^{88}Sr(^{6}Li,3nγ),^{78}Se(^{16}O,2npγ) 1976Br14

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 114, 1293 (2013)	1-Sep-2013

Others: 1975Br01, 1977Ha49, 1985An23.

^{88}Sr(^{6}Li,3nγ):

1976Br14,1975Br01: E=34 MeV. Natural target. Ge(Li), FWHM=2.5 keV to 3.0 keV. Si(Li), FWHM=180 eV. Measured γ singles and coincidence spectra, excitation functions, ^{6}Li-γ(t), and ^{6}Li-$\gamma(\theta)$.

1977Ha49: E=34 MeV. Enriched target. Ge(Li) detectors. Measured Eγ, angular distributions, time-dependent perturbed angular distributions.

^{78}Se(^{16}O,2npγ):

1985An23: E=56 MeV and 64 MeV. >95% enriched targets. Ge(Li). Measured Eγ, $\gamma\gamma$(t) (timing FWHM=6 ns). Deduced $T_{1/2}$ from centroid shift.

^{91}Nb Levels

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	Comments
0	$9/2^+$		
104.4 *7*	$1/2^-$		
1187.0 *5*	$5/2^-$		
1312.4 *13*	$3/2^-$		
1581.0 *10*	$(7/2)^+$		
1637.0 *10*	$(9/2^+)$		
1790.5 *4*	$(9/2^-)$		
1984.6 *4*	$13/2^-$	≈10 ns	$T_{1/2}$: from ^{6}Li-γ(t) (1976Br14).
2034.7 *4*	$17/2^-$	3.76 μs *12*	g=1.273 *16* (1977Ha49) $T_{1/2}$: from ^{6}Li-γ(t) (1976Br14). Other: 3.4 μs *1* from time-dependent perturbed angular distribution (1977Ha49). g: From time-dependent perturbed angular distribution (1977Ha49).
2291.0 *5*	$13/2^+$		
2414.2 *6*	$11/2^-$		
2660.9 *5*	$15/2^-$	≤14 ps	J$^{\pi}$: from 1985An23; 1976Br14 could not rule out J=19/2. $T_{1/2}$: from Doppler shift observed in (^{6}Li,3nγ) (1976Br14).
3110.4 *5*	$17/2^+$	<0.2 ns	$T_{1/2}$: from γ(t) (1985An23).
3467.0 *5*	$21/2^+$		
4096.9 *6*	$(19/2^-)$		
4351.5 *6*	$(21/2^+)$		J$^{\pi}$: from 1985An23; however, 1976Br14 suggest π=−, consistent with adopted π=(−).
4772.6[#]	$(23/2^+)$		J$^{\pi}$: from 1985An23.
5182.1? *21*	(23/2,25/2)		
5270.5[#]	$(23/2^+)$		J$^{\pi}$: from 1985An23.
5455.5	$(25/2^+)$	1.2 ns *3*	J$^{\pi}$: from 1985An23. $T_{1/2}$: from $\gamma\gamma$(t) (1985An23).

[†] From least-squares fit to Eγ.

[‡] From 1976Br14, based on $\gamma(\theta)$ and $\gamma\gamma$ coin data, if E(level)>1800 (unless noted otherwise); from Adopted Levels if E(level)<1800.

[#] E differs In Adopted Levels because adopted order differs for 185γ, 497γ and 422γ cascade; the adopted order defines levels At 4848 and 5034 instead of 4773 and 5271 shown here.

^{88}Sr(^{6}Li,3nγ),^{78}Se(^{16}O,2npγ) 1976Br14 (continued)

$\gamma(^{91}Nb)$

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[d]	Comments
50.1 *2*	≈6	2034.7	17/2$^-$	1984.6	13/2$^-$	[E2]		13.9 *3*	α(K)=9.8; α(L)=3.55; α(M)=0.638; α(N+..)=0.097 Mult.: not M2 from RUL.
(104.62 *5*)		104.4	1/2$^-$	0	9/2$^+$				Not observed in this reaction; Eγ is from Adopted Gammas.
[x]140									Coincident with 919γ (1976Br14).
185.0[&]		5455.5	(25/2$^+$)	5270.5	(23/2$^+$)				A_2<0 for 186γ doublet in 1976Br14.
194.1 *3*	48 *5*	1984.6	13/2$^-$	1790.5	(9/2$^-$)	E2[c]		0.1051	A_2=+0.22 *2*, A_2=−0.06 *3* (1976Br14); A_2=+0.24 *2* (1977Ha49).
254.5 *5*	13.0 *13*	4351.5	(21/2$^+$)	4096.9	(19/2$^-$)	(D+Q)			A_2=−0.29 *3*, A_2=+0.01 *3* (1976Br14).
[x]258									Possibly coincident with 421γ (1976Br14).
[x]305									Coincident with 626γ (1976Br14).
356.7 *3*	56 *6*	3467.0	21/2$^+$	3110.4	17/2$^+$	Q		0.0130	A_2=+0.35 *2*, A_2=−0.09 *2* (1976Br14).
421.1[&]		4772.6	(23/2$^+$)	4351.5	(21/2$^+$)				A_2<0 (1976Br14), so ΔJ=0,1.
429.6 *5*	9.0 *9*	2414.2	11/2$^-$	1984.6	13/2$^-$	D+Q	−0.42 *5*		A_2=+0.27 *4*, A_2=+0.04 *5* (1976Br14).
449.6 *5*	7.0 *7*	3110.4	17/2$^+$	2660.9	15/2$^-$				A_2=−0.22 *10*, A_2=−0.06 *11* (1976Br14).
497.9[&]		5270.5	(23/2$^+$)	4772.6	(23/2$^+$)				
603.5 *3*		1790.5	(9/2$^-$)	1187.0	5/2$^-$				I_γ: weak.
626.3 *5*	15.0 *15*	2660.9	15/2$^-$	2034.7	17/2$^-$	D(+Q)	−0.02 *5*		A_2=−0.16 *5*, A_2=+0.03 *6* (1976Br14). δ: for J=15/2; δ=+0.06 *6* if J=19/2 (1976Br14).
[x]651									Coincident with 1791γ (1976Br14).
[x]817									Coincident with 919γ, 819γ? (1976Br14).
819.4 *3*	69 *7*	3110.4	17/2$^+$	2291.0	13/2$^+$	E2[c]			A_2=+0.39 *2*, A_2=−0.12 *3* (1976Br14).
884.6 *5*	8.0 *8*	4351.5	(21/2$^+$)	3467.0	21/2$^+$				A_2=+0.41 *6*, A_2=−0.02 *7* (1976Br14).
919.0[&]		5270.5	(23/2$^+$)	4351.5	(21/2$^+$)				A_2<0 (1976Br14), so ΔJ=0,1.
[x]1014									Coincident with 2291γ (1976Br14).
1082.6 *5*	[a]	1187.0	5/2$^-$	104.4	1/2$^-$				
1208 *1*	13.0 *10*	1312.4	3/2$^-$	104.4	1/2$^-$				A_2=−0.05 *7*, A_2=+0.04 *8* (1976Br14).
1581 *1*	≈10	1581.0	(7/2)$^+$	0	9/2$^+$				
1637 *1*	≈10	1637.0	(9/2$^+$)	0	9/2$^+$				
1715[be] *2*	[a]	5182.1?	(23/2,25/2)	3467.0	21/2$^+$				
1790.6 *5*	58 *6*	1790.5	(9/2$^-$)	0	9/2$^+$				A_2=+0.18 *2*, A_2=+0.06 *3* (1976Br14); A_2=+0.29 *5* (1977Ha49).
1984.6 *5*	93 *9*	1984.6	13/2$^-$	0	9/2$^+$	Q+O	−0.11 *6*		A_2=+0.12 *2*, A_4=−0.06 *2*, A6=0.00 *3*; (1976Br14); A_2=+0.18 *4* (1977Ha49).

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^{88}Sr(^{6}Li,3nγ),^{78}Se(^{16}O,2npγ) 1976Br14 (continued)

$\gamma(^{91}Nb)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	Comments
							δ: −0.110 *5* or >15 (1977Ha49); −0.11 *6* or −10 *4* (1976Br14). Larger solutions excluded by data from other reactions; datum of 1976Br14 preferred to that of 1977Ha49 because high precision of latter suggests a typographical error in reported uncertainty.
2062.1 *5*	26 *3*	4096.9	(19/2$^-$)	2034.7	17/2$^-$	(D+Q)	A_2=−0.15 *8*, A_2=−0.09 *9* (1976Br14).
2290.9 *5*	100 *10*	2291.0	13/2$^+$	0	9/2$^+$	Q	A_2=+0.35 *3*, A_2=−0.09 *3* (1976Br14).
2414 *1*	10 *1*	2414.2	11/2$^-$	0	9/2$^+$		A_2=−0.17 *11*, A_2=−0.09 *13* (1976Br14).

† From (^{6}Li,3nγ) (1976Br14), if not indicated otherwise.
‡ Photon intensity relative to I(2291γ)=100 (1976Br14).
# From ^{6}Li-$\gamma(\theta)$ (1976Br14), if not indicated otherwise.
@ Deduced by 1976Br14 from ^{6}Li-$\gamma(\theta)$, except as noted.
& From 1985An23.
a Doublet.
b Observed by 1976Br14 only; for this reason, evaluator shows placement as tentative.
c Stretched Q from $\gamma(\theta)$; not M2 from RUL.
d 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.
e Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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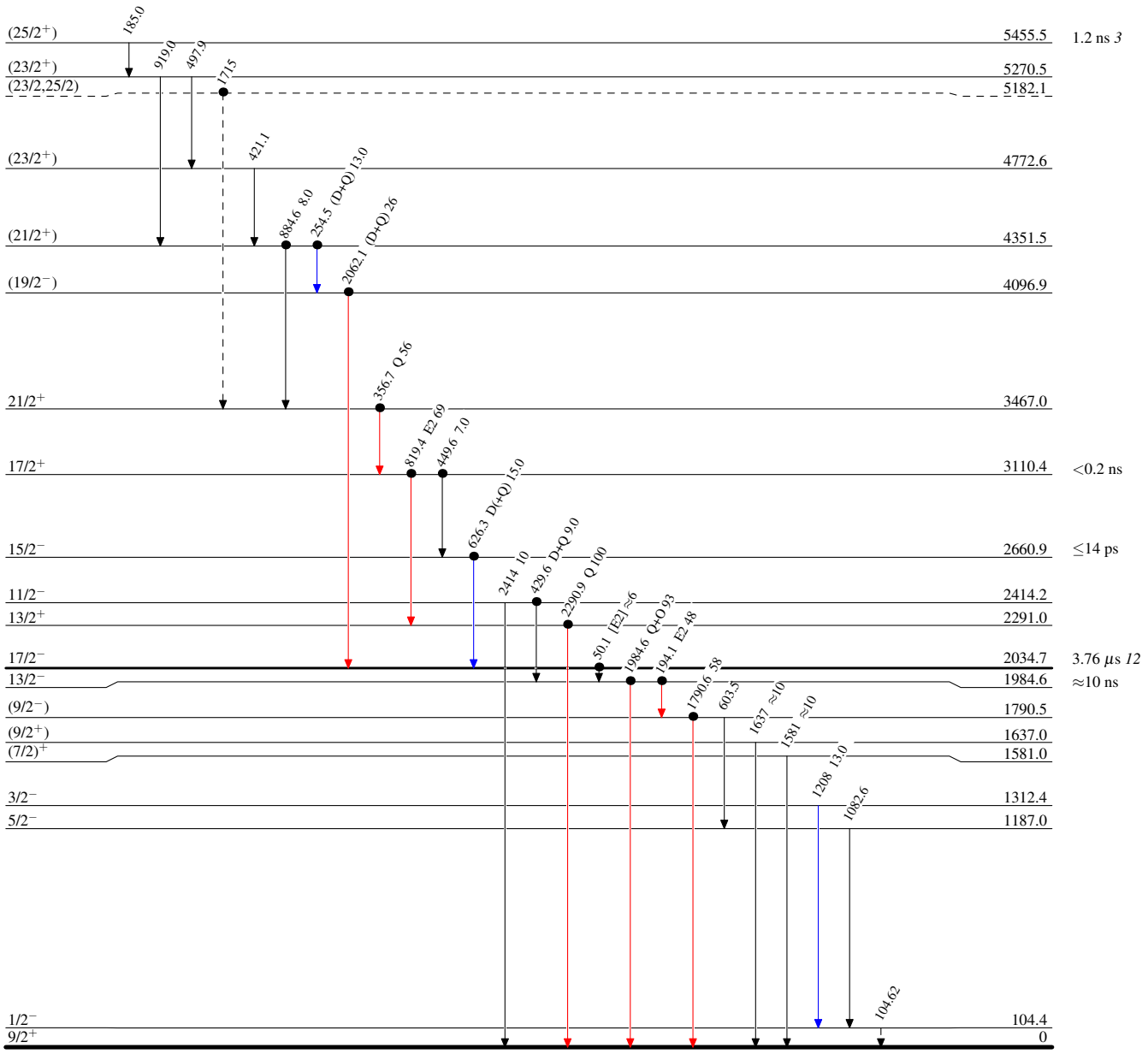
Level Scheme

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)
- Coincidence



$^{91}_{41}Nb_{50}$