Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov and A. Rodionov, F. G. Kondev	NDS 112,855 (2011)	31-Oct-2010

Q(β^-)=−1.00×10^4 *syst*; S(n)=1.02×10^4 *syst*; S(p)=2.9×10^3 *syst*; Q(α)=2.7×10^3 *syst* 2012Wa38
Note: Current evaluation has used the following Q record −10191 SY10372 SY2846 SY2542 syst 2009AuZZ.
ΔQ(β^+)=357, ΔS(n)=357, ΔS(p)=277, ΔQ(α)=281 (syst.,2009AuZZ).
Q(εp)=6969 *197* (syst,2009AuZZ).

^{133}Sm Levels

Cross Reference (XREF) Flags

A ^{96}Ru(^{40}Ca,2pnγ)

E(level)†	J$^\pi$‡	T$_{1/2}$	XREF	Comments
0.0#	(5/2$^+$)	2.89 s *16*	A	%ε+%β^+=100; %εp>0 E(level): The assignment of this level as g.s. is tentative. J$^\pi$: Observed %ε+%β^+ feeding to the 5/2$^+$ and 7/2$^+$ levels of the π3/2[411] (d$_{5/2}$) band in ^{133}Pm; Population of the 2$^+$ state in ^{132}Nd following εp; Comparison between the fit to εp spectrum and calculations using the statistical model in 1977Bo02 support J=5/2. Similar conclusions can be drawn from Fig.2 in 2006Xu07. T$_{1/2}$: weighted average of 3.2 s *4* (εp(t) in 1977Bo02), 2.8 s *2* (εp(t) in 1985Wi07), 3.2 s *7* (213γ(t) in coin with εp in 2006Xu07) and 2.8 s *5* (84.5γ(t) in 2001Xu04). configuration: ν5/2[402] (d$_{5/2}$).
139.7@ *6*	(7/2$^+$)		A	
314.7# *6*	(9/2$^+$)		A	
523.8@ *6*	(11/2$^+$)		A	
762.9# *6*	(13/2$^+$)		A	
1032.0@ *6*	(15/2$^+$)		A	
1326.4# *6*	(17/2$^+$)		A	
1640.4@ *6*	(19/2$^+$)		A	
1976.0# *6*	(21/2$^+$)		A	
2326.2@ *6*	(23/2$^+$)		A	
2692.1# *7*	(25/2$^+$)		A	
3064.4@ *7*	(27/2$^+$)		A	
3429.5# *8*	(29/2$^+$)		A	
0.0+y	(1/2$^-$)	3.5 s *4*	A	%ε+%β^+=?; %IT=?; %εp=? Additional information 1. E(level): The assignment of this level as an isomer is tentative. Calculations using the Woods-Saxon-Strutinsky approach in 2006Xu07 predict that the 1/2[541] orbital is 120 keV lower in energy compared to 5/2[402] one. J$^\pi$: Tentative assignment. Given the proposed ν1/2[541] (h$_{9/2}$) configuration, the rotational band associated with this state would be expected to have large signature splitting owing to the strong Coriolis interactions, and in some instances the J^π=5/2$^-$ band member becomes lower in energy. T$_{1/2}$: weighted average of 3.7 s *7* (1993BrZU) and 3.4 s *5* (2001Xu04) from 156.8γ(t) and 369.6γ(t). configuration: ν1/2[541] (h$_{9/2}$).
91.40+y& *20*	(5/2$^-$)		A	

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Adopted Levels, Gammas (continued)

^{133}Sm Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
290.5+y[&] 6	(9/2$^-$)	A	
603.6+y[&] 8	(13/2$^-$)	A	
1033.7+y[&] 8	(17/2$^-$)	A	
1577.8+y[&] 8	(21/2$^-$)	A	
2228.9+y[&] 9	(25/2$^-$)	A	
2980.0+y[&] 10	(29/2$^-$)	A	
3826.1+y[&] 11	(33/2$^-$)	A	
4753.2+y[&] 11	(37/2$^-$)	A	
5757.3+y[&] 13	(41/2$^-$)	A	
0.0+z[a]	(7/2$^-$)	A	Additional information 2. configuration: ν7/2[523] ($h_{11/2}$), supported by the in-band properties.
101.3+z[b] 3	(9/2$^-$)	A	
246.3+z[a] 3	(11/2$^-$)	A	
436.7+z[b] 4	(13/2$^-$)	A	
648.2+z[a] 4	(15/2$^-$)	A	
900.5+z[b] 5	(17/2$^-$)	A	
1154.4+z[a] 5	(19/2$^-$)	A	
1448.6+z[b] 5	(21/2$^-$)	A	
1741.4+z[a] 5	(23/2$^-$)	A	
2071.8+z[b] 5	(25/2$^-$)	A	
2403.6+z[a] 6	(27/2$^-$)	A	
2772.7+z[b] 6	(29/2$^-$)	A	
3142.8+z[a] 7	(31/2$^-$)	A	
3550.8+z[b] 6	(33/2$^-$)	A	
3956.9+z[a] 7	(35/2$^-$)	A	
4397.9+z[b] 8	(37/2$^-$)	A	
4840.0+z[a] 9	(39/2$^-$)	A	
5785.1+z[a] 11	(43/2$^-$)	A	
0.0+u		A	Additional information 3. E(level): the (5/2$^+$) g.s. or the (1/2$^-$) isomeric level in ^{133}Sm.
80.9+u[c] 7	(1/2$^+$)	A	configuration: ν1/2[411] ($d_{3/2}$).
96.90+u[d] 10	(3/2$^+$)	A	
231.02+u[c] 15	(5/2$^+$)	A	
268.5+u[d] 5	(7/2$^+$)	A	
491.1+u[c] 5	(9/2$^+$)	A	
544.7+u[d] 7	(11/2$^+$)	A	
843.2+u[c] 6	(13/2$^+$)	A	
910.9+u[d] 7	(15/2$^+$)	A	
1278.7+u[c] 7	(17/2$^+$)	A	
1365.5+u[d] 9	(19/2$^+$)	A	
1801.5+u[c] 8	(21/2$^+$)	A	
1910.8+u[d] 10	(23/2$^+$)	A	
2402.7+u[c] 9	(25/2$^+$)	A	
2544.0+u[d] 11	(27/2$^+$)	A	
3065.8+u[c] 9	(29/2$^+$)	A	
3267.1+u[d] 11	(31/2$^+$)	A	
3760.5+u[c] 10	(33/2$^+$)	A	

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Adopted Levels, Gammas (continued)

^{133}Sm Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF
4077.4+u[d] *12*	(35/2$^+$)	A
4499.6+u[c] *11*	(37/2$^+$)	A
4973.5+u[d] *15*	(39/2$^+$)	A
5294.0+u[c] *12*	(41/2$^+$)	A
5945.4+u[d] *17*	(43/2$^+$)	A
7001.5+u?[d] *17*	(47/2$^+$)	A

[†] From least-squares fit to Eγ's.

[‡] From deduced transition multipolarities and the observed apparent band structures with ΔJ=2 cascade transitions or with ΔJ=1 cascade and ΔJ=2 crossover transitions in ^{96}Ru(^{40}Ca,2pnγ).

[#] Band(A): 1-qp band based on the (5/2$^+$) g.s., α=+1/2; possible configuration=ν5/2[402] ($d_{5/2}$).

[@] Band(B): 1-qp band based on the (7/2$^+$) state at 139.7-keV, α=−1/2; possible configuration=ν5/2[402] ($d_{5/2}$).

[&] Band(C): 1-qp band based on the (1/2$^-$) state at 0.0+Y−keV, possible configuration=ν1/2[541] ($h_{9/2}$), decoupled band.

[a] Band(D): 1-qp band based on the (7/2$^-$) state at 0.0+Z−keV, α=−1/2; possible configuration=ν7/2[523] ($h_{11/2}$).

[b] Band(E): 1-qp band based on the (9/2$^-$) state at 101.3+Z−keV, α=+1/2; possible configuration=ν7/2[523] ($h_{11/2}$).

[c] Band(F): 1-qp band based on the (1/2$^+$) state at 80.9+U−keV, α=+1/2; possible configuration=ν1/2[411] ($d_{3/2}$) which at high-spin may be crossed by the ν1/2[660] orbital. Probable highly-deformed band.

[d] Band(G): 1-qp band based on the (3/2$^+$) state at 96.90+U−keV, α=−1/2; possible configuration=ν1/2[411] ($d_{3/2}$) which at high-spin may be crossed by the ν1/2[660] orbital. Probable highly-deformed band.

γ(^{133}Sm)

E$_i$(level)	J$_i^{\pi}$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$_f^{\pi}$	Mult.[‡]
139.7	(7/2$^+$)	139.1 *8*	100	0.0	(5/2$^+$)	(M1)
314.7	(9/2$^+$)	175.1 *2*	55 *8*	139.7	(7/2$^+$)	
		315.1 *7*	100 *10*	0.0	(5/2$^+$)	E2
523.8	(11/2$^+$)	209.1 *1*	100 *14*	314.7	(9/2$^+$)	(M1)
		384.1 *1*	70 *12*	139.7	(7/2$^+$)	E2
762.9	(13/2$^+$)	239.1 *1*	51 *11*	523.8	(11/2$^+$)	(M1)
		449.1 *5*	100 *11*	314.7	(9/2$^+$)	E2
1032.0	(15/2$^+$)	269.1 *3*	74 *22*	762.9	(13/2$^+$)	(M1)
		509.1 *5*	100 *22*	523.8	(11/2$^+$)	E2
1326.4	(17/2$^+$)	294.1 *3*	34 *10*	1032.0	(15/2$^+$)	(M1)
		563.1 *3*	100 *15*	762.9	(13/2$^+$)	E2
1640.4	(19/2$^+$)	314.1 *6*	62 *31*	1326.4	(17/2$^+$)	(M1)
		608.4 *1*	100 *19*	1032.0	(15/2$^+$)	E2
1976.0	(21/2$^+$)	335.1 *9*	33 *30*	1640.4	(19/2$^+$)	(M1)
		649.1 *3*	100 *17*	1326.4	(17/2$^+$)	E2
2326.2	(23/2$^+$)	350.1 *1*	45 *35*	1976.0	(21/2$^+$)	(M1)
		685.9 *1*	100 *45*	1640.4	(19/2$^+$)	E2
2692.1	(25/2$^+$)	366.1 *5*	44 *28*	2326.2	(23/2$^+$)	(M1)
		716.1 *7*	100 *40*	1976.0	(21/2$^+$)	
3064.4	(27/2$^+$)	373.3 *8*	57 *64*	2692.1	(25/2$^+$)	(M1)
		738.1 *4*	100 *86*	2326.2	(23/2$^+$)	
3429.5	(29/2$^+$)	365.4 *7*	58 *83*	3064.4	(27/2$^+$)	(M1)
		737.1 *6*	100 *93*	2692.1	(25/2$^+$)	
91.40+y	(5/2$^-$)	91.4 *2*	100	0.0+y	(1/2$^-$)	
290.5+y	(9/2$^-$)	199.1 *5*	100	91.40+y	(5/2$^-$)	E2
603.6+y	(13/2$^-$)	313.1 *5*	100	290.5+y	(9/2$^-$)	E2
1033.7+y	(17/2$^-$)	430.1 *2*	100	603.6+y	(13/2$^-$)	E2

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Adopted Levels, Gammas (continued)

γ(^{133}Sm) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]
1577.8+y	(21/2$^-$)	544.1 *1*	100	1033.7+y	(17/2$^-$)	E2
2228.9+y	(25/2$^-$)	651.1 *4*	100	1577.8+y	(21/2$^-$)	E2
2980.0+y	(29/2$^-$)	751.1 *5*	100	2228.9+y	(25/2$^-$)	E2
3826.1+y	(33/2$^-$)	846.1 *3*	100	2980.0+y	(29/2$^-$)	E2
4753.2+y	(37/2$^-$)	927.1 *2*	100	3826.1+y	(33/2$^-$)	
5757.3+y	(41/2$^-$)	1004.1 *7*	100	4753.2+y	(37/2$^-$)	
101.3+z	(9/2$^-$)	102.1 *5*	100	0.0+z	(7/2$^-$)	
246.3+z	(11/2$^-$)	145.0 *1*	100	101.3+z	(9/2$^-$)	(M1)
		246.0 *3*	84 *6*	0.0+z	(7/2$^-$)	E2
436.7+z	(13/2$^-$)	190.9 *4*	84 *7*	246.3+z	(11/2$^-$)	(M1)
		334.8 *5*	100 *8*	101.3+z	(9/2$^-$)	E2
648.2+z	(15/2$^-$)	211.1 *4*	77 *13*	436.7+z	(13/2$^-$)	(M1)
		401.7 *5*	100 *13*	246.3+z	(11/2$^-$)	E2
900.5+z	(17/2$^-$)	251.7 *5*	36 *10*	648.2+z	(15/2$^-$)	
		464.1 *3*	100 *11*	436.7+z	(13/2$^-$)	E2
1154.4+z	(19/2$^-$)	255.5 *7*	84 *24*	900.5+z	(17/2$^-$)	
		506.2 *1*	100 *20*	648.2+z	(15/2$^-$)	E2
1448.6+z	(21/2$^-$)	294.1 *2*	46 *9*	1154.4+z	(19/2$^-$)	
		548.1 *1*	100 *18*	900.5+z	(17/2$^-$)	E2
1741.4+z	(23/2$^-$)	292.8 *2*	26 *6*	1448.6+z	(21/2$^-$)	
		587.4 *4*	100 *10*	1154.4+z	(19/2$^-$)	E2
2071.8+z	(25/2$^-$)	330.4 *1*	33 *22*	1741.4+z	(23/2$^-$)	
		623.1 *2*	100 *17*	1448.6+z	(21/2$^-$)	E2
2403.6+z	(27/2$^-$)	331.9 *8*	26 *17*	2071.8+z	(25/2$^-$)	
		662.3 *9*	100 *14*	1741.4+z	(23/2$^-$)	E2
2772.7+z	(29/2$^-$)	369.1 *1*	32 *36*	2403.6+z	(27/2$^-$)	
		700.9 *5*	100 *20*	2071.8+z	(25/2$^-$)	E2
3142.8+z	(31/2$^-$)	370.4 *4*	21 *24*	2772.7+z	(29/2$^-$)	
		739.1 *2*	100 *15*	2403.6+z	(27/2$^-$)	E2
3550.8+z	(33/2$^-$)	778.1 *1*	100	2772.7+z	(29/2$^-$)	E2
3956.9+z	(35/2$^-$)	814.1 *2*	100	3142.8+z	(31/2$^-$)	
4397.9+z	(37/2$^-$)	847.1 *4*	100	3550.8+z	(33/2$^-$)	
4840.0+z	(39/2$^-$)	883.1 *5*	100	3956.9+z	(35/2$^-$)	
5785.1+z	(43/2$^-$)	945.1 *7*	100	4840.0+z	(39/2$^-$)	
96.90+u	(3/2$^+$)	96.9 *1*	100	0.0+u		
231.02+u	(5/2$^+$)	134.1 *1*	100 *28*	96.90+u	(3/2$^+$)	(M1)
		150.1 *6*	78 *39*	80.9+u	(1/2$^+$)	E2
268.5+u	(7/2$^+$)	172.1 *5*	100	96.90+u	(3/2$^+$)	E2
491.1+u	(9/2$^+$)	223.1 *5*	40 *23*	268.5+u	(7/2$^+$)	(M1)
		259.1 *7*	100 *17*	231.02+u	(5/2$^+$)	E2
544.7+u	(11/2$^+$)	276.1 *8*	100	268.5+u	(7/2$^+$)	E2
843.2+u	(13/2$^+$)	298.6 *5*	39 *29*	544.7+u	(11/2$^+$)	(M1)
		352.1 *3*	100 *29*	491.1+u	(9/2$^+$)	E2
910.9+u	(15/2$^+$)	366.1 *3*	100	544.7+u	(11/2$^+$)	E2
1278.7+u	(17/2$^+$)	367.7 *2*	41 *32*	910.9+u	(15/2$^+$)	(M1)
		436.1 *8*	100 *40*	843.2+u	(13/2$^+$)	E2
1365.5+u	(19/2$^+$)	454.6 *6*	100	910.9+u	(15/2$^+$)	E2
1801.5+u	(21/2$^+$)	435.1[#] *6*	35 *30*	1365.5+u	(19/2$^+$)	(M1)
		522.8 *4*	100 *35*	1278.7+u	(17/2$^+$)	E2
1910.8+u	(23/2$^+$)	545.3 *3*	100	1365.5+u	(19/2$^+$)	E2
2402.7+u	(25/2$^+$)	601.2 *2*	100	1801.5+u	(21/2$^+$)	E2
2544.0+u	(27/2$^+$)	633.2 *4*	100	1910.8+u	(23/2$^+$)	E2
3065.8+u	(29/2$^+$)	663.1 *4*	100	2402.7+u	(25/2$^+$)	E2
3267.1+u	(31/2$^+$)	723.1 *2*	100	2544.0+u	(27/2$^+$)	E2
3760.5+u	(33/2$^+$)	694.7 *2*	100	3065.8+u	(29/2$^+$)	E2

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Adopted Levels, Gammas (continued)

$\gamma(^{133}Sm)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π
4077.4+u	$(35/2^+)$	810.3 *6*	100	3267.1+u	$(31/2^+)$
4499.6+u	$(37/2^+)$	739.1 *4*	100	3760.5+u	$(33/2^+)$
4973.5+u	$(39/2^+)$	896.1 *8*	100	4077.4+u	$(35/2^+)$
5294.0+u	$(41/2^+)$	794.4 *6*	100	4499.6+u	$(37/2^+)$
5945.4+u	$(43/2^+)$	971.9 *8*	100	4973.5+u	$(39/2^+)$
7001.5+u?	$(47/2^+)$	1055.7[#] *5*	100	5945.4+u	$(43/2^+)$

[†] From $^{90}Ru(^{40}Ca,2pn\gamma)$ data.

[‡] From $\gamma\gamma(\theta)$(DCO) values and the observed apparent band structures with $\Delta J=2$ cascade transitions or with $\Delta J=1$ cascade and $\Delta J=2$ crossover transitions in $^{96}Ru(^{40}Ca,2pn\gamma)$.

[#] Placement of transition in the level scheme is uncertain.

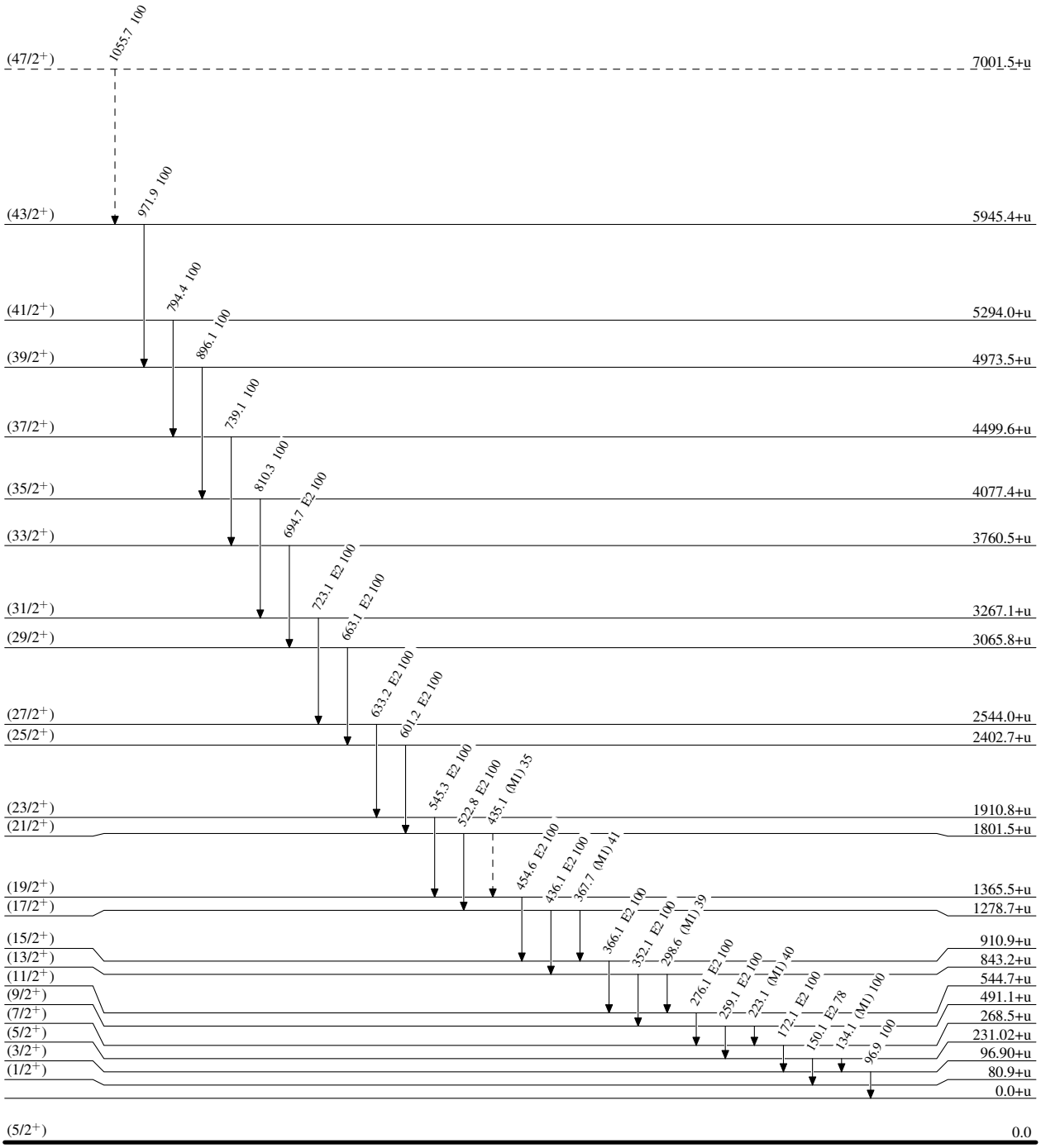
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

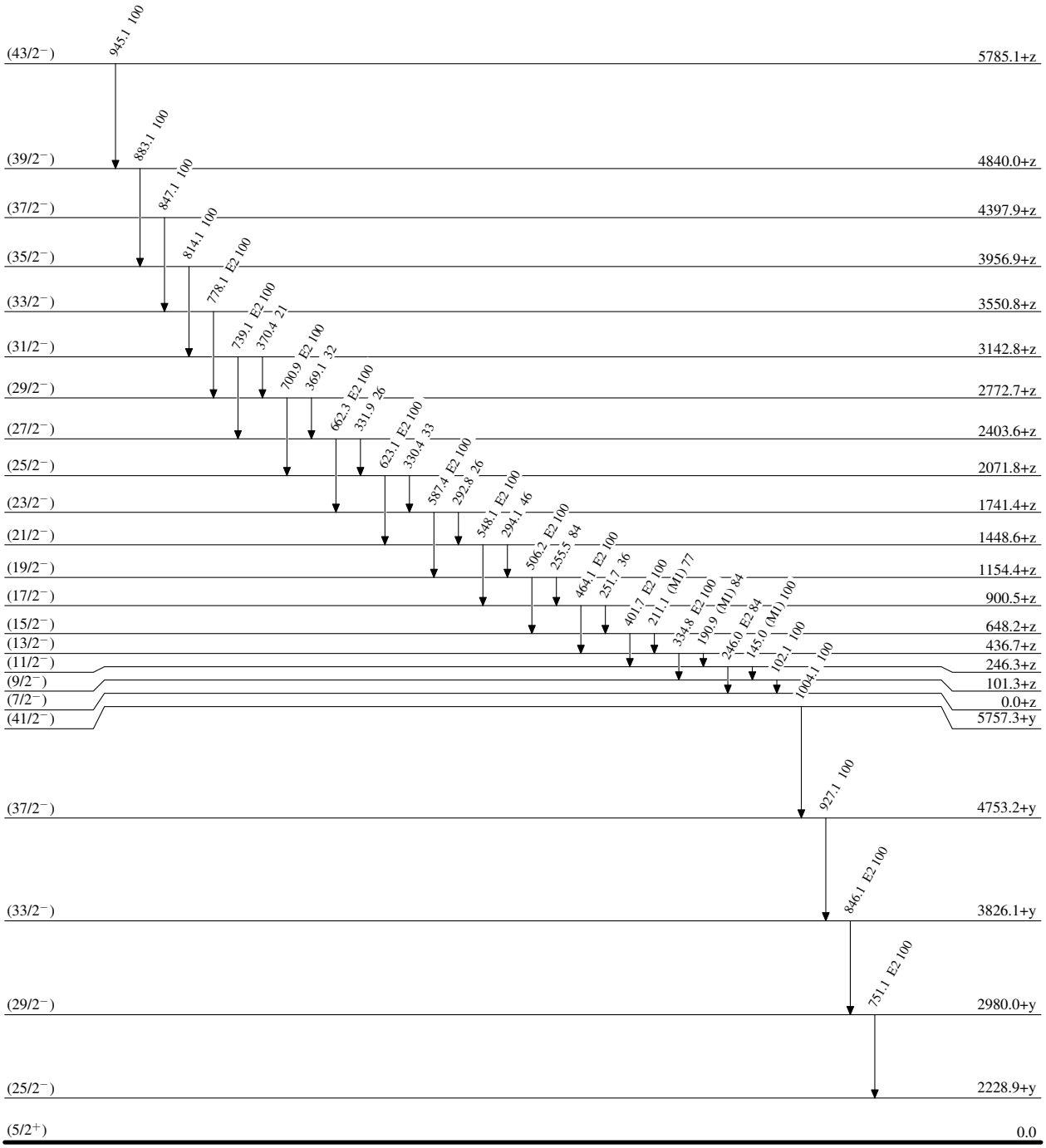


$^{133}_{62}Sm_{71}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

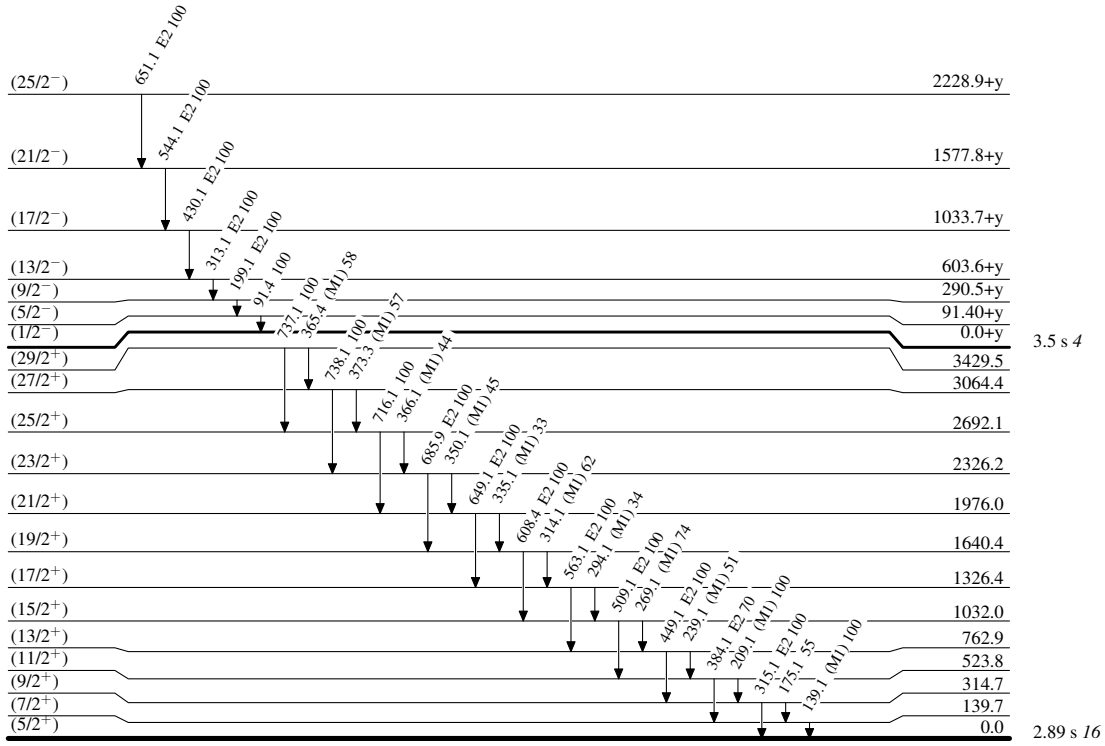


$^{133}_{62}Sm_{71}$

Adopted Levels, Gammas

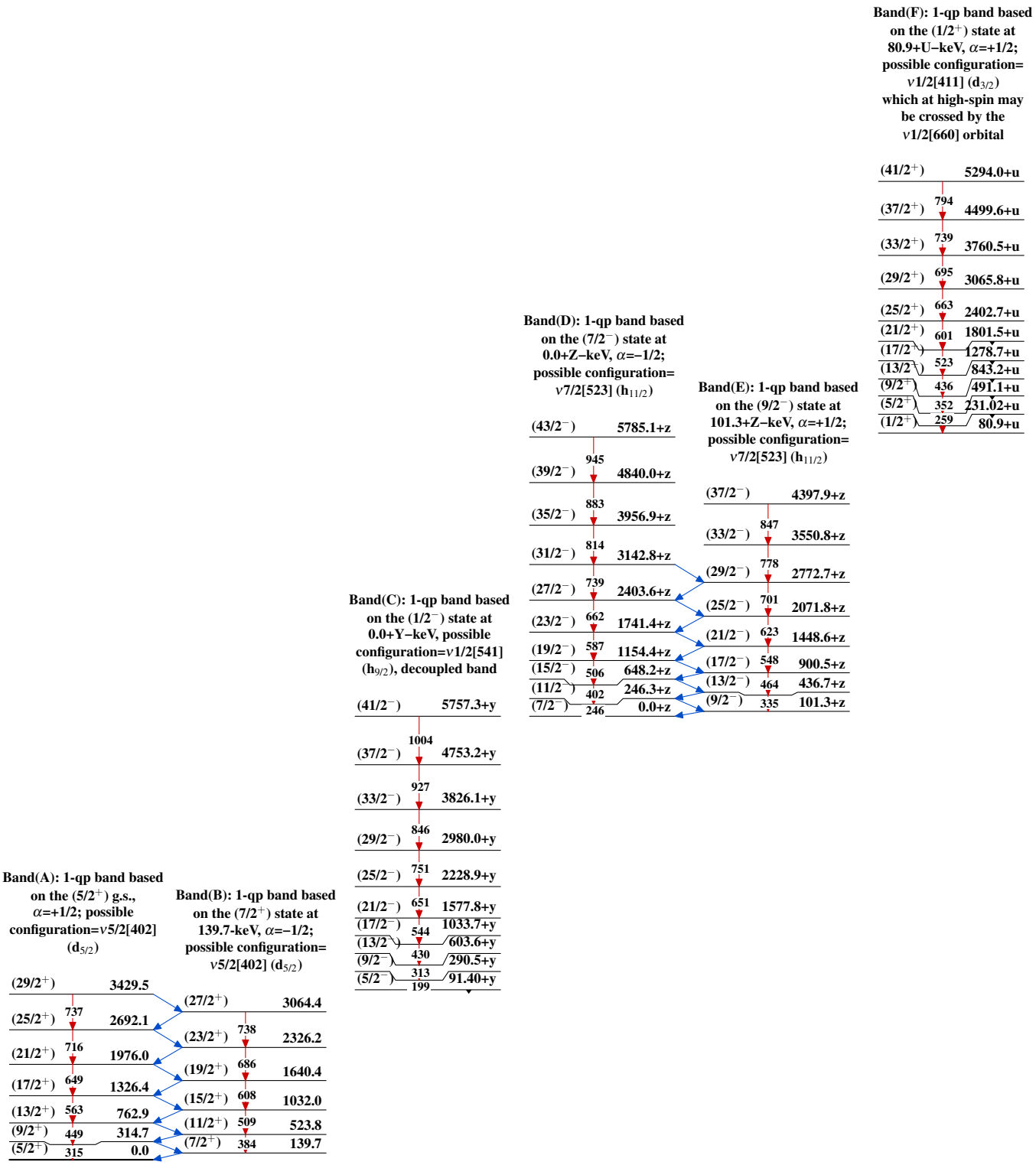
Level Scheme (continued)

Intensities: Relative photon branching from each level



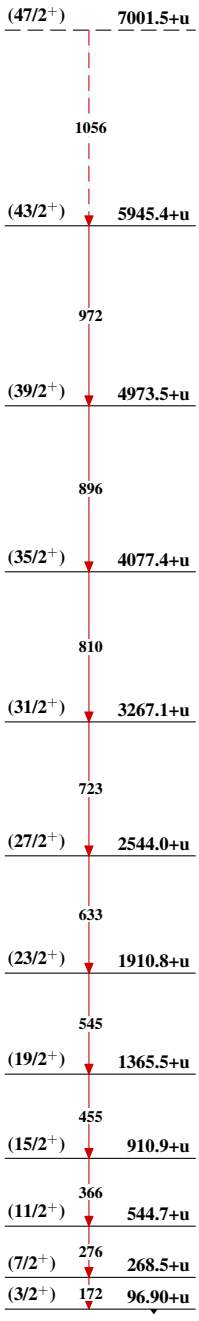
$^{133}_{62}Sm_{71}$

Adopted Levels, Gammas



Adopted Levels, Gammas (continued)

Band(G): 1-qp band based on the (3/2$^+$) state at 96.90+U−keV, α=−1/2; possible configuration= ν1/2[411] ($d_{3/2}$) which at high-spin may be crossed by the ν1/2[660] orbital



$^{133}_{62}Sm_{71}$