Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114,1 (2013)	20-Oct-2012

Q(β^-)=1500.4 *24*; S(n)=6358.72 *9*; S(p)=10888.7 *11*; Q(α)=−7153.3 *23* 2012Wa38
Note: Current evaluation has used the following Q record 1500.9 256358.72 *9* 10888.8 *11* −7153.423 2011AuZZ.
S(2n)=17471.35 *18*, S(2p)=20077.2 *11* (2011AuZZ).
Values in 2003Au03: Q(β^-)=1492.6 *26*, S(n)=6358.72 *9*, S(p)=10889.1 *11*, Q(α)=−7153.8 *22*, S(2n)=17471.36 *18*, S(2p)=20077.7 *11*.
^{89}Sr isotope produced and identified in bombardment of Sr with deuterons by 1937St01 (also 1939St01), and fission of uranium by neutrons (1939Li10), followed by measurement of half-life. Later studies of decay of ^{89}Sr: 1946Gr06, 1949Go20, 1955He81, 1959Os37, 1965An07, 1971Ba28, 1972La14, 1982Me04, 1990Sc08, 1998Sc09, 2002Al02, 2005Am01, and several others.
Structure calculations (selected): 2010Ro27, 2002Gr16, 1996Ja24, 1994He43, 1987LiZR, 1986He14.
Additional information 1.
Other reaction:
Resonances from (n,n),(n,γ): in '^{88}Sr(n,n),(n,γ):Resonances' dataset. 440 resonances are listed where the excitation energies range from 6370.99 to 7296.26 keV corresponding to resonance (lab) energies of 12.41 to 948.2 keV. Resonance parameters are listed there.

^{89}Sr Levels

Cross Reference (XREF) Flags

A	^{89}Rb β^- decay (15.32 min)	E	^{88}Sr(n,γ) E=th	I	^{88}Sr(d,pγ)
B	^{82}Se(^{11}B,p3nγ)	F	^{88}Sr(n,γ) E=23.6 keV	J	^{88}Sr(^{13}C,^{12}C)
C	^{86}Kr(α,nγ)	G	^{88}Sr(n,n),(n,γ):resonances	K	^{89}Y(μ^-,γ)
D	^{87}Sr(t,p)	H	^{88}Sr(d,p),(pol d,p)	L	^{89}Y(t,^{3}He)

E(level)†	J$^\pi$	T$_{1/2}$‡	XREF	Comments
0.0	5/2$^+$	50.563 d *25*	ABCDEF HIJKL	%β^-=100 μ=−1.1481 *8* (1987An02,1989Ra17,2011StZZ) Q=−0.271 *9* (2002Ma09,1987An02,1989Ra17,2011StZZ) RMS charge radius: (<r^2>)$^{1/2}$=4.2418 fm *23* (2004An14 evaluation; and 2008 update available at http://cdfe.sinp.msu.ru). J$^\pi$: hyperfine structure (1987Bu11). L=2 and Ay(θ) in (pol d,p). Additional information 2. T$_{1/2}$: weighted average (LWM method) of 50.65 d *5* (2005Am01), 50.61 d *5* (2002Al02), 50.75 d *25* (1972La14), 50.55 d *9* (1971Ba28), 50.52 d *3* (1965An07), 50.36 d *18* (1959Os37), and 50.5 d *2* (1955He81); normalized χ^2=1.3. Methods generally used timing of β using 4π proportional counter. Others: 1965Fl02, 53 d (Novey et al, NNES 9, 678 (1950)), 55 d (1949Go20), 54.5 d (1946Gr06), 55 d 5 (1939St01,1937St01), 54 d (1939Li10). μ,Q: hyperfine structure measurement (1987An02). Q is recalculated value by 2002Ma09. 1989Ra17 quoted Q from from 1987An02. Others: μ=−1.147 *2* (1990Bu12,1990Li28), Q=−0.315 *23* (1987An02), −0.278 *25* (1990Bu12,1990Li28). Δ<r^2>(^{88}Sr−^{89}Sr)=−0.124 fm^2 *5* (1990Bu12,1996Li25,1992Ne09,1992Li24). Others: −0.147 fm^2 *8* (1985Bu20), −0.10 *4* or −0.21 *10* (1987An02).
1032.00 *4*	1/2$^+$	>1 ps	A CDEF HIJK	J$^\pi$: L(d,p)=0. T$_{1/2}$: DSA in (^{13}C,^{12}Cγ) (1973HaUN).
1473.35 *6*	(7/2)$^+$	0.26 ps *10*	A CDE HI	XREF: H(1460). J$^\pi$: ΔJ=1, M1+E2 γ to 5/2$^+$. Probable 2$^+$ coupled to νd$_{5/2}$, populated in (d,p).

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Adopted Levels, Gammas (continued)

^{89}Sr Levels (continued)

E(level)[†]	J^π	$T_{1/2}$[‡]	XREF	Comments
1940.19 *6*	5/2$^+$	0.19 ps *5*	A CDEF HI	J^π: L=2 and Ay(θ) in (pol d,p).
2007.59 *5*	3/2$^+$	0.10 ps *4*	A CDEF HI	J^π: L=2 and Ay(θ) in (pol d,p).
2057.4 *5*	(1/2$^+$,3/2,5/2$^+$)		A	J^π: γ rays to 5/2$^+$ and 1/2$^+$.
2061.5 *5*	(9/2$^+$)	0.21 ps *6*	CD H	J^π: ΔJ=1 γ to (7/2$^+$). L(t,p)=2 from 9/2$^+$ for a 2073 *10* group. Probable 2$^+$ coupled to $\nu d_{5/2}$.
2079.0 *5*	11/2$^-$	0.33 ns *7*	BC H	J^π: L=5 and Ay(θ) in (pol d,p).
2280.19 *4*	(1/2)$^-$		A E H	J^π: L(d,p)=1 and probable 3$^-$ coupled to $\nu d_{5/2}$, populated as a non-stripped state in (d,p).
2451.64 *6*	3/2$^+$		A DEF HI	J^π: L=2 and Ay(θ) in (pol d,p).
2570.10 *4*	(3/2)$^-$		A E H	J^π: L(d,p)=1 and intense γ to 5/2$^+$.
2675[#] *4*	7/2$^+$		HI	XREF: I(2670). J^π: L=4 and Ay(θ) in (pol d,p).
2707.12 *9*	(5/2$^-$)		A D H	XREF: H(2696). J^π: log *ft*=6.8 from 3/2$^-$, γ rays to 5/2$^+$ and (7/2)$^+$; probable 3$^-$ coupled to $\nu d_{5/2}$.
2805 *3*	(7/2$^-$,5/2$^+$)		H	J^π: L=3,(2) and Ay(θ) in (pol d,p).
2916 *5*	3/2$^+$,5/2$^+$		H	J^π: L(d,p)=2.
2930.5 *5*	9/2$^{(+)}$	0.15 ps *5*	C	J^π: ΔJ=1, (M1+E2) γ to 7/2$^+$, γ to 11/2$^-$.
2961.9 *5*	9/2$^+$	0.7 ps *3*	CD H	XREF: D(2974). J^π: L(t,p)=0 from 9/2$^+$, also ΔJ=1 γ to 7/2$^+$.
3073 *9*	(3/2)$^+$		H	J^π: L(d,p)=2 and IAR of 15174, 3/2$^+$ resonance in ^{89}Y.
3128[#] *5*	3/2$^+$		D HI	XREF: D(3116)I(3130). J^π: L=2 and Ay(θ) in (pol d,p).
3200 *7*			H	
3227.87 *5*	(3/2)$^-$		A E	J^π: log *ft*=5.0 from 3/2$^-$, γ rays to 1/2$^+$ and 5/2$^+$.
3249[#] *9*	5/2$^+$		HI	XREF: I(3250). J^π: L=2, (3) and Ay(θ) in (d,p); IAR of 15291, 5/2$^+$ resonance in ^{89}Y.
3303.10 *24*	(3/2,5/2,7/2$^+$)		A	J^π: log *ft*=8.2 from 3/2$^-$; γ rays to 5/2$^+$ and (5/2$^-$).
3388.1 *7*	15/2$^-$	>7 ps	BC	J^π: ΔJ=2, E2 γ to 11/2$^-$.
3390?[#]			I	
3404.1 *7*	11/2$^-$		C H	XREF: H(3390). L=5 and Ay(θ) in (d,p); also ΔJ=(0) γ to 11/2$^-$.
3421 *10*	(11/2$^-$)		H	L=5 and Ay(θ) in (d,p).
3433.06 *11*	(1/2$^+$,3/2)		DE H	XREF: D(3448). J^π: γ rays to 5/2$^+$ and (1/2)$^-$; primary γ from 1/2$^+$.
3468 *1*			H	
3508.64 *7*	(3/2)$^+$		A E H	XREF: H(3497). J^π: L(d,p)=2; primary γ from 1/2$^+$.
3524.3 *7*	13/2$^-$	0.39 ps *12*	CD	J^π: ΔJ=1, M1+E2 γ to 11/2$^-$.
3541 *8*			D H	XREF: D(3566).
3599.0 *7*	(11/2$^+$)	0.43 ps *12*	C H	J^π: ΔJ=0, (E1) γ to 11/2$^-$.
3634 *5*	5/2$^-$,7/2$^-$		D H	J^π: L(d,p)=3.
3651.71 *19*	1/2$^{(+)}$,3/2,5/2		A	J^π: log *ft*=6.98 from 3/2$^-$; γ to 5/2$^+$.
3672.1 *7*	(15/2$^-$)	2.4 ps *+27−8*	BC	J^π: γ to 11/2$^-$; γ from (19/2)$^-$; possible ΔJ=0 transition to 15/2$^-$. 13/2$^-$ was proposed in (α,nγ) (1981Wa10) based on $\gamma(\theta)$ and polarization. The $\gamma(\theta)$ data in 1981Wa10 are consistent with ΔJ=2, quadrupole for 1593γ to 11/2$^-$. The polarization measurement in 1981Wa10 had a large uncertainty, thus M1+E2 assignment for 1593γ based on these data could be suspect.
3677 *7*	+		D H	J^π: L(t,p)=2 from 9/2$^+$ target.
3699.82 *10*	5/2$^+$		E H	XREF: H(3687). J^π: L=2 and Ay(θ) in (pol d,p) for a 3687 *6* level which is

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Adopted Levels, Gammas (continued)

^{89}Sr Levels (continued)

E(level)[†]	J^π	XREF	Comments
			associated with 3699.8 level populated in (n,γ).
3728.0 *10*		C	J^π: γ to (11/2$^-$).
3745 *7*		H	
3750.7 *10*	17/2$^-$	BC	J^π: ΔJ=1, M1(+E2) γ to 15/2$^-$.
3755[#] *7*	1/2$^+$	HI	J^π: L(d,p)=0.
3763 *7*	$^+$	D H	J^π: L(t,p)=2 from 9/2$^+$.
3829 *6*	3/2$^+$,5/2$^+$	H	J^π: L(d,p)=2.
3845.7 *4*	5/2$^+$	A D	XREF: D(3858). J^π: L(t,p)=2 from 9/2$^+$ and log *ft*=6.75 from 3/2$^-$.
3881 *7*		H	
3910 *7*	($^+$)	d H	J^π: L(t,p)=2 from 9/2$^+$ for 3922 *10* level which corresponds to 3910 and/or 3937 level.
3937 *7*	($^+$)	d H	J^π: see comment for 3910 level.
3987.8 *4*	1/2$^{(+)}$,3/2,5/2$^{(+)}$	A H	J^π: log *ft*=6.44 from 3/2$^-$, γ rays to 5/2$^+$ and 1/2$^+$.
4017 *5*		H	
4034 *5*		H	
4050.0 *3*	1/2$^+$	A H	J^π: L(d,p)=0.
4055 *4*		H	
4065 *6*	(1/2$^+$,5/2$^-$,7/2$^-$)	H	J^π: L(d,p)=(0,3).
4072 *10*	($^+$)	D	J^π: L(t,p)=(2) from 9/2$^+$.
4081 *4*		H	
4093.8 *6*	1/2$^{(+)}$,3/2,5/2	A	J^π: log *ft*=5.87 from 3/2$^-$; γ to 5/2$^+$.
4120 *5*		H	
4168 *7*	(3/2$^+$,5/2$^+$)	H	J^π: L(d,p)=(2).
4180 *7*		d H	
4199 *7*		d H	
4207 *7*		H	
4208.8 *10*	(19/2)$^-$	BC	J^π: ΔJ=2, (E2) γ to 15/2$^-$; ΔJ=1, M1+E2 γ to 17/2$^-$.
4222 *7*		H	
4225.53 *9*	(1/2$^+$,3/2)	E H	J^π: primary γ from 1/2$^+$; γ to 5/2$^+$.
4233 *7*		H	
4247 *7*		H	
4254 *7*		d H	
4271 *7*		d H	
4328.80 *9*	(3/2)$^+$	E H	XREF: H(4315). J^π: L(d,p)=2 for 4315 *10* group; primary γ from 1/2$^+$.
4335.58 *7*	(1/2$^+$,3/2)	E	J^π: primary γ from 1/2$^+$, γ to 5/2$^+$.
4359 *10*		H	
4382 *7*		H	
4406 *7*		H	
4417 *7*		H	
4435 *7*	(5/2$^-$,7/2$^-$)	H	J^π: L(d,p)=(3).
4445.16 *9*	(1/2$^+$,3/2)	DE	J^π: primary γ from 1/2$^+$; γ to 5/2$^+$, 1/2$^+$ and (1/2)$^-$. L(d,p)=(2) supports 3/2$^+$.
4465 *8*		H	
4472 *8*	1/2$^+$	H	J^π: L(d,p)=0.
4518 *10*	7/2$^+$,9/2$^+$	D H	XREF: D(4539). J^π: L(d,p)=4.
4560 *10*	(3/2$^+$,5/2$^+$)	H	J^π: L(d,p)=(2).
4594 *10*	3/2$^+$,5/2$^+$	H	J^π: L(d,p)=2.
4614 *10*	1/2$^+$	H	J^π: L(d,p)=0.
4626 *10*		H	
4659.85 *8*	1/2$^+$	DE H	J^π: L(d,p)=0.
4679 *7*	(1/2$^-$,3/2,5/2$^+$)	H	J^π: L(d,p)=(2,1).
4742 *7*	(1/2$^+$)	H	J^π: L(d,p)=(0).
4759 *10*		D H	
4790 *10*		d H	

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Adopted Levels, Gammas (continued)

^{89}Sr Levels (continued)

E(level)[†]	J^π	XREF	Comments
4818 *10*		d H	J^π: L(d,p)=(4,3).
4865 *10*	(7/2$^+$,9/2$^+$)	D H	J^π: L(d,p)=(4).
4894 *10*		H	
4928 *10*	(1/2$^-$,3/2,5/2$^+$)	H	J^π: L(d,p)=(1,2).
4955.54 *9*	(3/2$^+$)	E	J^π: primary γ from 1/2$^+$; γ to (7/2)$^+$.
5005 *10*		H	
5036 *10*	1/2$^+$	d H	J^π: L(d,p)=0.
5067 *10*	3/2$^+$,5/2$^+$	d H	J^π: L(d,p)=2.
5081 *10*	3/2$^+$,5/2$^+$	d H	J^π: L(d,p)=2.
5107 *10*		dE H	J^π: L(t,p)=2 from 9/2$^+$ for a 5096 group gives π=+ for 5081 and/or 5107 levels.
5115.14 *19*	(21/2)	B	J^π: ΔJ=1 γ to (19/2)$^-$. Positive parity proposed by 2012Hw05 based on coupling of 15/2$^-$ to 3$^-$ octupole state.
5130 *10*		H	
5148 *10*		H	
5169 *10*	(3/2$^+$,5/2$^+$)	H	J^π: L(d,p)=(2).
5208 *10*		D H	
5242 *10*		H	
5259 *10*		H	
5280 *10*	1/2$^+$	H	J^π: L(d,p)=0.
5298 *10*	1/2$^+$	d H	J^π: L(d,p)=0.
5316 *10*		d H	
5360[#] *10*	1/2$^+$	HI	J^π: L(d,p)=0.
5399 *10*		d H	
5418 *10*	(1/2$^+$)	d H	J^π: L(d,p)=(0).
5442 *10*		H	
5456 *10*		H	
5480 *10*		d H	
5496 *10*		d H	
5529 *10*		d H	
5540 *10*		d H	J^π: L(t,p)=(3,4) from 9/2$^+$ for a 5526 level.
5573 *10*		H	
5583 *10*		H	
5611 *10*		d H	
5628 *10*		d H	
5657 *10*		d H	
5666 *10*		d H	
5694 *10*		H	
5725.9 *4*	(19/2,21/2,23/2$^-$)	B	J^π: γ to (19/2)$^-$.
5753 *10*		d H	
5773 *10*		d H	
5825 *10*		H	
5858 *10*		H	
5925 *10*		D	
5979.1 *4*	(23/2)	B	J^π: ΔJ=1 γ to (21/2).
5995 *10*		D	
6115 *10*		D	
6188 *10*		D	
6649.9 *4*	(25/2)	B	J^π: ΔJ=(2) γ to (21/2).
6857.5 *5*	(25/2)	B	J^π: ΔJ=1 γ to (23/2).
7025.7 *4*	(25/2)	B	J^π: γ to (21/2).
7421.6 *4*	(27/2)	B	J^π: ΔJ=(1) γ to (25/2); γ to (25/2).
7984.4? *7*		B	J^π: possible γ to (25/2) suggests (25/2:29/2).

[†] From least-squares fit to Eγ data for levels populated in γ-ray studies and, generally, from (d,p) for levels populated in transfer

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Adopted Levels, Gammas (continued)

^{89}Sr Levels (continued)

reaction studies only. In addition 439 neutron resonances give levels in the range from 6370.99 to 7296.26 keV, mostly with spins of 1/2 and 3/2 (from s-, p-, d- wave resonances). These levels are not listed here. See ^{88}Sr(n,n),(n,γ):resonances dataset for details.

‡ From DSA in (α,nγ) (1981Wa10) for levels above 1032.

From (d,p), (pol d,p).

$\gamma(^{89}Sr)$

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]	Comments
1032.00	$1/2^+$	1031.95 *5*	100	0.0	$5/2^+$	[E2]		B(E2)(W.u.)<20
1473.35	$(7/2)^+$	1473.30 *7*	100	0.0	$5/2^+$	M1+E2	+0.75 *7*	B(M1)(W.u.)=0.017 *7*; B(E2)(W.u.)=4.8 *20* δ: other: +0.32 *5* from (d,pγ).
1940.19	$5/2^+$	466.62 *15*	21 *5*	1473.35	$(7/2)^+$	M1+E2	+0.18 *8*	B(M1)(W.u.)=0.19 *7*; B(E2)(W.u.)=31 *+32−21*
		1940.15 *6*	100 *7*	0.0	$5/2^+$	M1+E2	−0.45 *17*	B(M1)(W.u.)=0.011 *4*; B(E2)(W.u.)=0.6 *5* δ: others: −0.5 *+2−10* (d,pγ); +6 *+9−3* (α,nγ).
2007.59	$3/2^+$	975.38 *19*	2.3 *5*	1032.00	$1/2^+$			
		2007.56 *8*	100 *7*	0.0	$5/2^+$	M1+E2[&]	−0.8[&] *+5−8*	B(M1)(W.u.)=0.016 *11*; B(E2)(W.u.)=2.8 *25*
2057.4	$(1/2^+,3/2,5/2^+)$	1025.3 *5*	98 *35*	1032.00	$1/2^+$			
		2058.0 *11*	100 *38*	0.0	$5/2^+$			
2061.5	$(9/2^+)$	588.1	9.5	1473.35	$(7/2)^+$	(M1+E2)	+0.01 *3*	B(M1)(W.u.)=0.045 *13*
		2061.6	100	0.0	$5/2^+$	[E2]		B(E2)(W.u.)=2.8 *8*
2079.0	$11/2^-$	2079.4 *1*	100	0.0	$5/2^+$	[E3]		B(E3)(W.u.)=47 *10*
2280.19	$(1/2)^-$	272.42[@] *7*	3.34 *16*	2007.59	$3/2^+$			
		1248.18 *5*	100 *5*	1032.00	$1/2^+$			
		2280.00 *15*	0.42 *4*	0.0	$5/2^+$			I_γ: from β^- decay. Other: 5.5 *28* in (n,γ).
2451.64	$3/2^+$	512	76 *7*	1940.19	$5/2^+$			Reported in (d,pγ) only.
		1419.56 *8*	100 *12*	1032.00	$1/2^+$	(M1+E2)[&]	−0.6[&] *4*	
		2451.65 *11*	61 *6*	0.0	$5/2^+$	(M1(+E2))[&]	<+0.18[&]	
2570.10	$(3/2)^-$	118.3[@] *5*	0.12 *6*	2451.64	$3/2^+$			
		289.76[@] *10*	5.5 *3*	2280.19	$(1/2)^-$			
		562.08[@] *21*	0.47 *6*	2007.59	$3/2^+$			
		1538.08 *6*	26.3 *18*	1032.00	$1/2^+$			
		2570.16 *7*	100 *5*	0.0	$5/2^+$			
2675	$7/2^+$	735[#]	12 *3*	1940.19	$5/2^+$			
		1202[#]	17 *4*	1473.35	$(7/2)^+$	(M1+E2)[&]	+2.5[&] *+10−6*	
		2675[#]	100 *6*	0.0	$5/2^+$	(M1+E2)[&]	−7[&] *2*	
2707.12	$(5/2^-)$	699.6 *4*	1.1 *3*	2007.59	$3/2^+$			
		766.76 *12*	8.0 *9*	1940.19	$5/2^+$			
		1234.0 *4*	1.4 *8*	1473.35	$(7/2)^+$			
		2707.26 *15*	100 *6*	0.0	$5/2^+$			
2930.5	$9/2^{(+)}$	852	45 *3*	2079.0	$11/2^-$	[E1]		B(E1)(W.u.)=0.0011 *4*
		1457.0	100 *4*	1473.35	$(7/2)^+$	(M1+E2)	−0.24 *6*	B(M1)(W.u.)=0.031 *11*; B(E2)(W.u.)=0.9 *6*
2961.9	$9/2^+$	1488.5	100	1473.35	$(7/2)^+$	(M1(+E2))		δ: 0.00 *5* or +4.1 *+23−11* for $J^\pi=9/2^+$ and 0.0 for $J^\pi=9/2^-$. Mult.: $\gamma(\theta)$ and ΔJ^π.
3128	$3/2^+$	3128[#]	100	0.0	$5/2^+$			
3227.87	$(3/2)^-$	657.77[@] *6*	75 *4*	2570.10	$(3/2)^-$			

$^{89}_{38}Sr_{51}$-6

$\gamma(^{89}Sr)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	δ[‡]	Comments
3227.87	(3/2)$^-$	776.19[@] *25*	0.52 *13*	2451.64	3/2$^+$			
		947.63 *7*	69 *4*	2280.19	(1/2)$^-$			I_γ: from β^- decay. Other: 125 *40* in (n,γ).
		1220.35[@] *9*	1.65 *13*	2007.59	3/2$^+$			
		2196.02 *20*	100 *7*	1032.00	1/2$^+$			
		3227.84[@] *13*	0.57 *4*	0.0	5/2$^+$			
3249	5/2$^+$	1776[#]	33 *13*	1473.35	(7/2)$^+$			
		3249[#]	100 *13*	0.0	5/2$^+$			
3303.10	(3/2,5/2,7/2$^+$)	596.0 *3*	100 *25*	2707.12	(5/2$^-$)			
		3303.5 *8*	25 *13*	0.0	5/2$^+$			
3388.1	15/2$^-$	1309.3 *1*	100	2079.0	11/2$^-$	E2		B(E2)(W.u.)<0.89
3390?		3390[#]	100	0.0	5/2$^+$			
3404.1	11/2$^-$	1325.1	100	2079.0	11/2$^-$			
3433.06	(1/2$^+$,3/2)	1152.75 *16*	69 *19*	2280.19	(1/2)$^-$			
		1425.39 *18*	60 *17*	2007.59	3/2$^+$			
		3433.14 *18*	100 *13*	0.0	5/2$^+$			
3508.64	(3/2)$^+$	205.7[@] *4*	1.0 *5*	3303.10	(3/2,5/2,7/2$^+$)			
		801.1[@] *5*	1.5 *10*	2707.12	(5/2$^-$)			
		1057.2[@] *4*	2.0 *10*	2451.64	3/2$^+$			
		1228.46 *13*	10.6 *15*	2280.19	(1/2)$^-$			E_γ,I_γ: from β^- decay.
		1501.00[@] *15*	17.2 *15*	2007.59	3/2$^+$			
		2035.37 *20*	4.5 *23*	1473.35	(7/2)$^+$			γ reported in (n,γ) E=th only.
		3508.65 *19*	100 *6*	0.0	5/2$^+$			
3524.3	13/2$^-$	1445.3	100	2079.0	11/2$^-$	M1+E2	+0.67 *15*	B(M1)(W.u.)=0.013 *5*; B(E2)(W.u.)=3.0 *14*
3599.0	(11/2$^+$)	1520.0	100	2079.0	11/2$^-$	(E1)		B(E1)(W.u.)=0.00022 *7*
3651.71	1/2$^{(+)}$,3/2,5/2	1081.4 *3*	67 *17*	2570.10	(3/2)$^-$			
		1644.2 *3*	67 *17*	2007.59	3/2$^+$			
		3651.8 *4*	100 *33*	0.0	5/2$^+$			
3672.1	(15/2$^-$)	283.9 *3*	100 *6*	3388.1	15/2$^-$	D		
		1593.2 *3*	75 *6*	2079.0	11/2$^-$	[E2]		B(E2)(W.u.)=0.4 *2* I_γ: branching ratios are from (^{11}B,p3nγ). In (α,nγ), Iγ(1593)/Iγ(284)=3.2, but 284γ in this reaction is unresolved. Mult.: M1+E2, δ=+0.30 *3* from $\gamma(\theta$,pol) data in (α,nγ). E2 required by 15/2$^-$ assignment proposed in (^{11}B,p3nγ) (2001St14).
3699.82	5/2$^+$	1419.56[a]	<63	2280.19	(1/2)$^-$			
		2667.84 *13*	100 *13*	1032.00	1/2$^+$			
		3699.3 *4*	27 *6*	0.0	5/2$^+$			
3728.0		323.9	100	3404.1	11/2$^-$			

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$\gamma(^{89}Sr)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	δ[‡]
3750.7	17/2⁻	362.4 *1*	100	3388.1	15/2⁻	M1(+E2)	+0.01 *3*
3755	1/2⁺	1747[#]	61 *8*	2007.59	3/2⁺		
		3755[#]	100 *8*	0.0	5/2⁺		
3845.7	5/2⁺	1138.5 *5*	40 *20*	2707.12	(5/2⁻)		
		2372.8 *9*	40 *20*	1473.35	(7/2)⁺		
		3845.4 *6*	100 *20*	0.0	5/2⁺		
3987.8	1/2⁽⁺⁾,3/2,5/2⁽⁺⁾	1979.7 *5*	100 *25*	2007.59	3/2⁺		
		2955.0 *12*	25 *13*	1032.00	1/2⁺		
		3989.1 *8*	75 *25*	0.0	5/2⁺		
4050.0	1/2⁺	822.0 *4*	100 *40*	3227.87	(3/2)⁻		
		1770.2 *8*	40 *20*	2280.19	(1/2)⁻		
		2109.7 *5*	60 *20*	1940.19	5/2⁺		
4093.8	1/2⁽⁺⁾,3/2,5/2	4093.7 *6*	100	0.0	5/2⁺		
4208.8	(19/2)⁻	458.0 *1*	100.0 *18*	3750.7	17/2⁻	M1+E2	+0.41 *5*
		536.5 *3*	5.1 *7*	3672.1	(15/2⁻)		
		820.4 *1*	94.2 *15*	3388.1	15/2⁻	(E2)	
4225.53	(1/2⁺,3/2)	2285.2 *3*	100 *20*	1940.19	5/2⁺		
		4225.55 *16*	100 *8*	0.0	5/2⁺		
4328.80	(3/2)⁺	2321.29 *19*	82 *15*	2007.59	3/2⁺		
		3296.62 *24*	44 *7*	1032.00	1/2⁺		
		4328.66 *15*	100 *7*	0.0	5/2⁺		
4335.58	(1/2⁺,3/2)	2055.4 *3*	17 *4*	2280.19	(1/2)⁻		
		3303.52 *10*	100 *5*	1032.00	1/2⁺		
		4335.46 *13*	40 *3*	0.0	5/2⁺		
4445.16	(1/2⁺,3/2)	2165.3 *3*	100 *23*	2280.19	(1/2)⁻		
		2437.74 *24*	85 *18*	2007.59	3/2⁺		
		3413.1 *5*	28 *10*	1032.00	1/2⁺		
		4444.0 *10*	15 *8*	0.0	5/2⁺		
4659.85	1/2⁺	2379.43 *12*	100 *12*	2280.19	(1/2)⁻		
		2652.58 *16*	53 *8*	2007.59	3/2⁺		
		3627.73 *18*	51 *5*	1032.00	1/2⁺		
4955.54	(3/2⁺)	2948.05 *11*	100 *11*	2007.59	3/2⁺		
		3482.0 *4*	14 *4*	1473.35	(7/2)⁺		
		3923.30 *17*	29 *3*	1032.00	1/2⁺		
5115.14	(21/2)	906.0 *1*	100	4208.8	(19/2)⁻	D	
5360	1/2⁺	4328[#a]		1032.00	1/2⁺		
		5360[#a]		0.0	5/2⁺		
5725.9	(19/2,21/2,23/2⁻)	1516.7 *3*	100	4208.8	(19/2)⁻		
5979.1	(23/2)	253.3 *5*	9.1 *18*	5725.9	(19/2,21/2,23/2⁻)		
		864.0 *3*	100 *9*	5115.14	(21/2)	D	
6649.9	(25/2)	1534.7 *5*	100	5115.14	(21/2)	(Q)	

$^{89}_{38}Sr_{51}$-8

$\gamma(^{89}Sr)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]
6857.5	(25/2)	878.3 *3*	100	5979.1	(23/2)	D
7025.7	(25/2)	1910.5 *3*	100	5115.14	(21/2)	
7421.6	(27/2)	395.9 *3*	88 *12*	7025.7	(25/2)	(D)
		771.7 *3*	100 *12*	6649.9	(25/2)	
7984.4?		1334.5 *5*	100	6649.9	(25/2)	

[†] Weighted averages of all available values.
[‡] From (α,nγ), unless otherwise stated.
[#] γ from (d,pγ). Eγ is from level energy difference.
[@] γ reported in β^- decay only.
[&] From (d,pγ).
[a] Placement of transition in the level scheme is uncertain.

$^{89}_{38}Sr_{51}$-9

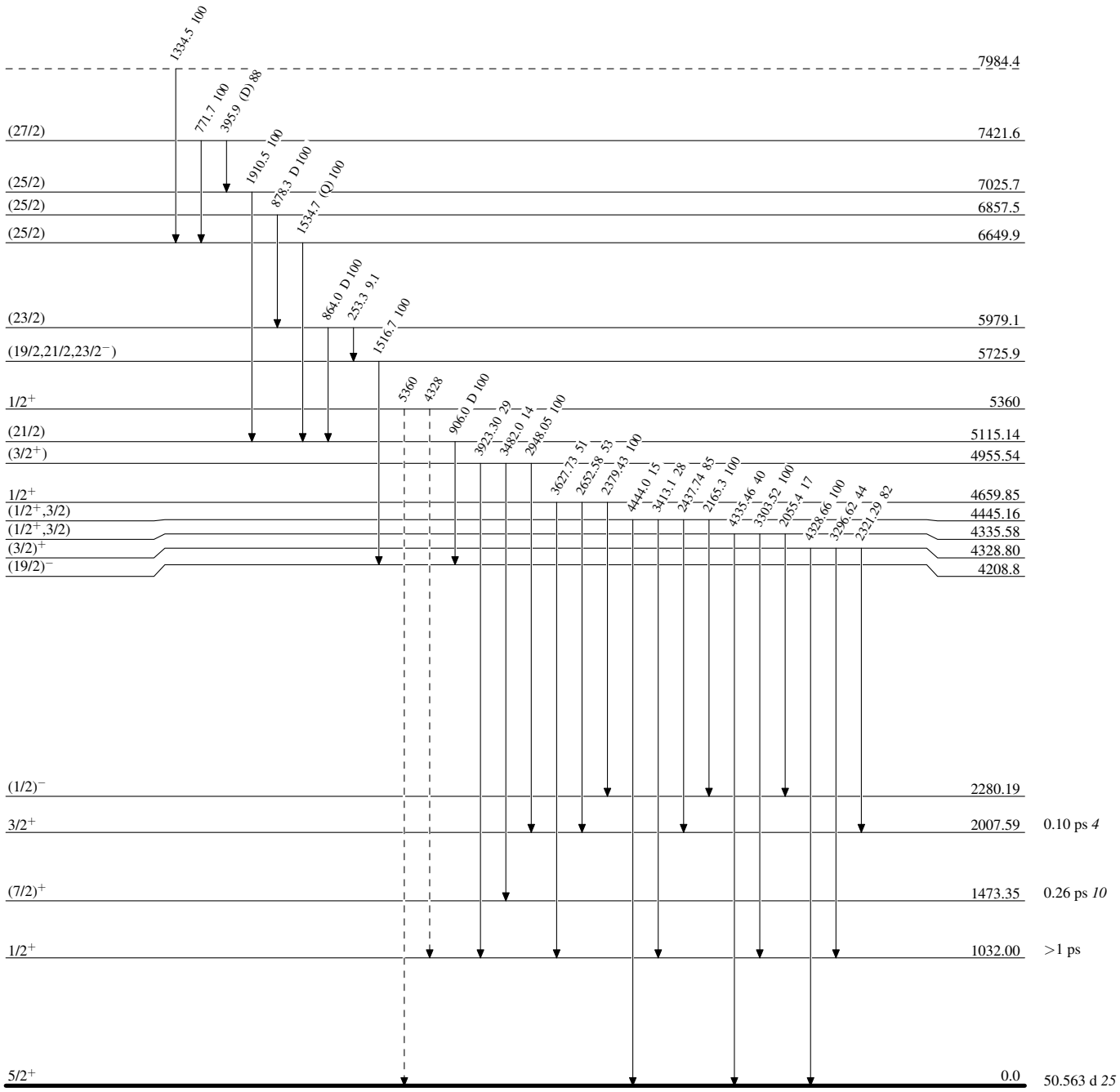
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{89}_{38}Sr_{51}$

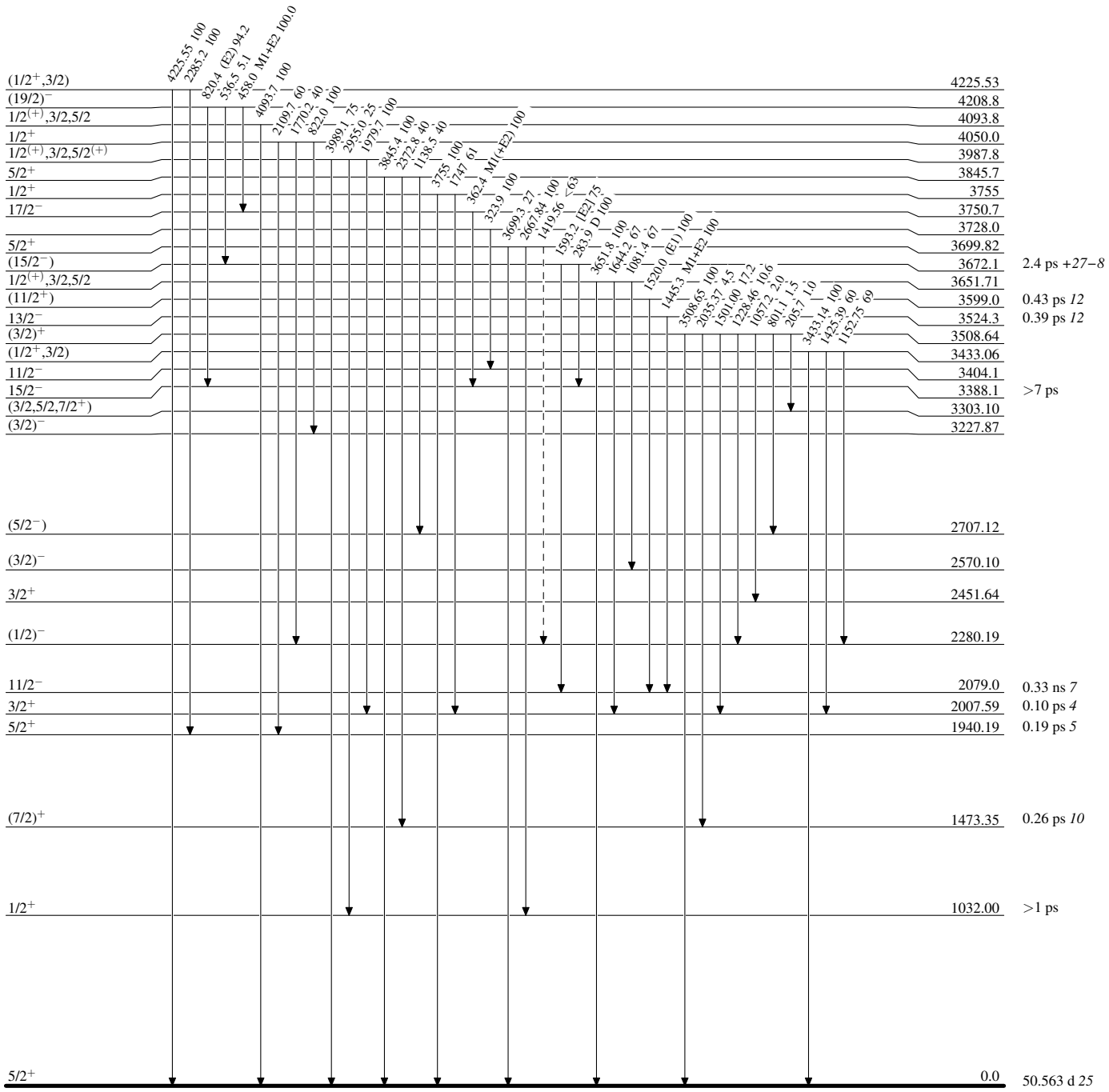
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)

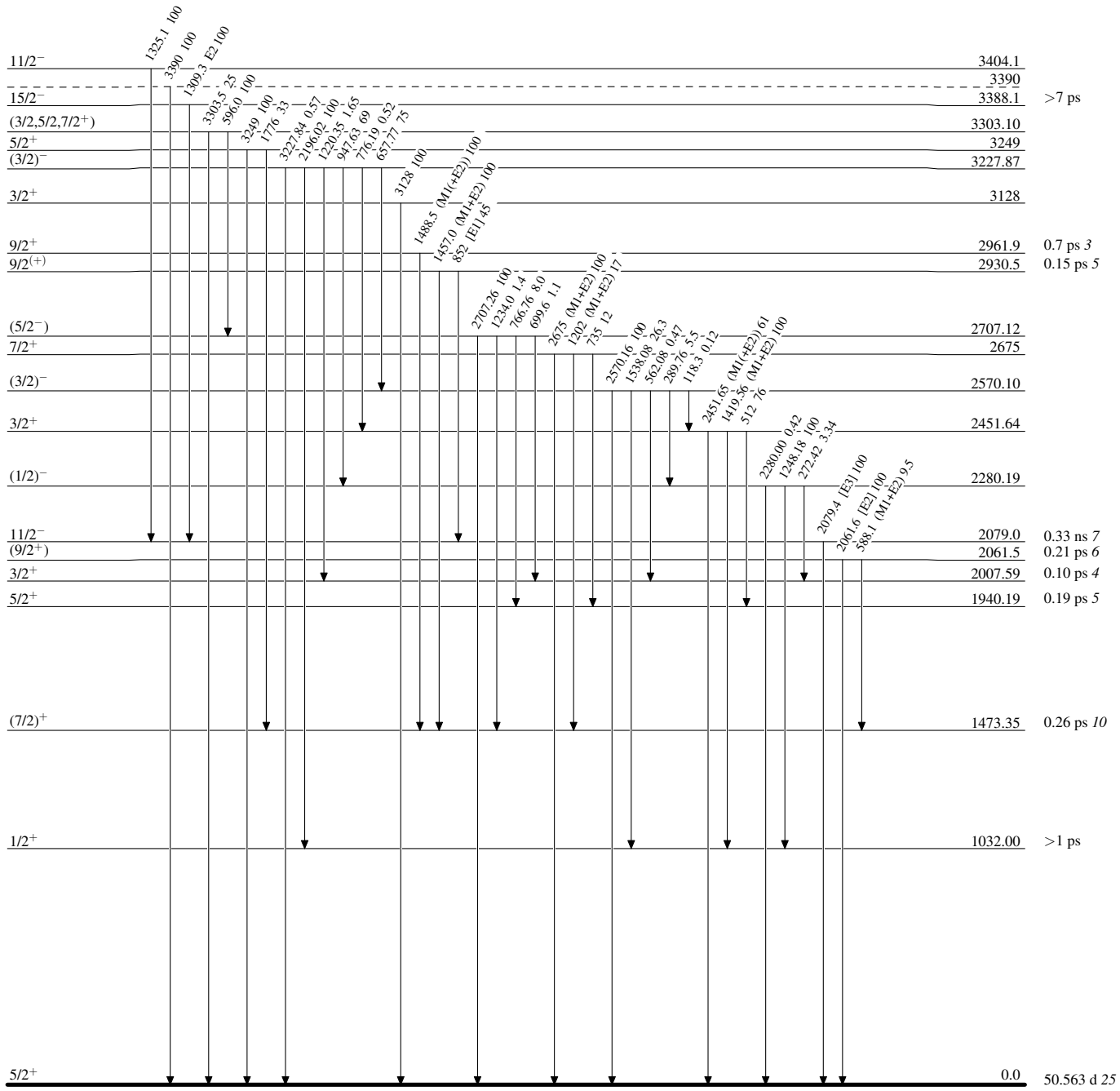


$^{89}_{38}Sr_{51}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

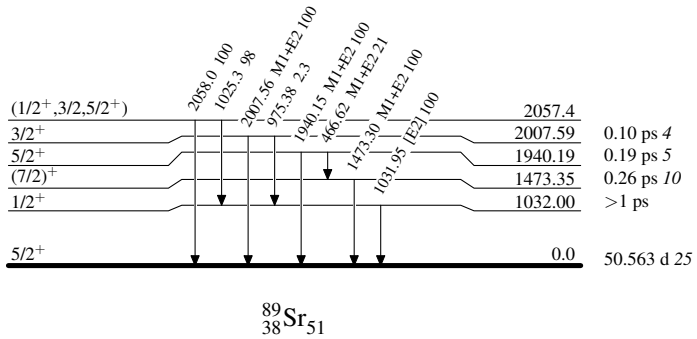


$^{89}_{38}Sr_{51}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{89}_{38}Sr_{51}$