Adopted Levels, Gammas

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

Q(β^-)=−6222 *7*; S(n)=10107 *7*; S(p)=6835 *7*; Q(α)=−5287 *8* 2012Wa38
Q(εp)=−724 *6* (2012Wa38).

Other experiment: (p,π^-), 1982Vi05.

Theory (partial list):
Nuclear structure calculations:
1996Ru02, 1992Si15, 1976Gr07, 1976Se01 (shell model).
1973Ki04, 1984Ng01 (quasi-particle phonon coupling model).

^{91}Mo Levels

See 1993Hi12 for spectroscopic strength functions for $p_{1/2}$, $p_{3/2}$, $f_{5/2}$, $f_{7/2}$ and $g_{9/2}$ hole states in ^{91}Mo.

Cross Reference (XREF) Flags

A	^{90}Zr(α,3nγ), ^{92}Mo(α,α'nγ)	F	^{92}Mo(pol p,d)
B	^{91}Mo IT decay (64.6 s)	G	^{66}Zn(^{28}Si,2pnγ)
C	^{91}Tc ε decay (3.14 min)	H	^{63}Cu(^{31}P,n2pγ)
D	^{91}Tc ε decay (3.3 min)	I	^{92}Mo(p,pn):radius,Mom
E	^{92}Mo(p,d),(d,t),(^{3}He,α)		

E(level)	J$^\pi$[†]	$T_{1/2}$[‡]	XREF	Comments
0	9/2$^+$	15.49 min *1*	ABCDEFGHI	%ε+%β^+=100 μ=−0.932 *3* (2009Ch09) μ: from hyperfine structure in laser spectroscopy (2011StZZ from 2009Ch09). Δ<r^2>(^{91}Mo,^{92}Mo)=+0.021 fm^2 1 (2009Ch09); uncertainty is statistical only. Isotope shift(^{91}Mo,^{92}Mo)=−171 MHz 5 (2009Ch09); total uncertainty is given; statistical uncertainty is 2. J$^\pi$: J(pol p,d)=9/2; L(pol p,d)=4. $T_{1/2}$: from 1965Eb01. Other measurements: 16.6 min *8* (1976De37), 15.6 min *4* (1976Bo19), 15.7 min *2* (1965Cr10), 15.2 min *3* (1961Ra06), 15.7 min *3* (1955Ax02), 15.5 min *2* (1953Ka11), 15.5 min *5* (1949Du10). Additional information 1.
653.01 *9*	1/2$^-$	64.6 s *6*	BCDEF	%ε+%β^+=50.0 *16*; %IT=50.0 *16* %ε+%β^+, %IT: from ^{91}Mo ε decay (64.6 s). J$^\pi$: J(pol p,d)=1/2; L(pol p,d)=1. $T_{1/2}$: weighted average of 63.5 s *10* (1990KaZW), 65.1 s *12* (1976De37), 68 s *2* (1965Cr10), 64 s *1* (1957Pr44), 66 s *3* (1955Ax02), 65.5 s *20* (1953Ka11).
1156.10 *13*	3/2$^-$		CDEF	J$^\pi$: J(pol p,d)=3/2; L(pol p,d)=1.
1362.01 *8*	5/2$^+$		CDEF	J$^\pi$: L(n)=2; J=5/2 from (pol p,d).
1414.11[&] *13*	13/2$^{(+)}$		A C E G	J$^\pi$: stretched Q 1414γ to 9/2$^+$ g.s.; 13/2$^+$ supported by shell-model calculations.
1531.90 *24*	5/2$^-$		C EF	J$^\pi$: J(pol p,d)=5/2; L(n)=3.
1564.92 *9*			C	J$^\pi$: γ to 9/2$^+$ g.s. favors J$^\pi$=5/2$^+$,7/2,9/2,11/2,13/2$^+$.
1605.32 *7*			C E	J$^\pi$: γ to 9/2$^+$ g.s. favors J$^\pi$=5/2$^+$,7/2,9/2,11/2,13/2$^+$.
1639.95 *8*	(7/2,9/2$^+$)		C E	J$^\pi$: 1640γ to 9/2$^+$ g.s.; 278γ to 5/2$^+$ 1362; log *ft*=6.5 from (9/2)$^+$.

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Adopted Levels, Gammas (continued)

^{91}Mo Levels (continued)

E(level)	J$^{\pi}$ †	T$_{1/2}$ ‡	XREF	Comments
1844 *5*	5/2$^-$,7/2$^-$		E	J$^{\pi}$: L(p,d)=3.
1902.49 *7*	9/2$^+$		C EF	J$^{\pi}$: J(pol p,d)=9/2; L(p,d)=4.
2067.91& *24*	17/2$^{(+)}$		A GH	J$^{\pi}$: stretched E2 654γ to 13/2$^{(+)}$ 1414 from (^{31}P,n2pγ) and (α,3nγ).
2083.66 *14*	3/2$^-$		DEF	J$^{\pi}$: J(pol p,d)=3/2; L(n)=1.
2201 *6*			E	
2233.69 *9*	9/2$^+$		C EF	J$^{\pi}$: J(pol p,d)=9/2; L(n)=4.
2243#			E	
2267.4& *4*	21/2$^{(+)}$	47 ns *1*	A GH	μ=+8.89 *8* μ: From time-differential perturbed angular distribution. Unweighted average of +8.81 *8* (1983Ra08) and +8.97 *9* (1978Ha52) (the data listed In 2011StZZ and 1989Ra17). J$^{\pi}$: stretched E2 200γ to 17/2$^{(+)}$ 2068; measured g factor consistent (via additivity rule) with the configuration (ν $g_{9/2}$)$^{-1}$⊗((π $g_{9/2}$)^2(6$^+$ or 8$^+$)) coupled to give a J$^{\pi}$=21/2$^+$ state (1983Ra08).
2279.6 *4*	(17/2$^-$)	38 ns *4*	A	μ=+4.51 *6* μ: From time-differential perturbed angular distribution (2011StZZ and 1989Ra17, from 1983Ra08). relative to ^{90}Mo 2875 level. J$^{\pi}$: 212γ to 17/2$^{(+)}$ 2068 In (α,3nγ); measured g factor supports (via additivity rule) the configuration ((ν $g_{9/2}$)$^{-1}$⊗(^{92}Mo, 5$^-$ level))17/2$^-$ (1983Ra08).
2302@	(1/2$^-$&9/2$^+$)		EF	XREF: E(2300)F(2304). J$^{\pi}$: J(pol p,d)=(1/2); L(pol p,d)=(1&4). E(level): for doublet.
2345 *4*	(7/2$^+$,9/2$^+$)		E	J$^{\pi}$: L(^{3}He,α)=4 for σ(θ) with little structure.
2450.99 *9*	9/2$^+$		C EF	J$^{\pi}$: J(pol p,d)=9/2; L(n)=4.
2492.16 *17*			C E	J$^{\pi}$: 2492γ to 9/2$^+$ g.s. so J=(5/2 to 13/2).
2537 *4*	3/2$^+$,5/2$^+$		EF	XREF: F(2548). J$^{\pi}$: L(n)=2.
2566 *4*	7/2$^+$,9/2$^+$		E	J$^{\pi}$: L(n)=4.
2624 *6*			E	
2663 *6*			E	
2690.44 *11*	(3/2)$^-$		DE	J$^{\pi}$: log *ft*=5.6 from (1/2)$^-$; 1328γ to (5/2)$^+$ 1362.
2716 *4*	5/2$^-$		EF	J$^{\pi}$: J(pol p,d)=5/2; L(n)=3.
2716.44 *7*	(7/2,9/2)$^+$		C	J$^{\pi}$: log *ft*=5.3 from (9/2)$^+$; 1354γ to (5/2)$^+$ 1362.
2772? *6*	(7/2$^+$,9/2$^+$)		E	J$^{\pi}$: L(n)=(4).
2781.12 *8*	(7/2$^+$,9/2$^+$,11/2$^+$)		C	J$^{\pi}$: log *ft*=5.6 from (9/2)$^+$.
2818 *4*	9/2$^+$		EF	J$^{\pi}$: J(pol p,d)=9/2; L(n)=4.
2851 *6*	9/2$^-$,11/2$^-$		E	J$^{\pi}$: L(n)=5.
2867 *6*	9/2$^-$,11/2$^-$		E	J$^{\pi}$: L(p,d)=5.
2883 *4*	1/2$^-$,3/2$^-$		E	J$^{\pi}$: L(n)=1.
2887.50 *12*	(9/2$^+$,11/2$^+$)		C	J$^{\pi}$: log *ft*=5.8 from (9/2)$^+$; weak 1731γ to 3/2$^-$ 1156; 2808γ to 9/2$^+$ g.s.
2901	3/2$^-$		F	J$^{\pi}$: J(pol p,d)=3/2; L(n)=1.
2914 *5*	(5/2$^-$,7/2$^-$)		E	J$^{\pi}$: L(n)=(3).
2940.1 *4*	(23/2$^+$)	0.08 ps	A GH	J$^{\pi}$: M1 673γ to 21/2$^{(+)}$ 2267 In (HI,xnγ) In (^{31}P,n2pγ).
2941 *5*	(5/2$^-$,7/2$^-$)		E	J$^{\pi}$: L(n)=(3).
2964 *6*			E	
2984 *6*			Ef	XREF: f(2997).
3010 *5*	(5/2$^-$,7/2$^-$)		Ef	J$^{\pi}$: L(n)=(3).
3031 *6*	(1/2$^-$,3/2$^-$)		E	J$^{\pi}$: L(^{3}He,α)=(1).
3085 *6*			EF	
3126 *6*	(1/2$^-$,3/2$^-$)		E	J$^{\pi}$: L(^{3}He,α)=(1) for doublet at 3120 *20*.
3162 *6*			E	
3191 *6*	3/2$^-$		EF	J$^{\pi}$: J(pol p,d)=3/2; L(n)=1.

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Adopted Levels, Gammas (continued)

^{91}Mo Levels (continued)

E(level)	Jπ[†]	$T_{1/2}$[‡]	XREF	Comments
3230 *6*	(5/2⁻,7/2⁻)		E	Jπ: L(^{3}He,α)=(3).
3307 *6*			E	
3328 *6*	(9/2⁺)		EF	Jπ: L(n)=4, J=9/2 for 3330 level in (pol p,d); inconsistent with L(n)=(2) in (p,d).
3351 *6*	(5/2⁻,7/2⁻)		E	Jπ: L(p,d)=(3).
3398 *6*			E	
3413 *6*	(5/2⁻,7/2⁻)		E	Jπ: L(p,d)=(3).
3447 *6*	7/2⁻		EF	Jπ: L(n)=3, J=7/2 for 3456 level in (pol p,d); confirmed in (^{3}He,α). However, L(p,d)=(2).
3472 *6*	(1/2⁻,3/2⁻)		E	Jπ: L(^{3}He,α)=(1).
3524 *6*			E	
3545.6[&] *4*	(25/2⁺)	0.11 ps	A GH	Jπ: ΔJ=1 D(+Q) 605γ to (23/2⁺) 2940 In (^{28}Si,2pnγ).
3585 *6*	(7/2⁻)		EF	Jπ: L(pol p,d)=(3), J=(7/2) for 3591 level; supported by L(^{3}He,d). L(p,d)=(4) is probably erroneous due to incomplete σ(θ).
3631 *6*	(1/2⁻,3/2⁻)		E	Jπ: L(n)=(1).
3645 *6*	5/2⁺		EF	Jπ: J(pol p,d)=5/2; L(n)=2.
3696 *6*			E	
3729 *6*			E	
3759 *6*			EF	
3806 *6*			E	
3809.7 *4*	(25/2⁺)	17 ps *3*	A GH	Jπ: D(+Q) 870γ to (23/2⁺) 2940, (M1) 264γ to (25/2⁺) 3545 In; (^{31}P,n2pγ); absence of γ to J<23/2. $T_{1/2}$: from RDM in (^{28}Si,2pnγ). Other: >20 ps from (α,3nγ).
3836 *6*	(7/2⁻)		EF	XREF: F(3823). Jπ: J(pol p,d)=7/2, L(n)=3 for 3823 state which may conceivably be a 3806+3836 doublet.
3930 *6*	(9/2⁺)		EF	Jπ: L(p,d)=(4); J(pol p,d)=(7/2) for L=(3&4) 3956-keV doublet.
3956 *6*	(7/2⁻)		EF	Jπ: L(p,d)=(3); J(pol p,d)=(7/2) for L=(3&4) 3956-keV doublet.
4022 *6*	(1/2⁻,3/2⁻)		E	Jπ: L(p,d)=(1). However, L(^{3}He,α)=(3) for level at 4020 *20*.
4060 *20*	(5/2⁻,7/2⁻)		E	Jπ: L(^{3}He,α)=(3) for doublet which presumably includes the 4069 level.
4069 *6*	9/2⁺		EF	Jπ: J(pol p,d)=9/2; L(n)=4 in (pol p,d).
4091 *6*			E	
4116 *7*			E	
4133 *6*	5/2⁻,7/2⁻		EF	Jπ: L(p,d)=3.
4157[#] *7*	(9/2⁺)		EF	Jπ: L=(3&4), J=(7/2) in (pol p,d) for 4151-keV doublet which May include L=3 *4133* level.
4186 *7*			E	
4228 *7*			E	
4258 *7*			E	
4276 *7*	(9/2⁺)		EF	Jπ: L(n)=4, J=9/2 for 4283 level in (pol p,d). L(p,d)=3 assigned by 1976Ka08, but σ(θ) does not appear to rule out L=4.
4301 *6*	(5/2⁻,7/2⁻)		E	Jπ: L(^{3}He,α)=(3).
4341.9 *5*	(27/2⁺)	0.20 ps	A GH	Jπ: ΔJ=1 D+Q 532γ to (25/2⁺) 3811 In (^{28}Si,2pnγ). Other $T_{1/2}$: <1.4 ps from RDM in (^{28}Si,2pnγ).
4349 *7*			E	
4385 *7*	(5/2⁻&7/2⁻)		EF	Jπ: L(n)=(3&3), J=(5/2) for 4383 doublet in (pol p,d). It is unclear whether this doublet is comprised of two levels near 4385 or of the 4408+4385 levels.
4408 *7*			E	See comment on 4385 level.
4432 *7*	(5/2⁻,7/2⁻)		E	Jπ: L(^{3}He,α)=3 for a 4450 *20* level, presumably the same level as this one.
4445.1[a] *4*	25/2⁽⁺⁾		GH	Jπ: stretched Q 2178γ to 21/2⁽⁺⁾ 2267; 1504γ to 23/2⁺ 2940.
4456.5 *11*	(27/2)		H	Jπ: 647γ to (25/2⁺) 3810 In (^{31}P,n2pγ).
4481	5/2⁻		F	Jπ: J(pol p,d)=5/2, L(n)=3.
4522 *7*			E	Jπ: L(^{3}He,α)=3 for a 4500 *20* level; this may correspond to the 4481 and/or 4522 levels adopted here.

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Adopted Levels, Gammas (continued)

^{91}Mo Levels (continued)

E(level)	J$^{\pi}$†	$T_{1/2}$‡	XREF	Comments
4560 7			E	
4577 7			E	J$^{\pi}$: L(^{3}He,α)=3 for a 4600 20 doublet.
4603 7			E	J$^{\pi}$: L(^{3}He,α)=3 for a 4600 20 doublet.
4643 7	3/2^{-}		EF	XREF: F(4664). J$^{\pi}$: J(pol p,d)=3/2, L(n)=1.
4683 7	(7/2^{+},9/2^{+})		E	J$^{\pi}$: L(n)=4 favored over L(n)=3 in (^{3}He,α).
4707 7			E	
4768 7			E	
4780 7	(1/2^{-},3/2^{-})		E	J$^{\pi}$: L(^{3}He,α)=1 favored over L=3 for 4790 20 peak.
4796?	7/2^{-}		F	J$^{\pi}$,E(level): J(pol p,d)=7/2, L(n)=3. However, it is possible that the 4796 peak in (pol p,d) corresponds to the 4780 or 4780+4815 levels in (p,d).
4815 7			E	
4841 7			E	
4869 7			E	L(^{3}He,α)=1 for 4869+4899 doublet.
4899 7			EF	XREF: F(4917). L(^{3}He,α)=1 for 4869+4899 doublet.
4952.6[a] 4	(27/2^{+})		GH	J$^{\pi}$: stretched Q 2012γ to (23/2^{+}); D+Q 508γ to 25/2$^{(+)}$ 4445 In (^{28}Si,2pnγ).
4958.8 5	(29/2^{+})	0.12 ps	A GH	J$^{\pi}$: ΔJ=1 D(+Q) 617γ to (27/2^{+}) 4342 in (^{28}Si,2pnγ). Other $T_{1/2}$: <1.4 ps from RDM in (^{28}Si,2pnγ).
5.03×10^{3} 2	(1/2^{-},3/2^{-})		EF	XREF: F(5056). J$^{\pi}$: L(^{3}He,α)=(1).
5.13×10^{3}# 2			EF	XREF: F(5177). J$^{\pi}$: L(^{3}He,α)=(1) for doublet.
5.19×10^{3} 2	(1/2^{-},3/2^{-})		E	J$^{\pi}$: L(^{3}He,α)=(1).
5.23×10^{3} 2	(5/2^{-},7/2^{-})		E	J$^{\pi}$: L(^{3}He,α)=(3).
5243.3 6	(31/2^{+})	0.40 ps	A G	J$^{\pi}$: M1, ΔJ=1 285γ to (29/2^{+}) 4959 In (^{28}Si,p2nγ).
5295	7/2^{-}		F	J$^{\pi}$: J=7/2, L(n)=3 from (pol p,d). E(level): may be the same level as that seen in (^{3}He,α) at 5230 20.
5299.0? 6	(31/2)		GH	J$^{\pi}$: ΔJ=1 D+Q 340γ to (29/2^{+}) 4959 In (^{31}P,n2pγ).
5.34×10^{3} 2	1/2^{-},3/2^{-}		E	J$^{\pi}$: L(^{3}He,α)=1.
5.42×10^{3} 2	7/2^{-}		EF	XREF: F(5394). J$^{\pi}$: J(pol p,d)=7/2, L(n)=3.
5488.4[a] 5	(29/2^{+})		GH	J$^{\pi}$: stretched Q 1943γ to (25/2^{+}) 3546; D+Q 536γ to (27/2^{+}) 4953.
5.50×10^{3} 2	1/2^{-},3/2^{-}		E	J$^{\pi}$: L(^{3}He,α)=1.
5516	7/2^{-}		F	J$^{\pi}$: J(pol p,d)=7/2, L(n)=3.
5690	(7/2^{-})		F	J$^{\pi}$: J(pol p,d)=(7/2), L(n)=(3).
5796			F	
5817.8? 6			G	J$^{\pi}$: 329γ to (29/2^{+}) 5488 In (^{28}Si,2pnγ).
5.90×10^{3}# 2	$^{-}$		EF	J$^{\pi}$: L(n)=1 for 5900 20 doublet in (^{3}He,α), but L(n)=3, J=7/2 in (pol p,d) for 5930 line which presumably may also be a doublet.
5929.3 12			H	
5963.8 12	(35/2)		H	J$^{\pi}$: E2 665γ to (31/2) 5299 In (^{31}P,n2pγ).
5.99×10^{3} 2	1/2^{-},3/2^{-}		E	J$^{\pi}$: L(^{3}He,α)=1.
6.06×10^{3} 2	7/2^{-}		EF	XREF: F(6070). J$^{\pi}$: J(pol p,d)=7/2, L(n)=3.
6106.6 8	(29/2^{+})		H	J$^{\pi}$: D 1154γ to 27/2^{+} 4952; Q 1661γ to 25/2^{+} 4445 In (^{31}P,n2pγ).
6232.7[a] 6	(31/2^{+})		GH	J$^{\pi}$: ΔJ=1 D+Q 744γ to (29/2^{+}) 5488 In (^{28}Si,2pnγ).
6327.8 15	(31/2)		H	J$^{\pi}$: Q 1871γ to (27/2) 4458 In (^{31}P,n2pγ).
6437.9 12	(33/2)		H	J$^{\pi}$: D 1139γ to (31/2^{+}) 5300 In (^{31}P,n2pγ).
6444.8 15			H	
6469.2[a] 6	(33/2^{+})		GH	J$^{\pi}$: ΔJ=1 M1(+E2) 236γ to (31/2^{+}) 6233 In (^{31}P,n2pγ).
6658.6 8	(31/2^{+})		H	J$^{\pi}$: Q 1706γ to (27/2^{+}) 4952 In (^{31}P,n2pγ).
6813.1? 12			H	

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Adopted Levels, Gammas (continued)

^{91}Mo Levels (continued)

E(level)	Jπ†	XREF	Comments
6959.4? *12*		H	
6.99×10^3 *3*	9/2$^+$	EF	XREF: F(7026). Jπ: J(pol p,d)=9/2, L(n)=4. ^{91}Nb(g.s.) IAS.
7.12×10^3 *3*	1/2$^-$	EF	XREF: F(7158). Jπ: J(pol p,d)=1/2, L(n)=1. ^{91}Nb(105) IAS.
7262.8 *9*	(33/2$^+$)	H	Jπ: Q 1775γ to (29/2$^+$) 5488 In (^{31}P,n2pγ).
7321.2 *12*	(35/2$^+$)	H	Jπ: E2 2078γ to (31/2$^+$) 5244 In (^{31}P,n2pγ).
7336.5 *11*	(33/2$^+$)	H	Jπ: Q 1848γ to 29/2$^+$ 5488 In (^{31}P,n2pγ).
7469.4 *14*	(35/2$^+$)	H	Jπ: D+Q 207γ to (33/2$^+$) 7263 In (^{31}P,n2pγ).
7805.7 *12*	(33/2)	H	Jπ: D 2562γ to (31/2$^+$) 5244 In (^{31}P,n2pγ).
8001.6 *16*	(39/2$^+$)	H	Jπ: Q 2038γ to (35/2$^+$) 5965 In (^{31}P,n2pγ).
8112.5 *17*	(37/2$^+$)	H	Jπ: (M1) 643γ to (35/2$^+$) 7469 In (^{31}P,n2pγ).
8153.6 *16*	(39/2$^+$)	H	Jπ: Q 2190γ to (35/2$^+$) 5965 In (^{31}P,n2pγ).
8.17×10^3	(5/2$^-$)	E	Jπ: L(^{3}He,α)=(3,4); probable analog of 5/2$^-$ ^{91}Nb(1187) level.
8173.7 *15*		H	
8278.7 *12*	(37/2$^+$)	H	Jπ: (E2) 1810γ to (37/2$^+$) 6469 In (^{31}P,n2pγ); J=37/2 supported by shell-model calculations (2004Ra12).
8.34×10^3 *3*	3/2$^-$	EF	XREF: F(8433). Jπ: J(pol p,d)=3/2, L(n)=1. ^{91}Nb(1313) IAS.
8578.3? *20*		H	Jπ: possible 466γ to (37/2$^+$) 8112 In (^{31}P,n2pγ).
8626.6 *12*	(37/2$^+$)	H	Jπ: Q 2157γ to (33/2$^+$) 6469 In (^{31}P,n2pγ).
8.66×10^3 *3*	3/2$^-$	EF	XREF: F(8742). Jπ: J(pol p,d)=3/2, L(n)=1. ^{91}Nb(1613) IAS.
8708.2 *19*		H	Jπ: 707γ to (39/2$^+$) 8002 In (^{31}P,n2pγ).
8749.4 *20*	(39/2$^+$)	H	Jπ: M1 637γ to (37/2$^+$) 8112 In (^{31}P,n2pγ).
8.87×10^3 *3*	5/2$^-$	EF	XREF: F(8938). Jπ: J(pol p,d)=5/2, L(n)=3. ^{91}Nb(1845) IAS.
9282.2 *15*	(39/2$^+$)	H	Jπ: (Q) 1961γ to (35/2$^+$) 7322 In (^{31}P,n2pγ).
10.15×10^3		E	
10.40×10^3		E	
10749.4? *16*		H	Jπ: 2471γ to (37/2$^+$) 8279 In (^{31}P,n2pγ).
12.42×10^3		E	

† Due to the large number of unplaced γ′s in ε decay (3.14 min), Jπ arguments based on log *ft* for weakly fed levels should be treated with caution.
‡ From Doppler-shift attenuation or time-differential perturbed angular distribution observed in (α,3nγ), if not indicated otherwise.
# Doublet.
@ Triplet.
& Band(A): π=+, seniority=3 states (1993Si14).
a Band(B): π=+, seniority=5 states (1993Si14). The 25/2$^+$ state configuration includes a significant seniority=3 component.

$\gamma(^{91}Mo)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	α[b]	Comments
653.01	1/2⁻	652.9 *1*	100	0	9/2⁺	M4	0.0374	B(M4)(W.u.)=8.8 *3* Mult.: from α(exp)=0.052 *14* as deduced in IT decay. calculated hindrance =4.48 *25* (2012Se10).
1156.10	3/2⁻	502.9 *2*	100	653.01	1/2⁻			
1362.01	5/2⁺	205.6 *4*	1.1 *4*	1156.10	3/2⁻	[E1]	0.01572	
		1362.0 *1*	100 *4*	0	9/2⁺			
1414.11	13/2$^{(+)}$	1414.10 *13*	100	0	9/2⁺	(E2)		E_γ: weighted average from ^{91}Tc ε decay, (^{28}Si,2pnγ), (α,3nγ). Mult.: Q from $\gamma(\theta)$, $\Delta\pi$=no from level scheme.
1531.90	5/2⁻	375.8 *2*	100	1156.10	3/2⁻			
1564.92		1564.9 *1*	100	0	9/2⁺			E_γ: weighted average from ε decay and (α,3nγ).
1605.32		1605.2 *1*	100	0	9/2⁺			
1639.95	(7/2,9/2⁺)	277.9 *2*	6.7 *7*	1362.01	5/2⁺			
		1639.9 *1*	100 *3*	0	9/2⁺			
1902.49	9/2⁺	297.1 *2*	3.9 *4*	1605.32				
		337.5 *2*	19 *3*	1564.92				
		1902.3 *1*	100 *3*	0	9/2⁺			
2067.91	17/2$^{(+)}$	653.8[@] *2*	100	1414.11	13/2$^{(+)}$	E2		Mult.: Q from $\gamma(\theta)$; not M2 from RUL, assuming $T_{1/2}$<10 ns based on prompt coincidence component in 654γ in (α,3nγ).
2083.66	3/2⁻	927.6[&] *1*	100[&] *6*	1156.10	3/2⁻			
		1430.4[&] *2*	53[&] *3*	653.01	1/2⁻			
2233.69	9/2⁺	628.4 *3*	56 *11*	1605.32				
		668.8 *10*	24 *12*	1564.92				
		2233.8 *1*	100 *4*	0	9/2⁺			
2267.4	21/2$^{(+)}$	199.5[@] *2*	100	2067.91	17/2$^{(+)}$	E2	0.1000	B(E2)(W.u.)=1.42 *4* Mult.: Q from $\gamma(\theta)$; not M2 from RUL.
2279.6	(17/2⁻)	211.7[@] *2*	100	2067.91	17/2$^{(+)}$	[E1]	0.01447	B(E1)(W.u.)=9.1×10^{-7} *10* Mult.: not M2 or higher from RUL. $\gamma(\theta)$ in (α,3nγ) consistent with Q (ΔJ=2) or D+Q (ΔJ=1) or D(+Q) (ΔJ=0); the level scheme implies the latter.
2450.99	9/2⁺	217.8 *2*	1.04 *12*	2233.69	9/2⁺			
		548.7 *3*	12.2 *7*	1902.49	9/2⁺			
		811.0 *5*	37.1 *23*	1639.95	(7/2,9/2⁺)			
		844.9 *3*	8.8 *9*	1605.32				
		1088.9 *4*	4.25 *27*	1362.01	5/2⁺			
		2450.9 *1*	100 *3*	0	9/2⁺			
2492.16		851.8 *3*	100 *13*	1639.95	(7/2,9/2⁺)			
		2492.3 *2*	71 *3*	0	9/2⁺			
2690.44	(3/2)⁻	606.7[&] *3*	58[&] *4*	2083.66	3/2⁻			
		1328.4[&] *2*	100[&] *4*	1362.01	5/2⁺			
		1534.4[&] *2*	98[&] *4*	1156.10	3/2⁻			
		2037.4[&] *1*	20.8[&] *19*	653.01	1/2⁻			

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Adopted Levels, Gammas (continued)

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

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α[b]	Comments
2716.44	(7/2,9/2)$^+$	483.2 *6*	34.2 *25*	2233.69	9/2$^+$			
		813.9 *5*	55 *10*	1902.49	9/2$^+$			
		1076.5 *2*	29.6 *20*	1639.95	(7/2,9/2$^+$)			
		1111.1 *1*	100 *4*	1605.32				
		1354.4 *2*	22.9 *10*	1362.01	5/2$^+$			
		2716.4 *1*	58.8 *20*	0	9/2$^+$			
2781.12	(7/2$^+$,9/2$^+$,11/2$^+$)	878.4 *1*	34.3 *25*	1902.49	9/2$^+$			
		2781.3 *1*	100 *4*	0	9/2$^+$			
2887.50	(9/2$^+$,11/2$^+$)	985.0 *4*	15.8 *10*	1902.49	9/2$^+$			
		1322.6 *2*	49.9 *23*	1564.92				
		1731.0 *2*	9.9 *9*	1156.10	3/2$^-$			
		2887.8 *2*	100 *3*	0	9/2$^+$			
2940.1	(23/2$^+$)	672.6[@] *2*	100	2267.4	21/2$^{(+)}$	M1		B(M1)(W.u.)=0.90 Mult.: from (^{31}P,n2pγ).
3545.6	(25/2$^+$)	605.5[@] *2*	100	2940.1	(23/2$^+$)	D(+Q)		B(M1)(W.u.)≈0.90 other Eγ: 604.7 In (^{31}P,n2pγ). Mult.: D(+Q) (ΔJ=1) from $\gamma(\theta)$ in (α,3nγ).
3809.7	(25/2$^+$)	264.2[@] *2*	12.2 *7*	3545.6	(25/2$^+$)	(M1)	0.0186	B(E1)(W.u.)=0.0076 *15* E_γ: 265.1 *3* in (^{28}Si,2pnγ), 265.0 In (^{31}P,n2pγ). I_γ: weighted average of 12.0 *8* from (^{28}Si,2pnγ) and 12.8 *13* from (α,3nγ). other: 20.0 *7* from (^{31}P,n2pγ). Mult.: Q (ΔJ=2) or D (ΔJ=0) from anisotropy and $\gamma(\theta)$ in (^{28}Si,2pnγ); magnetic D from (^{31}P,n2pγ); ΔJ=0 favored by level scheme.
		869.6[@] *2*	100 *3*	2940.1	(23/2$^+$)	D(+Q)		I_γ: weighted average from (^{28}Si,2pnγ) and (α,3nγ).
4341.9	(27/2$^+$)	532.2[@] *2*	100	3809.7	(25/2$^+$)	D+Q		B(M1)(W.u.)=0.7
4445.1	25/2$^{(+)}$	1504.2[a]	5.3[a] *4*	2940.1	(23/2$^+$)			
		2177.8[#] *3*	100[#] *10*	2267.4	21/2$^{(+)}$	Q		other Eγ: 2176.8 from (^{31}P,n2pγ).
4456.5	(27/2)	646.8[a]	100[a]	3809.7	(25/2$^+$)			
4952.6	(27/2$^+$)	507.6[#] *3*	100.0[#] *16*	4445.1	25/2$^{(+)}$	D+Q		
		1406.6[a]	9.9[a] *6*	3545.6	(25/2$^+$)	D		Mult.: from (^{31}P,n2pγ).
		2012.4[#] *3*	42[#] *5*	2940.1	(23/2$^+$)	Q		other Eγ (Iγ): 2011.4 (24.4 *23*) from (^{31}P,n2pγ).
4958.8	(29/2$^+$)	616.9[@] *2*	100	4341.9	(27/2$^+$)	D(+Q)		Mult.: D+Q from (^{28}Si,2pnγ), D from (^{31}P,n2pγ). B(E1)(W.u.) exceeds RUL if pure E1.
5243.3	(31/2$^+$)	284.5[@] *2*	100	4958.8	(29/2$^+$)	M1	0.01542	B(M1)(W.u.)=2.35 Mult.: D, ΔJ=1 from (^{31}P,n2pγ); polarization favors M1; B(E1)(W.u.) exceeds RUL if E1.
5299.0?	(31/2)	340.2[#] *3*	100[#]	4958.8	(29/2$^+$)	D+Q		
5488.4	(29/2$^+$)	535.8[#] *3*	100[#] *3*	4952.6	(27/2$^+$)	D+Q		other Iγ: 139 *7* from (^{31}P,n2pγ).

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

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[‡]	α[b]	Comments
5488.4	(29/2+)	1942.8[#] 3	72[#] 5	3545.6	(25/2+)	Q		
5817.8?		329.4[#c] 3	100[#]	5488.4	(29/2+)			
5929.3		686.0[a]	100[a]	5243.3	(31/2+)			
5963.8	(35/2)	664.8[a]	100[a]	5299.0?	(31/2)	E2		Mult.: from (^{31}P,n2pγ).
6106.6	(29/2+)	1154.1[a]	45[a] 3	4952.6	(27/2+)	D		Mult.: from (^{31}P,n2pγ).
		1661.3[a]	100[a] 10	4445.1	25/2(+)	Q		Mult.: from (^{31}P,n2pγ).
6232.7	(31/2+)	744.3[#] 3	100[#]	5488.4	(29/2+)	D+Q		
6327.8	(31/2)	1871.3	100 9	4456.5	(27/2)	Q		Mult.: from (^{31}P,n2pγ).
6437.9	(33/2)	1138.9	100 6	5299.0?	(31/2)	D		Mult.: from (^{31}P,n2pγ).
6444.8		515.5[a]	100[a] 6	5929.3				
6469.2	(33/2+)	236.4[#] 3	100[#] 4	6232.7	(31/2+)	M1(+E2)	0.0248	Mult.: M1 from (^{31}P,n2pγ); D+Q from (^{28}Si,2pnγ).
		981.5[a]	56.0[a] 26	5488.4	(29/2+)	Q		Mult.: from (^{31}P,n2pγ).
6658.6	(31/2+)	551.7[a]	100[a] 5	6106.6	(29/2+)			
		1705.8[a]	60.00[a] 6	4952.6	(27/2+)	Q		Mult.: from (^{31}P,n2pγ).
6813.1?		1569.8[ac]	100[a]	5243.3	(31/2+)			
6959.4?		2000.5[ac]	100[a]	4958.8	(29/2+)			
7262.8	(33/2+)	603.9[a]	28[a] 14	6658.6	(31/2+)			
		1774.8[a]	100[a] 11	5488.4	(29/2+)	Q		Mult.: from (^{31}P,n2pγ).
7321.2	(35/2+)	2077.8[a]	100[a] 8	5243.3	(31/2+)	E2		Mult.: from (^{31}P,n2pγ).
7336.5	(33/2+)	1848.1[a]	100[a]	5488.4	(29/2+)	Q		Mult.: from (^{31}P,n2pγ).
7469.4	(35/2+)	206.6[a]	100[a] 5	7262.8	(33/2+)	D+Q		Mult.: from (^{31}P,n2pγ).
7805.7	(33/2)	2562.3[a]	100[a] 10	5243.3	(31/2+)	D		Mult.: from (^{31}P,n2pγ).
8001.6	(39/2+)	2037.7[a]	100[a] 10	5963.8	(35/2)	Q		Mult.: from (^{31}P,n2pγ).
8112.5	(37/2+)	643.1[a]	100[a] 6	7469.4	(35/2+)	(M1)		Mult.: from (^{31}P,n2pγ).
8153.6	(39/2+)	2189.7[a]	100[a]	5963.8	(35/2)	Q		Mult.: from (^{31}P,n2pγ).
8173.7		2244.3[a]	100[a]	5929.3				
8278.7	(37/2+)	1809.5[a]	100[a]	6469.2	(33/2+)	(E2)		Mult.: from (^{31}P,n2pγ).
8578.3?		465.8[ac]	100[a]	8112.5	(37/2+)			
8626.6	(37/2+)	2157.4[a]	100[a]	6469.2	(33/2+)	Q		Mult.: from (^{31}P,n2pγ).
8708.2		706.6[a]	100[a]	8001.6	(39/2+)			
8749.4	(39/2+)	636.9[a]	100[a]	8112.5	(37/2+)	M1		Mult.: from (^{31}P,n2pγ).
9282.2	(39/2+)	1961.0[a]	100[a]	7321.2	(35/2+)	(Q)		Mult.: from (^{31}P,n2pγ).
10749.4?		2470.7[ac]	100[a]	8278.7	(37/2+)			

† From ^{91}Tc ε decay (3.14 min), except as noted.
‡ From γ(θ) in (^{28}Si,2pnγ), if not noted otherwise.
# From (^{28}Si,2pnγ).
@ From ^{90}Zr(α,3nγ), ^{92}Mo(α,α′nγ).

γ(^{91}Mo) (continued)

[&] From ^{91}Tc ε decay (3.3 min).
[a] From ^{63}Cu(^{31}P,n2pγ).
[b] 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.
[c] Placement of transition in the level scheme is uncertain.

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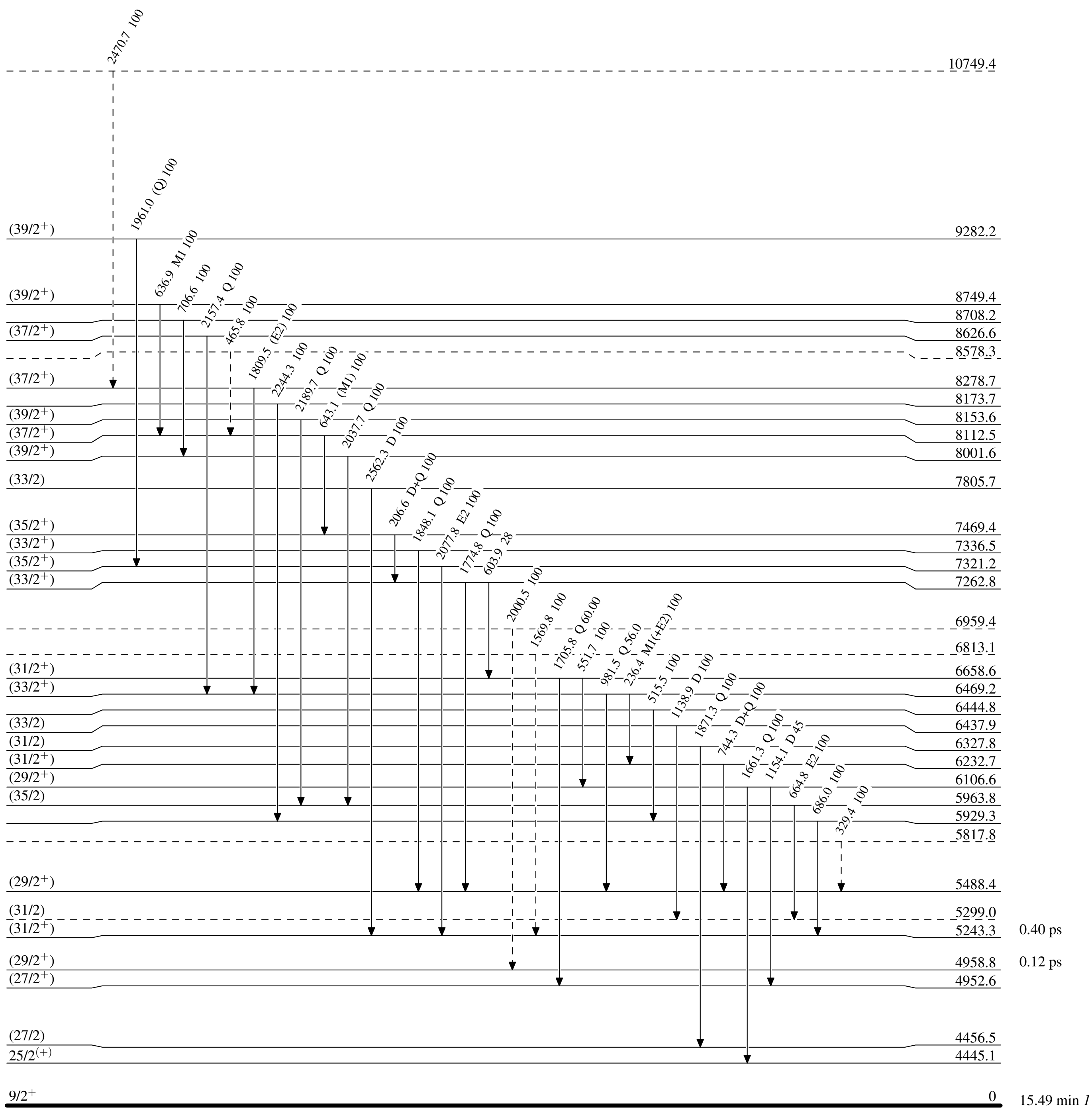
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



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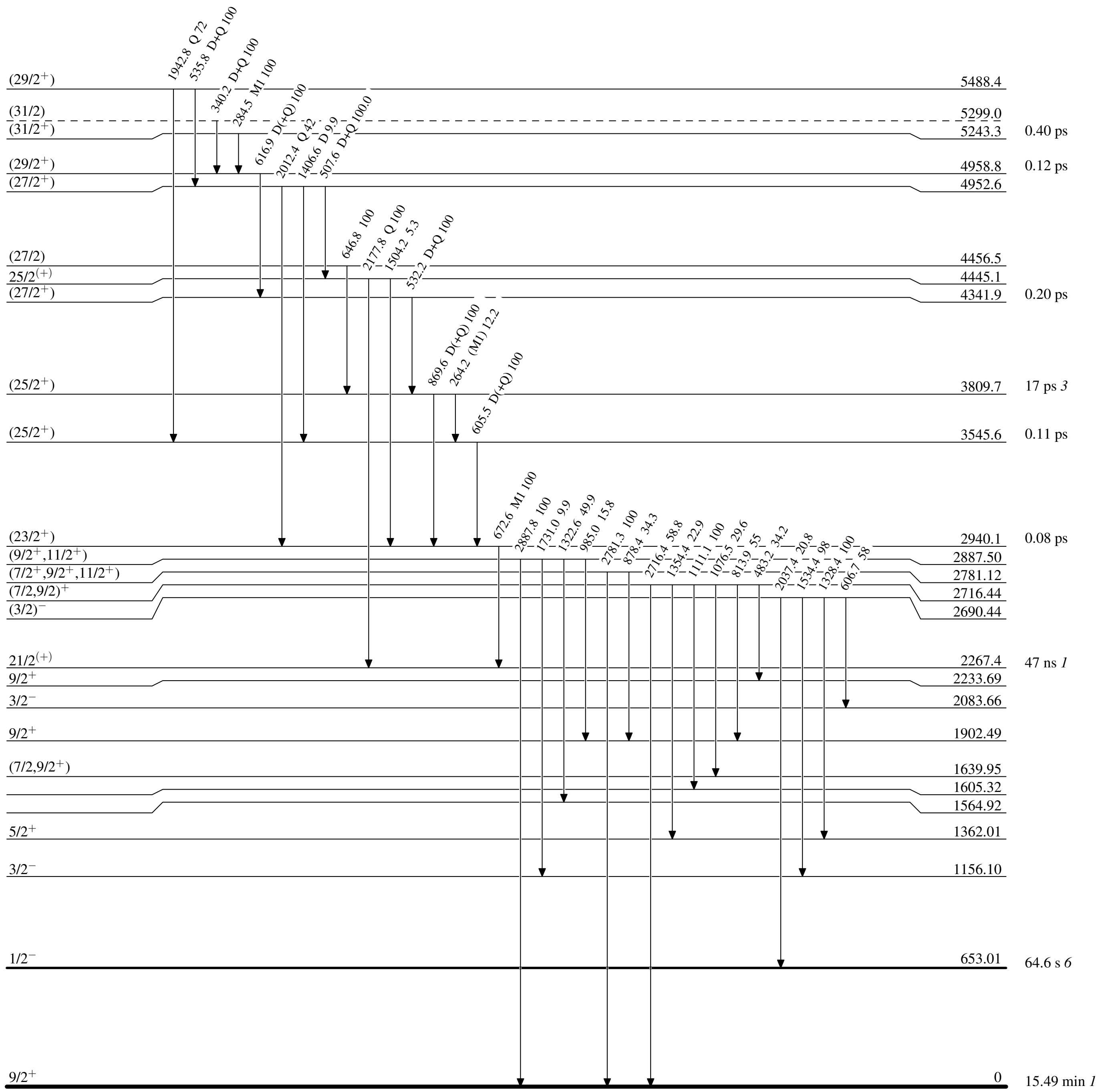
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



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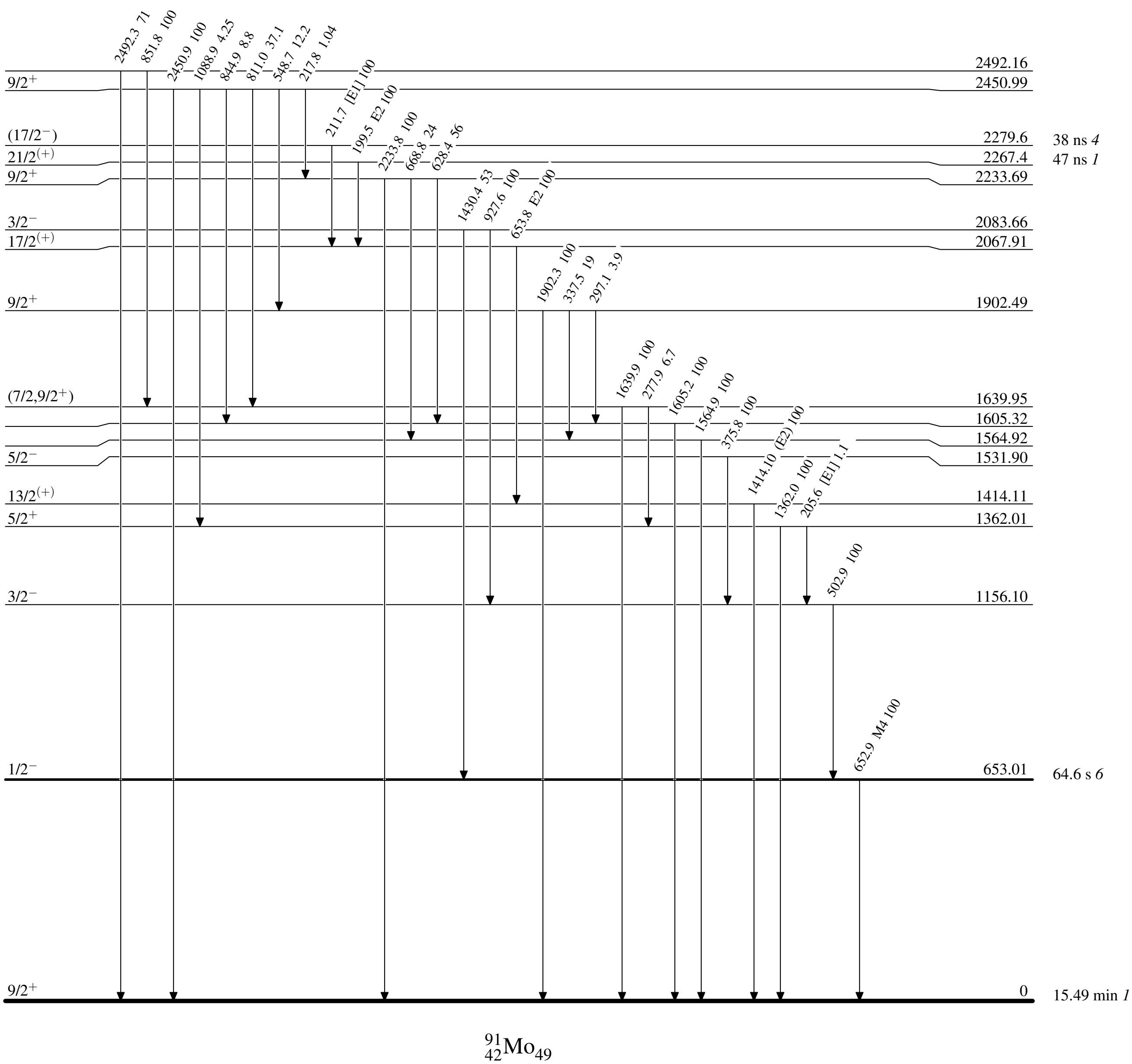
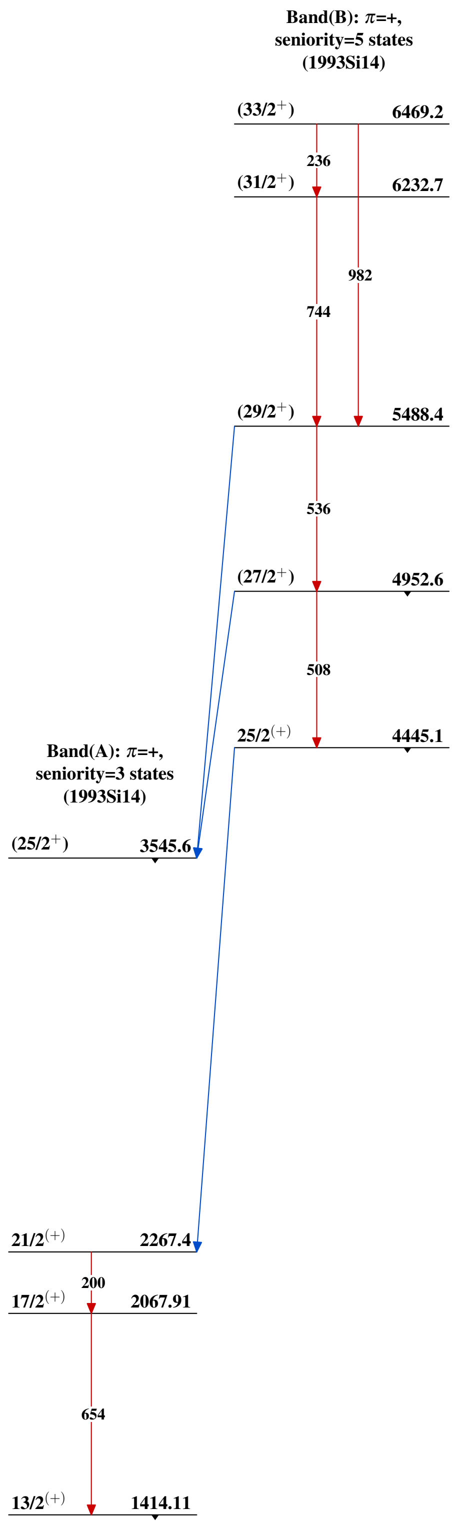
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas



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