Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. W. Reich	NDS 112,2497 (2011)	1-Jun-2011

Q(β^-)=−5.28×10^3 *4*; S(n)=7746 *22*; S(p)=4.83×10^3 *4*; Q(α)=3.13×10^3 *3* 2012Wa38
Note: Current evaluation has used the following Q record $ −5280 *32* 7746 *22* 4829 *38* 3146 *31* 2009AuZZ.
Q(β^-): Essentially the same value is listed in 2003Au03.
S(n),S(p),Q(α) 2003Au03 report: S(n)=7798; S(p)=4716; Q(α)=3078; all from systematics.
Additional information 1.

^{161}Yb Levels

Cross Reference (XREF) Flags

A ^{148}Sm(^{16}O,3nγ),^{122}Sn(^{44}Ca,5nγ)
B ^{161}Lu ε decay

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0[@]	3/2$^-$	4.2 min *2*	AB	%ε+%β^+=100 μ=−0.327 *8*; Q=+1.03 *2* J$^\pi$: J value is from laser spectroscopy (1983Ne13). With this J value, 3/2[521] is the expected Nilsson orbital, and the calculated μ (1989Be04) value is consistent with this. Hence, π=−. From an evaluation of data on nuclear rms charge radii, 2004An14 report <r^2>$^{1/2}$=5.183 fm 8. T$_{1/2}$: from the ^{161}Yb ε decay (1974Ad10). %ε+%β^+: evaluator has assumed that any α-decay branch is negligible. μ: from laser spectroscopy (1983Ne13) and adopted in the evaluation by 1989Ra17. This value is also listed in the compilation by 2005St24. Q: from laser spectroscopy (1983Ne13) and adopted in the evaluation by 1989Ra17. This value is also listed in the compilation by 2005St24.
43.67[@] *18*	5/2$^-$		AB	J$^\pi$: assigned as the J=5/2 member of the g.s. band.
110.79[@] *9*	7/2$^-$		AB	J$^\pi$: assigned as the J=7/2 member of the g.s. band.
197.20 *25*			B	
211.08 *12*	(3/2$^-$)		B	J$^\pi$: γ's to 3/2$^-$ and 7/2$^-$ levels indicate J$^\pi$=3/2$^-$, 5/2,7/2$^-$. Possible population in the ε decay of the ^{161}Lu g.s. (J$^\pi$=1/2$^+$) suggests J=3/2. Note, however, that this decay scheme is incomplete, casting doubt on any deduced ε+β^+ intensities.
211.1[b]	(9/2$^+$)		A	E(level): The interpretation of the in-beam data is based on the existence of a 9/2$^+$ level at or near this energy.
220.7[@]	9/2$^-$		A	
230.6[b]	(13/2$^+$)		A	E(level): value reported by 1990TeZW, from ^{122}Sn(^{44}Ca,5n), but the basis for it is not given. In particular, no deexciting γ transition is reported. The decay presumably takes place through a low-energy γ to the 9/2$^+$ level at 211.1 KeV.
367.28 *14*			B	
462.6[b]	(17/2$^+$)	85 ps *6*	A	
552.7[@]	13/2$^-$	6 ps *3*	A	
703.0[c]	(15/2$^+$)		A	
859.9[b]	(21/2$^+$)	7.2 ps *6*	A	
1006.7[@]	17/2$^-$	3.5 ps *21*	A	
1117.0[c]	(19/2$^+$)		A	
1382.3[b]	(25/2$^+$)	1.5 ps *3*	A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{161}Yb Levels (continued)

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	XREF	E(level)[†]	J^{π}[‡]	XREF
1535.9[@]	21/2−	<21 ps	A	5631.6[@]	49/2−	A
1649.0[c]	(23/2+)		A	5963.5[&]	(49/2−)	A
1999.2[b]	(29/2+)	1.6 ps *3*	A	6120.2[a]	(51/2−)	A
2044.4[&]	(25/2−)		A	6405.6[b]	(53/2+)	A
2098.1[@]	25/2−		A	6500.1[@]	53/2−	A
2259.0[c]	(27/2+)		A	6813.8[&]	(53/2−)	A
2304.6[a]	(27/2−)		A	6977.5[a]	(55/2−)	A
2478.3[@]	29/2−		A	7288.8[b]	(57/2+)	A
2560.6[&]	(29/2−)		A	7347.4[@]	57/2−	A
2680.1[b]	(33/2+)	<1.4 ps	A	7876.7[a]	(59/2−)	A
2686.5[a]	(31/2−)		A	8194.7[@]	61/2−	A
2915.7[@]	33/2−	4.2 ps *8*	A	8198.0[b]	(61/2+)	A
2919.0[c]	(31/2+)		A	8832.3[a]	(63/2−)	A
3108.8[&]	(33/2−)		A	9090.2[@]	65/2−	A
3167.4[a]	(35/2−)		A	9095.0[b]	(65/2+)	A
3387.4[b]	(37/2+)		A	9844.3[a]	(67/2−)	A
3443.5[@]	37/2−	<2.8 ps	A	10010.5[b]	(69/2+)	A
3627.0[c]	(35/2+)		A	10053.2[@]	69/2−	A
3712.6[&]	(37/2−)		A	10914.3?[a]	(71/2−)	A
3766.9[a]	(39/2−)		A	10972.5[b]	(73/2+)	A
4074.9[@]	41/2−		A	11105.2[@]	73/2−	A
4092.5[b]	(41/2+)		A	11988.5[b]	(77/2+)	A
4350.0[c]	(39/2+)		A	12044.3?[a]	(75/2−)	A
4382.8[&]	(41/2−)		A	12218.2[@]	77/2−	A
4473.2[a]	(43/2−)		A	13054.5[b]	(81/2+)	A
4811.4[@]	45/2−		A	13364.5[@]	81/2−	A
4812.0[b]	(45/2+)		A	14181.5[b]	(85/2+)	A
5142.9[&]	(45/2−)		A	14531.5[@]	85/2−	A
5266.4[a]	(47/2−)		A	15709.4?[@]	(89/2−)	A
5578.6[b]	(49/2+)		A			

[†] For those levels seen only in the (HI,xnγ) reactions, the level energies are those listed by 1990TeZW from the ^{122}Sn(^{44}Ca,5n) reaction. For the others, they are computed from the γ energies.

[‡] The spins from the heavy-ion studies are based largely on the observed γ-deexcitation of the levels, general considerations of rotational-band structure and $\gamma(\theta)$ data, which, especially, establish a sequence of stretched E2 transitions. With the exception of those for the members of the g.s. band, the J^{π} values are shown in parentheses.

[#] Unless noted otherwise, the values are from the in-beam study of 1988Fe01, using the recoil-distance technique. Preliminary values are given by the same authors for six excited levels (1985Fe02).

[@] Band(A): K^{π}=3/2− g.s. band. Based on the deduced alignment (≈2.5) and the signature, 1980Ri08 conclude that the configuration is a mixture of the 3/2−[521] and 3/2−[532] Nilsson orbitals. Above the J=7/2 level, only the signature=+1/2 portion of the band has been established. (See, however, the comment on the "negative-parity band, α=−1/2 band" below.) A=8.16 keV, B=+71 eV, from the energies of the 3/2− through 7/2− levels, but these parameters do not provide a good description of the higher-spin members of this band.

[&] Band(B): negative-parity band. α=+1/2.

[a] Band(C): Negative-parity band. α=−1/2. 1980Ri08 suggest that, although not observed at the lower spins, this band may be the signature=−1/2 portion of the g.s. band.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{161}Yb Levels (continued)

[b] Band(D): Yrast band, α=+1/2. from the observed alignment, the band is assumed to be associated with the $i_{13/2}$ state and, hence, to have positive parity.

[c] Band(E): Positive-parity band, α=−1/2. This band structure looks like that expected for the unfavored members of the $i_{13/2}$ band (1980Ri08).

γ(^{161}Yb)

E_i(level)	J^π_i	E_γ[†]	I_γ	E_f	J^π_f	Mult.[‡]	δ[‡]	α[@]	Comments
43.67	5/2−	43.7 *3*	100.	0	3/2−	[M1,E2]			
110.79	7/2−	67.13 *20*	48. *5*	43.67	5/2−	[M1,E2]			
		110.78 *10*	100. *9*	0	3/2−	[E2]			
197.20		86.79 *15*	100.	110.79	7/2−				
211.08	(3/2−)	100.32 *10*	100. *9*	110.79	7/2−				
		211.10 *20*	21. *10*	0	3/2−				
211.1	(9/2+)	100.3		110.79	7/2−				
220.7	9/2−	109.9		110.79	7/2−				
		176.9 *1*		43.67	5/2−				
367.28		156.24 *10*	100. *10*	211.08	(3/2−)				
		170.08 *20*	29. *8*	197.20					
		256.24 *25*	100. *16*	110.79	7/2−				
462.6	(17/2+)	232.0		230.6	(13/2+)	E2		0.1650	B(E2)(W.u.)=163 *12*
552.7	13/2−	332.0		220.7	9/2−	[E2]		0.0547	B(E2)(W.u.)=4.3×10^2 *22*
703.0	(15/2+)	240.4		462.6	(17/2+)	M1+E2	−0.17[#] *8*	0.283 *6*	
		472.4		230.6	(13/2+)	M1+E2	+0.6[#] *4*	0.040 *7*	
859.9	(21/2+)	397.3		462.6	(17/2+)	E2		0.0328	B(E2)(W.u.)=148 *13*
1006.7	17/2−	454.0		552.7	13/2−	[E2]		0.0229	B(E2)(W.u.)=1.6×10^2 *10*
1117.0	(19/2+)	256.4	49 *12*	859.9	(21/2+)	M1+E2	−0.20 *11*	0.236 *7*	
		414.5	100	703.0	(15/2+)				
		653.9	72 *15*	462.6	(17/2+)	M1+E2	+0.5 *+10−1*	0.018 *6*	
1382.3	(25/2+)	522.4		859.9	(21/2+)	E2		0.01597	B(E2)(W.u.)=1.8×10^2 *4*
1535.9	21/2−	529.2		1006.7	17/2−	[E2]		0.01546	B(E2)(W.u.)>12
1649.0	(23/2+)	264.7	15 *3*	1382.3	(25/2+)	M1+E2	−0.20 *10*		
		532.8	100	1117.0	(19/2+)				
		788.9	49 *9*	859.9	(21/2+)	M1+E2	+0.40 *15*	0.0119 *7*	
1999.2	(29/2+)	616.9		1382.3	(25/2+)	E2		0.01066	B(E2)(W.u.)=75 *15*
2044.4	(25/2−)	508.5		1535.9	21/2−				
2098.1	25/2−	562.2		1535.9	21/2−				
2259.0	(27/2+)	610.5		1649.0	(23/2+)				
2304.6	(27/2−)	922.3		1382.3	(25/2+)				
2478.3	29/2−	380.2		2098.1	25/2−				
		433.5		2044.4	(25/2−)				
2560.6	(29/2−)	516.2		2044.4	(25/2−)				
2680.1	(33/2+)	680.9		1999.2	(29/2+)	E2		0.00848	B(E2)(W.u.)>52
2686.5	(31/2−)	381.9		2304.6	(27/2−)				
		687.3		1999.2	(29/2+)				
2915.7	33/2−	355.1		2560.6	(29/2−)				
		437.4		2478.3	29/2−				
2919.0	(31/2+)	660.1		2259.0	(27/2+)				
3108.8	(33/2−)	548.2		2560.6	(29/2−)				
3167.4	(35/2−)	480.9		2686.5	(31/2−)				
		487.3[&]		2680.1	(33/2+)				
3387.4	(37/2+)	707.3		2680.1	(33/2+)	E2		0.00778	
3443.5	37/2−	527.8		2915.7	33/2−	[E2]		0.01556	B(E2)(W.u.)>93
3627.0	(35/2+)	708.0		2919.0	(31/2+)				

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{161}Yb)$ (continued)

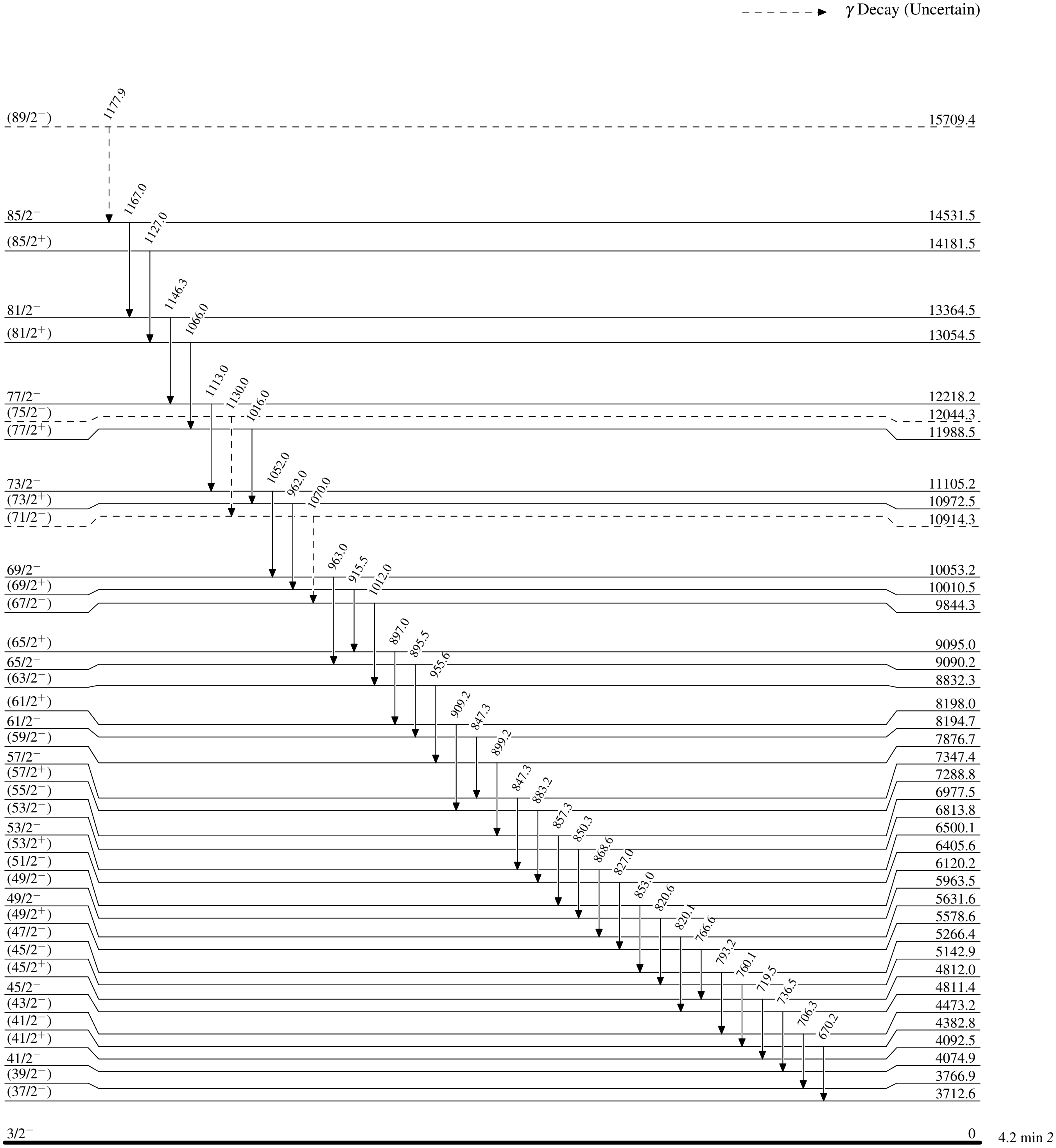
E_i(level)	J^π_i	E_γ†	E_f	J^π_f	E_i(level)	J^π_i	E_γ†	E_f	J^π_f
3712.6	(37/2⁻)	603.8	3108.8	(33/2⁻)	7876.7	(59/2⁻)	899.2	6977.5	(55/2⁻)
3766.9	(39/2⁻)	599.5	3167.4	(35/2⁻)	8194.7	61/2⁻	847.3	7347.4	57/2⁻
4074.9	41/2⁻	631.4	3443.5	37/2⁻	8198.0	(61/2⁺)	909.2	7288.8	(57/2⁺)
4092.5	(41/2⁺)	705.1	3387.4	(37/2⁺)	8832.3	(63/2⁻)	955.6	7876.7	(59/2⁻)
4350.0	(39/2⁺)	723.0	3627.0	(35/2⁺)	9090.2	65/2⁻	895.5	8194.7	61/2⁻
4382.8	(41/2⁻)	670.2	3712.6	(37/2⁻)	9095.0	(65/2⁺)	897.0	8198.0	(61/2⁺)
4473.2	(43/2⁻)	706.3	3766.9	(39/2⁻)	9844.3	(67/2⁻)	1012.0	8832.3	(63/2⁻)
4811.4	45/2⁻	736.5	4074.9	41/2⁻	10010.5	(69/2⁺)	915.5	9095.0	(65/2⁺)
4812.0	(45/2⁺)	719.5	4092.5	(41/2⁺)	10053.2	69/2⁻	963.0	9090.2	65/2⁻
5142.9	(45/2⁻)	760.1	4382.8	(41/2⁻)	10914.3?	(71/2⁻)	1070.0&	9844.3	(67/2⁻)
5266.4	(47/2⁻)	793.2	4473.2	(43/2⁻)	10972.5	(73/2⁺)	962.0	10010.5	(69/2⁺)
5578.6	(49/2⁺)	766.6	4812.0	(45/2⁺)	11105.2	73/2⁻	1052.0	10053.2	69/2⁻
5631.6	49/2⁻	820.1	4811.4	45/2⁻	11988.5	(77/2⁺)	1016.0	10972.5	(73/2⁺)
5963.5	(49/2⁻)	820.6	5142.9	(45/2⁻)	12044.3?	(75/2⁻)	1130.0&	10914.3?	(71/2⁻)
6120.2	(51/2⁻)	853.0	5266.4	(47/2⁻)	12218.2	77/2⁻	1113.0	11105.2	73/2⁻
6405.6	(53/2⁺)	827.0	5578.6	(49/2⁺)	13054.5	(81/2⁺)	1066.0	11988.5	(77/2⁺)
6500.1	53/2⁻	868.6	5631.6	49/2⁻	13364.5	81/2⁻	1146.3	12218.2	77/2⁻
6813.8	(53/2⁻)	850.3	5963.5	(49/2⁻)	14181.5	(85/2⁺)	1127.0	13054.5	(81/2⁺)
6977.5	(55/2⁻)	857.3	6120.2	(51/2⁻)	14531.5	85/2⁻	1167.0	13364.5	81/2⁻
7288.8	(57/2⁺)	883.2	6405.6	(53/2⁺)	15709.4?	(89/2⁻)	1177.9&	14531.5	85/2⁻
7347.4	57/2⁻	847.3	6500.1	53/2⁻					

† The unplaced γ's from the ε decay of ^{161}Lu (1980Be39) are not included here.
‡ From $\gamma(\theta)$ in Sm(^{16,18}O,xnγ) (1976HeZZ) and comments in 1982Ch12.
\# $\gamma(\theta)$ results allow another value of δ (1982Ch12).
@ Values are given only for γ rays from levels with known half-lives so that reduced-transition probabilities can be computed.
& Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



$^{161}_{70}Yb_{91}$

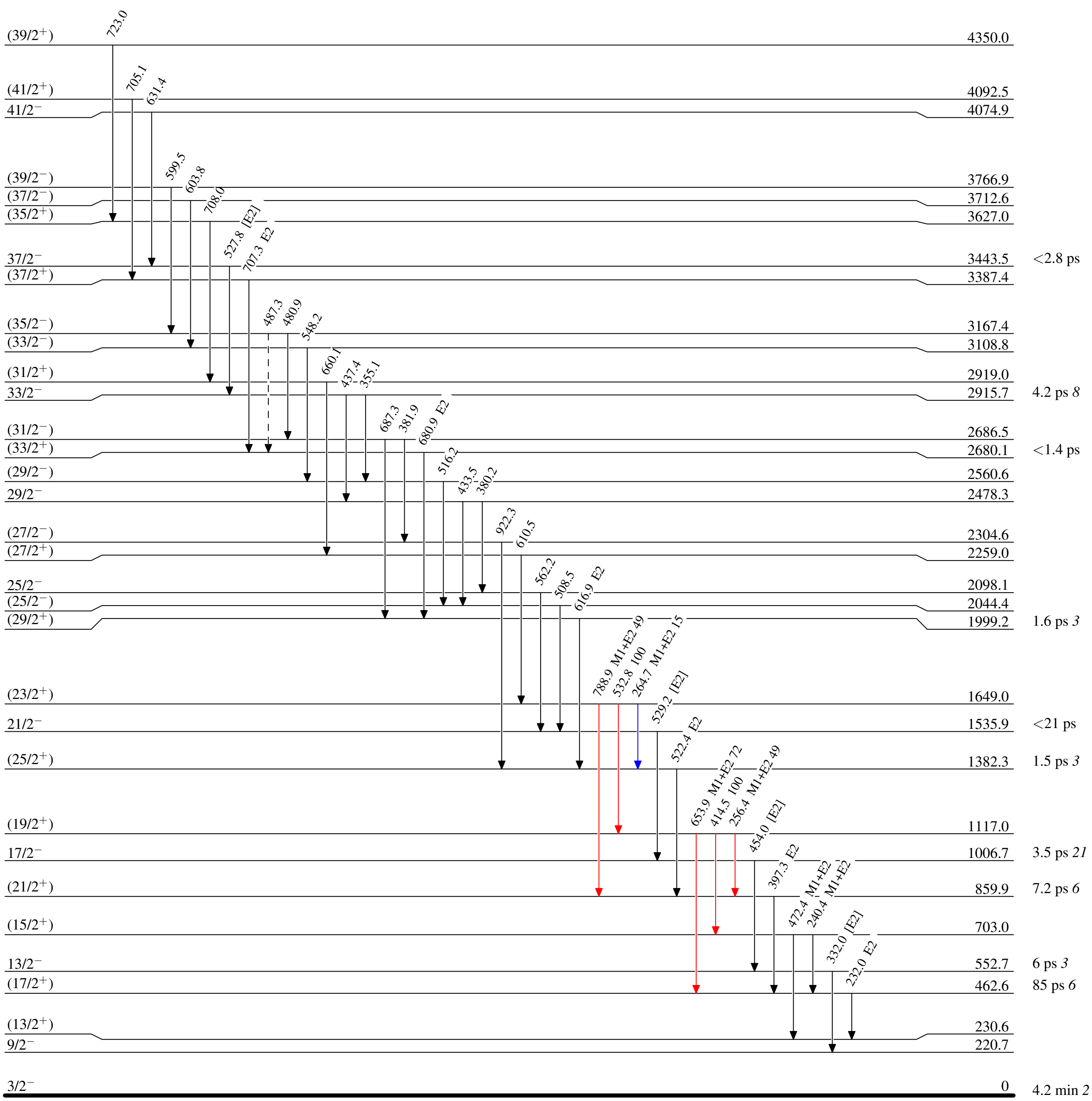
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified

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)



$^{161}_{70}Yb_{91}$

Adopted Levels, Gammas

Level Scheme (continued)

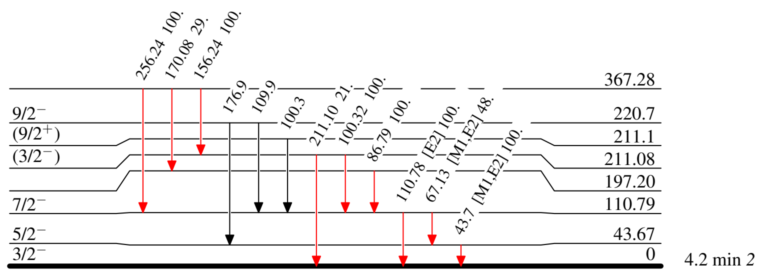
Intensities: Type not specified

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

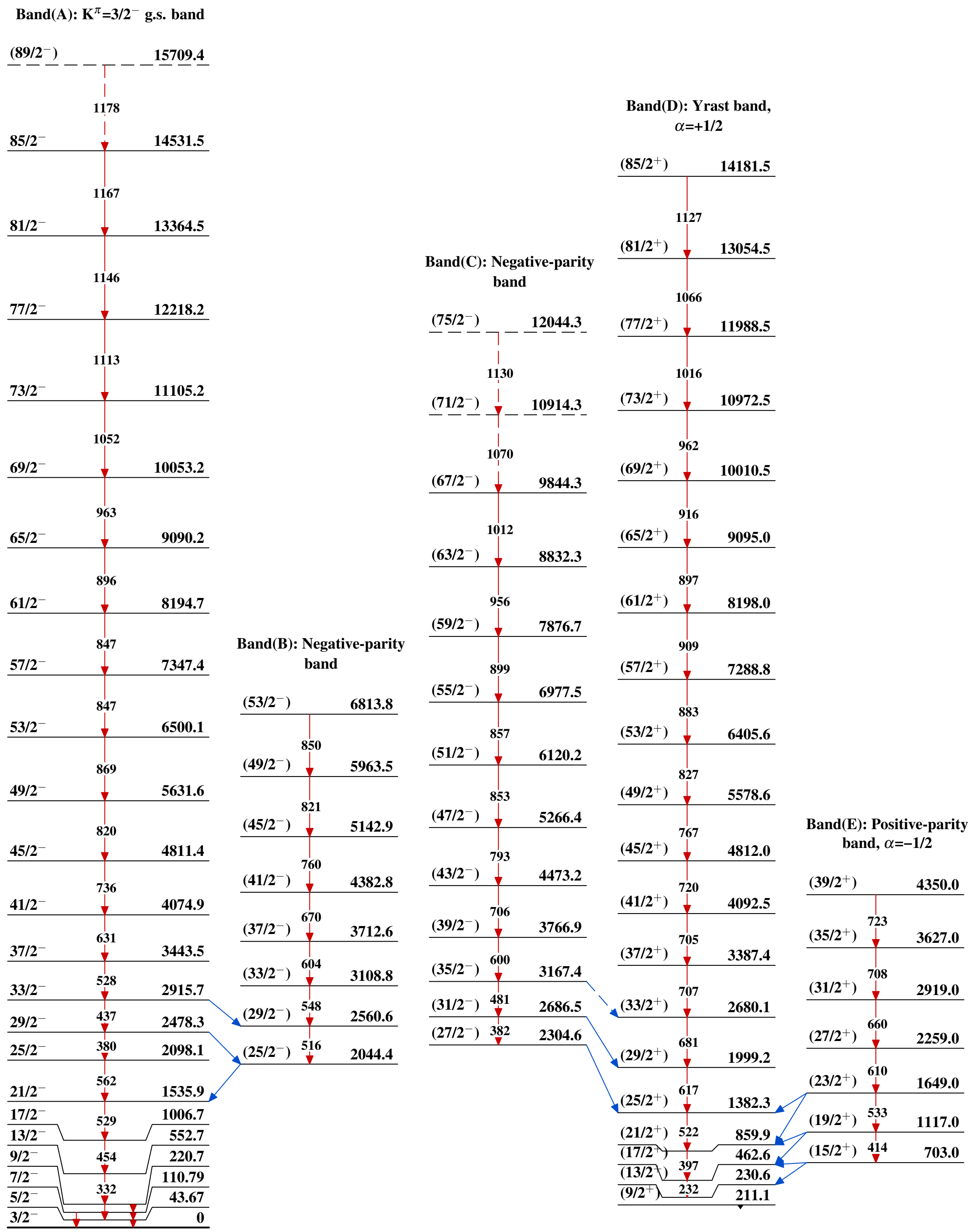
$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{161}_{70}Yb_{91}$

Adopted Levels, Gammas



$^{161}_{70}Yb_{91}$