^\pi$: ΔJ=2 γ to 6^+.
2537.1?b *8*	(4^-)		C	J$^\pi$: γ to 4^+; possible bandhead; similar band structures in ^{74}Kr and ^{82}Zr.
2606.0e *5*	(4^-)		C	J$^\pi$: ΔJ=(0) γ to 4^+; possible member of octupole band.
2712.0?c *12*	(5^-)		C	J$^\pi$: γ to 4^+; possible bandhead; similar band structures in ^{74}Kr and ^{82}Zr.
2860.1d *5*	(5^-)		C	J$^\pi$: ΔJ=1 γ to (4^-); γ to 4^+.
3080.1 *6*	(6^-)		C	J$^\pi$: γ's to (4^-) and (5^-).
3138.9b *8*	(6^-)		C	J$^\pi$: ΔJ=(0) γ to 6^+; γ to (4^-).
3173.1e *6*	(6^-)		C	J$^\pi$: ΔJ=1 γ to (5^-); γ to (4^-).
3230.6?a *18*			C	
3385.0c *9*	(7^-)		C	J$^\pi$: ΔJ=2 γ to (5^-); ΔJ=1 γ to 6^+.
3446.2& *4*	10^+		C	J$^\pi$: ΔJ=2 γ to 8^+.
3525.6d *6*	(7^-)		C	J$^\pi$: γ's to (5^-) and (6^-).

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Adopted Levels, Gammas (continued)

^{78}Sr Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
3927.3[b] *10*	(8⁻)	C	Jπ: ΔJ=2 γ (6⁻).
3963.9[e] *9*	(8⁻)	C	Jπ: γ′s to (6⁻) and (7⁻).
4251.1[c] *9*	(9⁻)	C	Jπ: γ′s to (7⁻) and 8⁺.
4400.6[d] *12*	(9⁻)	C	Jπ: γ to (7⁻).
4657.5[&] *5*	12⁺	C	Jπ: ΔJ=(2) γ to 10⁺.
4883.3[b] *11*	(10⁻)	C	Jπ: γ to (8⁻).
5281.1[c] *11*	(11⁻)	C	Jπ: γ to (9⁻).
5468.6[d] *16*	(11⁻)	C	Jπ: γ to (9⁻).
5982.0[b] *12*	(12⁻)	C	Jπ: γ to (10⁻).
6025.4[&] *7*	14⁺	C	Jπ: ΔJ=2 γ to 12⁺.
6035.8[@] *9*	(14⁺)	C	Jπ: γ to 12⁺.
6436.3[c] *12*	(13⁻)	C	Jπ: γ to (11⁻).
7190[b] *2*	(14⁻)	C	Jπ: γ to (12⁻).
7559.1[&] *8*	16⁺	C	Jπ: ΔJ=2 γ to 14⁺.
7671.3[c] *14*	(15⁻)	C	Jπ: γ to (13⁻).
8474[b] *2*	(16⁻)	C	Jπ: γ to (14⁻).
8987[c] *2*	(17⁻)	C	Jπ: γ to (15⁻).
9253.8[&] *9*	18⁺	C	Jπ: ΔJ=2 γ to 16⁺.
9870[b] *3*	(18⁻)	C	Jπ: γ to (16⁻).
10448[c] *2*	(19⁻)	C	Jπ: γ to (17⁻).
10995[&] *1*	(20⁺)	C	Jπ: γ to 18⁺.
11195[@] *1*	(20⁺)	C	Jπ: γ to 18⁺.
11428[b] *4*	(20⁻)	C	Jπ: γ to (18⁻).
12109?[c] *3*	(21⁻)	C	Jπ: possible γ to (19⁻).
12981[&] *2*	(22⁺)	C	Jπ: γ to (20⁺).
13294[@] *2*	(22⁺)	C	Jπ: γ to (20⁺).
15233?[&] *4*	(24⁺)	C	Jπ: possible γ to (22⁺).
17764?[&] *6*	(26⁺)	C	Jπ: possible γ to (24⁺).

[†] From least-squares fit to Eγ′s.

[‡] As proposed by 1997Ru03 based on γγ(θ)(DCO) data and band associations, with the exception that parentheses have been added by the evaluators when strong arguments are lacking. It is assumed that the spin ascend with excitation energy in heavy-ion fusion reactions.

[#] For excited states, values are from neutron-gated recoil-distance method (1982Li08).

[@] Level connected with g.s. band.

[&] Band(A): $K^\pi=0^+$, g.s. band. Strongly deformed structure with a deformation parameter of $\beta_2\approx0.40$ and Q(transition)=3.29 *19* for 2^+ state and 3.47 *17* for 4^+ state.

[a] Band(B): ΔJ=2 band (?).

[b] Band(C): Band based on (4⁻).

[c] Band(D): Band based on (5⁻).

[d] Band(E): Possible octupole band, α=1.

[e] Band(e): Possible octupole band, α=0.

Adopted Levels, Gammas (continued)

γ(^{78}Sr)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[†#]	α[a]	Comments
277.60	2$^+$	277.6 *1*	100	0.0	0$^+$	E2	0.0252	B(E2)(W.u.)=103 *13* α(K)=0.0220 *3*; α(L)=0.00266 *4*; α(M)=0.000447 *7*; α(N+..)=5.76×10^{-5} *9* α(N)=5.45×10^{-5} *8*; α(O)=3.11×10^{-6} *5*
780.80	4$^+$	503.2 *1*	100	277.60	2$^+$	E2		B(E2)(W.u.)=169 *17*
1477.6?		1200[b] *1*	100	277.60	2$^+$			
1493.19	6$^+$	712.4 *2*	100	780.80	4$^+$	Q		
1903.3		1626 *1*	100	277.60	2$^+$			
2243.6?		766[b] *1*	100	1477.6?				
2310.5?	(3$^-$)	1530[‡@b] *1*	100	780.80	4$^+$			
2388.4	8$^+$	895.2 *2*	100	1493.19	6$^+$	Q		
2537.1?	(4$^-$)	1756 *1*	100	780.80	4$^+$			
2606.0	(4$^-$)	703 *1*	18 *9*	1903.3				
		1825.0 *5*	100 *9*	780.80	4$^+$	&		
2712.0?	(5$^-$)	1931[‡] *2*	100	780.80	4$^+$			
2860.1	(5$^-$)	254.0 *2*	100 *14*	2606.0	(4$^-$)	D		
		550 *1*	29 *14*	2310.5?	(3$^-$)			
		2080 *2*	71 *14*	780.80	4$^+$			
3080.1	(6$^-$)	219.8 *3*	100 *50*	2860.1	(5$^-$)			
		475 *1*	100 *50*	2606.0	(4$^-$)			
3138.9	(6$^-$)	601.7 *5*	67 *17*	2537.1?	(4$^-$)			
		1646 *1*	100 *17*	1493.19	6$^+$	&		
3173.1	(6$^-$)	313.0 *4*	100 *33*	2860.1	(5$^-$)	D		
		567 *1*	67 *33*	2606.0	(4$^-$)			
3230.6?		987[b] *1*	100	2243.6?				
3385.0	(7$^-$)	673 *1*	50 *17*	2712.0?	(5$^-$)	Q		
		1892 *1*	100 *17*	1493.19	6$^+$	D		
3446.2	10$^+$	1057.8 *2*	100	2388.4	8$^+$	Q		
3525.6	(7$^-$)	352 *1*	17 *17*	3173.1	(6$^-$)			
		445.4 *4*	33 *17*	3080.1	(6$^-$)			
		665.6 *3*	100 *17*	2860.1	(5$^-$)			
3927.3	(8$^-$)	788.4 *5*	100	3138.9	(6$^-$)	Q		
3963.9	(8$^-$)	438 *1*	50 *50*	3525.6	(7$^-$)			
		791 *1*	100 *50*	3173.1	(6$^-$)			
4251.1	(9$^-$)	866.1 *3*	100 *12*	3385.0	(7$^-$)			
		1862 *2*	62 *12*	2388.4	8$^+$			
4400.6	(9$^-$)	875 *1*	100	3525.6	(7$^-$)			
4657.5	12$^+$	1211.3[‡] *3*	100	3446.2	10$^+$	(Q)		
4883.3	(10$^-$)	956.0 *5*	100	3927.3	(8$^-$)			
5281.1	(11$^-$)	1030.0 *5*	100	4251.1	(9$^-$)			
5468.6	(11$^-$)	1068 *1*	100	4400.6	(9$^-$)			
5982.0	(12$^-$)	1098.7 *6*	100	4883.3	(10$^-$)			
6025.4	14$^+$	1367.9 *4*	100	4657.5	12$^+$	Q		
6035.8	(14$^+$)	1378 *1*	100	4657.5	12$^+$			
6436.3	(13$^-$)	1155.2 *6*	100	5281.1	(11$^-$)			
7190	(14$^-$)	1208[‡] *1*	100	5982.0	(12$^-$)			
7559.1	16$^+$	1523 *1*	38 *5*	6035.8	(14$^+$)			
		1533.7 *4*	100 *5*	6025.4	14$^+$	Q		
7671.3	(15$^-$)	1235.0 *7*	100	6436.3	(13$^-$)			
8474	(16$^-$)	1284 *1*	100	7190	(14$^-$)			
8987	(17$^-$)	1316 *1*	100	7671.3	(15$^-$)			
9253.8	18$^+$	1694.7 *5*	100	7559.1	16$^+$	Q		

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Adopted Levels, Gammas (continued)

γ(^{78}Sr) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π
9870	(18$^-$)	1396 *2*	100	8474	(16$^-$)	12109?	(21$^-$)	1661[b] *2*	100	10448	(19$^-$)
10448	(19$^-$)	1461 *1*	100	8987	(17$^-$)	12981	(22$^+$)	1986 *2*	100	10995	(20$^+$)
10995	(20$^+$)	1741 *1*	100	9253.8	18$^+$	13294	(22$^+$)	2099 *2*	100	11195	(20$^+$)
11195	(20$^+$)	1941[‡] *1*	100	9253.8	18$^+$	15233?	(24$^+$)	2252[b] *3*	100	12981	(22$^+$)
11428	(20$^-$)	1558 *3*	100	9870	(18$^-$)	17764?	(26$^+$)	2531[b] *4*	100	15233?	(24$^+$)

† From ^{58}Ni(^{28}Si,2$\alpha\gamma$).
‡ Unresolved doublet structure.
# From DCO ratios in ^{58}Ni(^{28}Si,2$\alpha\gamma$) and RUL (when level lifetime is known).
@ From level-energy difference.
& DCO consistent with ΔJ=0, dipole transition.
[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] Placement of transition in the level scheme is uncertain.

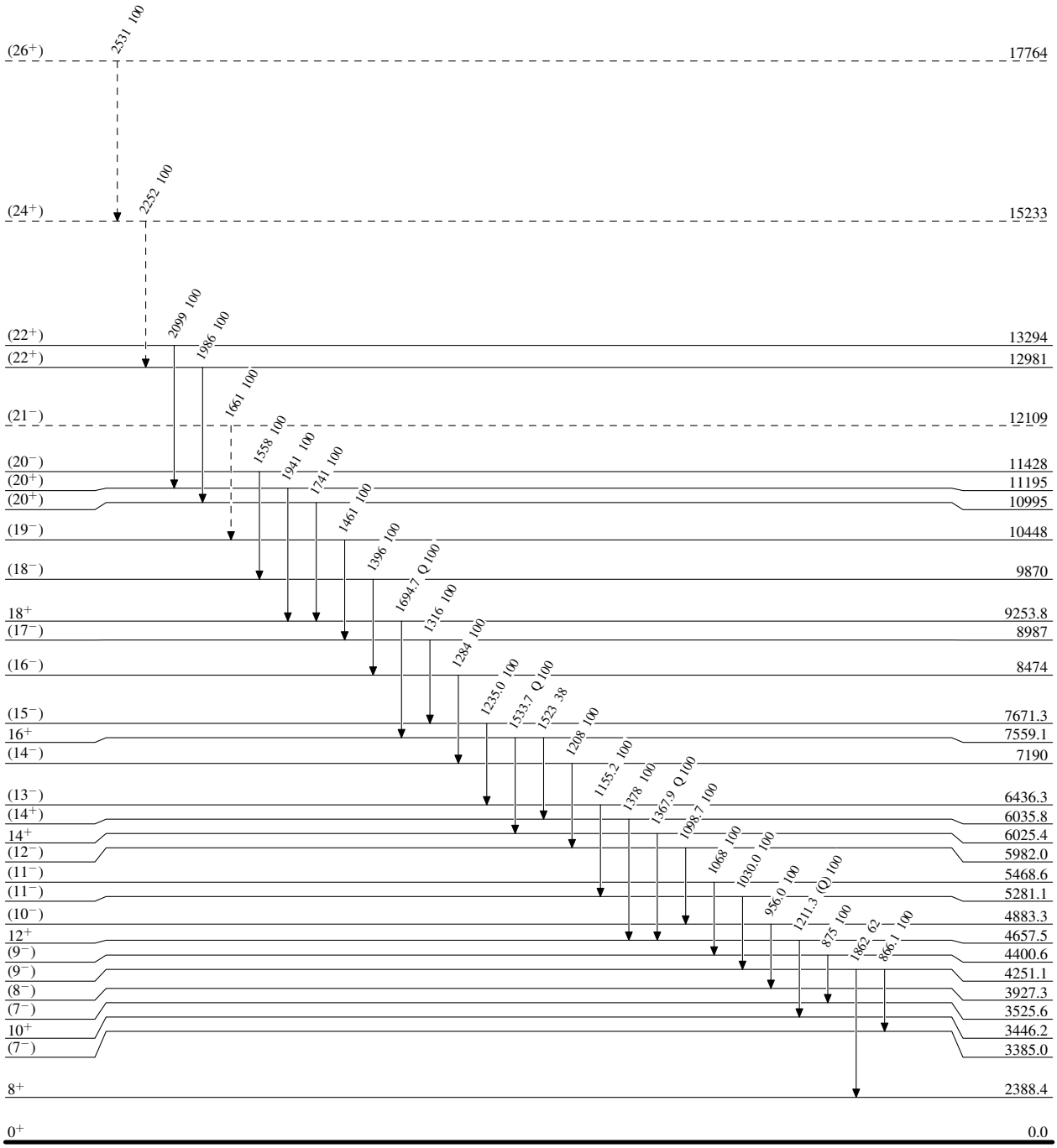
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{78}_{38}Sr_{40}$

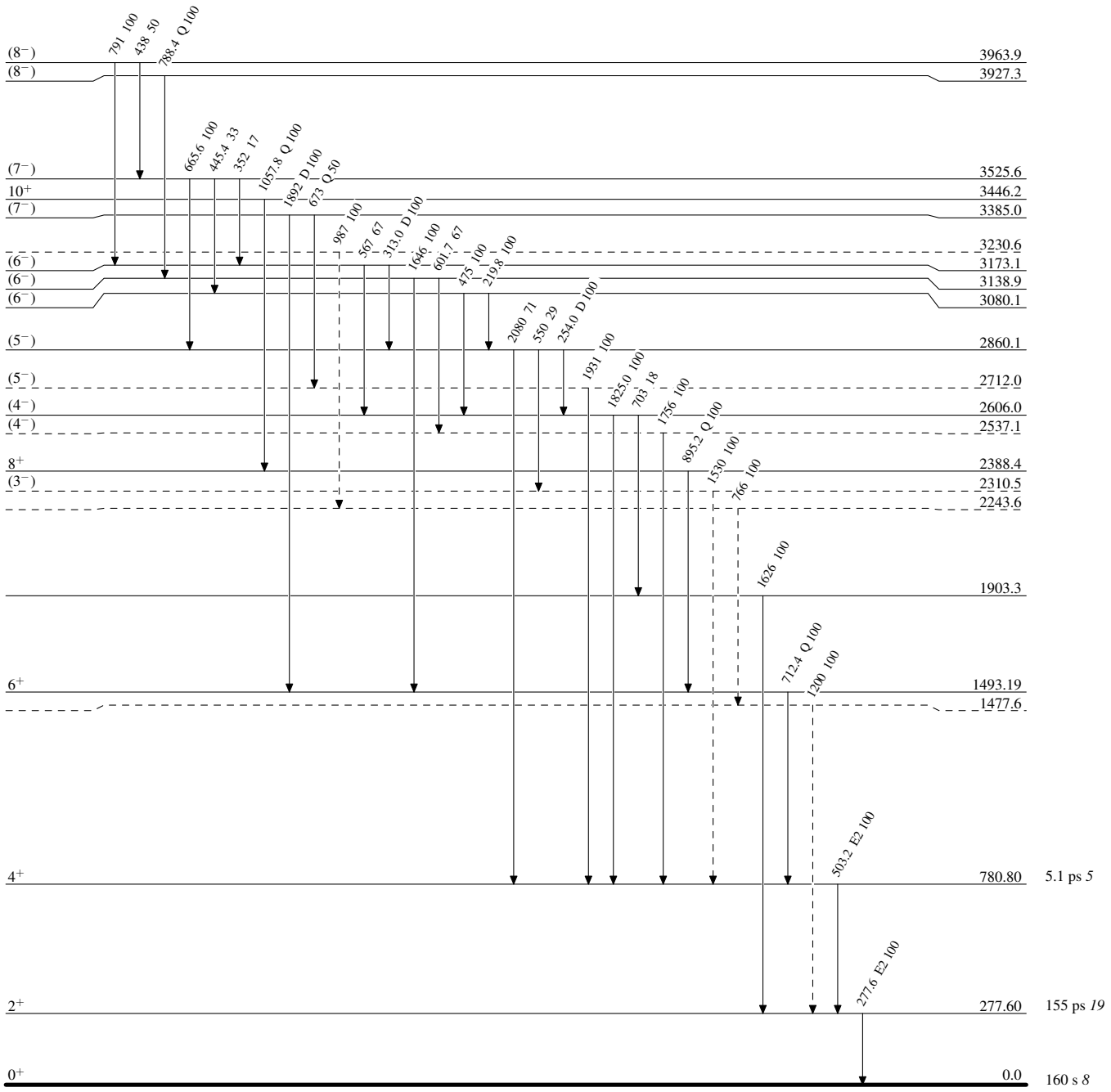
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{78}_{38}Sr_{40}$

Adopted Levels, Gammas