^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson and W. D. Kulp(a)	NDS 129, 1 (2015)	27-Jul-2015

2003Pa09: ^{58}Ni(^{32}S,3pγ) E(^{32}S=135 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) lifetimes with DSAM using the GAMMASPHERE comprised of 36 Compton-suppressed HPGe detectors in conjuction with the Microball composed of 95 CsI (Tl) scintillators. In a second experiment for lifetime measurements, 95 HPGe detectors were used.

1986CoZQ: ^{58}Ni(^{32}S,3pγ) E(^{32}S)=100-120 MeV, measured excitation functions, $\gamma\gamma$ coincidences, and γ angular distributions.

1991Mi15: ^{58}Ni(^{32}S,3pγ) E(^{32}S)=103 MeV, measured γ singles, $\gamma\gamma$-charged particle coincidences, and γ angular distributions. No uncertainties are given for the E$_\gamma$.

1991Ju05: ^{58}Ni(^{32}S,3pγ) E(^{32}S)=108 MeV and ^{40}Ca(^{50}Cr,3pγ) E(^{50}Cr)=170 MeV, γ singles, $\gamma\gamma$ coincidences, DCO ratios, γ angular distributions, and lifetimes by recoil distance Doppler shift method.

1995Ka06: ^{58}Ni(^{36}Ar,α3nγ) E(^{36}Ar)=149 MeV, measured one level lifetime by γ-n(t).

1995We03: ^{58}Ni(^{32}S,3pγ) E(^{32}S)=110 MeV, measured g-factors by IMPAD method.

1997La02 (also 1996LaZZ): ^{58}Ni(^{32}S,3pγ) E(^{32}S)=135 MeV. Measured E$_\gamma$, $\gamma\gamma\gamma$ and $\gamma\gamma(\theta)$ coincidences and deduced DCO ratios and lifetimes by centroid-shift method using GAMMASPHERE array and charged-particle microball. Deduced SD bands. Intensity measurements not reported.

1997We04: ^{58}Ni(^{32}S,3pγ) E(^{32}S)=95-105 MeV and ^{58}Ni(^{35}Cl,2pα) E(^{35}Cl)=124 MeV, measured $\gamma\gamma$ coincidences, $\gamma(\theta)$, excitation functions, DCO ratios with 5 Compton-suppressed Ge detectors.

Scheme is from 2003Pa09 with additions as noted; the scheme is similar to to that of 1991Ju05 with some rearrangements, which is is similar to that of 1991Mi15, 1997We04, but less extensive.

^{87}Nb Levels

See 2003Pa09 for configurations of non-superdeformed bands.

E(level)†‡#	J$^\pi$@	T$_{1/2}$&	Comments
0[m]	(1/2)$^-$		J$^\pi$: from Adopted Levels.
1.9[s] 2	(9/2)$^+$		J$^\pi$: from Adopted Levels.
199.6[i] 4	(3/2$^-$)		
264.9[t] 2	(7/2)$^+$		T$_{1/2}$: effective half-life, not corrected for feeding, is 67 ps *9* (1991Ju05).
332.9[m] 1	(5/2$^-$)	28.4 ns *2*	R(DCO)=1.18 *13* 1997We04. T$_{1/2}$: From 1995Ka06.
781.9[s] 1	(13/2)$^+$	1.8 ps *4*	T$_{1/2}$: From 1991Ju05.
838.1[i] 1	(7/2$^-$)		T$_{1/2}$: effective half-life, not corrected for feeding is 44 ps *15* (1991Ju05).
993.3 2	(11/2$^+$)		
1049.2[t] 1	(11/2)$^+$		
1167.1[m] 2	(9/2$^-$)		
1601.8[i] 2	(11/2$^-$)		T$_{1/2}$: effective half-life, not corrected for feeding, is 21 ps *7* (1991Ju05).
1734.7[s] 2	(17/2)$^+$	0.69 ps *21*	T$_{1/2}$: from 1991Ju05.
1952.1[t] 1	(15/2)$^+$	23 ps *18*	T$_{1/2}$: from 1991Ju05.
1974.8[m] 2	(13/2$^-$)		Angular distribution measurements from 1991Ju05 consistent with ΔJ=2 for a stretched E2. T$_{1/2}$: effective half-life, not corrected for feeding, is 37 ps *9* (1991Ju05).
2112.2 2	(15/2$^+$)		
2275.2[i] 2	(15/2$^-$)		T$_{1/2}$: Effective half-life, not corrected for feeding, is 11.1 ps *14* (1991Ju05).
2305.5 3	(15/2$^+$)		
2410.2[l] 2	(17/2$^-$)	58 ps *5*	g=+0.82 *10* g: from 1995We03. Since the level scheme has been slightly changed in 2003Pa09 as compared to 1995We03, the feeding pattern of this level has changed which impacts the calculations for the g-factor .This should be revisited experimentally. T$_{1/2}$: from 1991Ju05, although the different feeding due to the revised level scheme may

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

^{87}Nb Levels (continued)

E(level)[†‡#]	J$^\pi$[@]	T$_{1/2}$[&]	Comments
			impact the half-life somewhat.
2488.4[q] *2*	(21/2)$^+$	13.9 ps *7*	g=+0.41 *13* g: from 1995We03 may be slightly impacted by revised level scheme. T$_{1/2}$: from 1991Ju05 and may be slightly impacted by revised level scheme.
2579.0 *2*	(17/2$^-$)		
2858.7[s] *2*	(21/2)$^+$	0.8 ps *5*	T$_{1/2}$: from 1991Ju05.
2903.4[h] *2*	(19/2$^-$)		
2986.0 *2*	(19/2$^-$)		J$^\pi$: Consistent with DCO for 1066 feeding transition.
3216.7[l] *2*	(21/2$^-$)[a]	1.6 ps *3*	T$_{1/2}$: From 1991Ju05.
3217.3[r] *2*	(23/2$^+$)	0.55 ps *14*	T$_{1/2}$: from 1991Ju05.
3444.6[q] *16*	(25/2)$^+$	1.66 ps *14*	T$_{1/2}$: from 1991Ju05.
3739.4[s] *2*	(25/2$^+$)		Iγ(521)=4.9 *4*, Iγ(879)=6.3 *6*, Iγ(1251)=2.5 *3* (1991Ju05) $Evaluator notes a significant discrepency in branching ratios between 2003Pa09 and 1991Ju05.
3779.0[h] *4*	(23/2$^-$)[a]		
3866.6 *2*	(25/2$^+$)		
4128.5[l] *2*	(25/2$^-$)[a]	2.1 ps *3*	
4283.5[j] *4*	(25/2$^-$)[a]		
4298.5[r] *2*	(27/2$^+$)[a]		
4589.2[q] *2*	(29/2)$^+$		T$_{1/2}$: Effective half-life, not corrected for feeding is 0.62 ps *21* (1991Ju05).
4776.8[h] *4*	(27/2$^-$)[b]		
4937.3[s] *2*	(29/2)$^+$[a]		
5007.5[l] *2*	(29/2$^-$)	3.5 ps *3*	T$_{1/2}$: from 1991Ju05.
5299.2[j] *5*	(29/2$^-$)		J$^\pi$: based on DCOs of feeding 475 transition and depopulating γ.
5590.2[k] *3*	(31/2$^-$)		T$_{1/2}$: Effective half-life, not corrected for feeding is 0.62 ps *14* (1991Ju05).
5617.7[r] *2*	(31/2$^+$)		
5774.0[h] *4*	(31/2$^-$)[b]	0.28 ps *9*	
5838.6[q] *2*	(33/2)$^+$	0.29 ps *+9−6*	
6037.0[l] *3*	(33/2$^-$)	0.24 ps *4*	
6194.4 *4*	(33/2$^+$)		
6364.7[s] *3*	(33/2)$^+$[a]		
6390.9 *3*	(33/2$^-$)		
6441.3[j] *4*	(33/2$^-$)[b]		
6537.1 *4*	(33/2$^+$)		
6742.5[k] *3*	(35/2$^-$)	0.33 ps *5*	
6807.8[r] *3*	(35/2$^+$)	0.44 ps *6*	
6971.3[h] *5*	35/2$^-$[a]	0.31 ps *+16−8*	
7137.2[q] *3*	(37/2)$^+$	0.30 ps *4*	
7223.4[l] *3*	(37/2$^-$)[a]	0.58 ps *9*	
7616.7 *3*	(37/2$^+$)	0.33 ps *+7−5*	
7644.9[j] *4*	(37/2$^-$)[a]	0.26 ps *+12−9*	
7939.7[s] *6*	(37/2$^+$)[b]		
8059.6[r] *3*	(39/2$^+$)[a]	0.49 ps *8*	
8251.4[k] *6*	(39/2$^-$)[a]	0.46 ps *7*	
8363.4[h] *5*	(39/2$^-$)[a]		T$_{1/2}$: effective half-life, not corrected for side feeding is 0.36 ps *+7−6*.
8429.9[o] *4*	(41/2)$^+$	0.40 ps *6*	
8533.2[l] *6*	(41/2$^-$)[a]	0.33 ps *5*	
8569.0[q] *6*	(41/2$^+$)[b]	0.64 ps *+14−10*	
8871.2 *5*	(41/2$^+$)		
8932.4[j] *5*	(41/2$^-$)[a]	0.152 ps *28*	
9012.4 *5*	(41/2$^+$)		J$^\pi$: Feeding from (43/2$^+$) and into (39/2$^+$) both presumed to be Δ\=1.

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

^{87}Nb Levels (continued)

E(level)[†‡#]	Jπ[@]	$T_{1/2}$[&]	Comments
9512.1[r] 5	(43/2+)[a]	0.062 ps +28−21	
9572.7[s] 8	(41/2+)[b]		
9811.3?[c] 11	(43/2−)		Jπ: Tenative Assignment made assuming this level extended a band structure (1991Ju05), not confirmed in 2003Pa09.
9841.3[k] 6	(43/2−)[b]	0.28 ps +5−4	
9886.2[h] 7	(43/2−)[b]		
9994.9[o] 11	(45/2+)	0.222 ps 35	
10234.5[l] 7	(45/2−)[a]	0.34 ps 5	
10457.5[j] 6	(45/2−)[a]	0.090 ps 21	
11021.3 8	(45/2+)		Jπ: Assuming stretched E2 for the 2452 keV line, although needs experimental verification.
11184.5 7	(47/2+)[a]	0.07 ps +7−3	
11542.9[h] 9	(47/2−)[b]		
11577.6[k] 7	(47/2−)[b]		$T_{1/2}$: effective half-life, not corrected for side feeding is 0.194 ps +35−28.
11945.9[o] 15	(49/2+)[a]		$T_{1/2}$: effective half-life, not corrected for side feeding is 0.028 ps +35−21.
12015.1[j] 7	(49/2−)[a]	0.152 ps 21	
12490.0 2	(49/2+)		Jπ: Assuming stretched E2 for populating and depopulating transitions, but no experimental verification.
13117.5[r] 9	(51/2+)[b]	0.028 ps +35−21	
13256.5[p] 9	(51/2+)		Jπ: Band placement.
13473.9[h] 10	(51/2−)[b]		
13575.7[k] 9	(51/2−)[b]		
13750.0[n] 16	(53/2+)		Jπ: Assuming stretched E2 for the 1263 and 1804 keV depopulating transitions.
13877.1[j] 22	(53/2−)[a]	0.083 ps 14	
14199.1[o] 16	(53/2+)[b]		
14588.1 9	(53/2−)		Jπ: Assuming stretched E2 populating (49/2−).
14860? 1	(53/2−)		Jπ: Assuming stretched E2 for the 2846 depopulating transition.
15327.2[r] 10	(55/2+)	0.021 ps +21−7	Jπ: band placment.
15670.0[h] 11	(55/2−)[b]		
15864.8[n] 17	(57/2+)		Jπ: Assuming stretched E2 for the 2115 depopulating transition.
15927.0?[p] 8	(55/2+)		Jπ: Assuming stretched E2 for the 2674 depopulating transition.
15938[k] 1	(55/2−)		Jπ: Supported by tentative band placement.
16185.5[j] 22	(57/2−)[b]		$T_{1/2}$: effective half-life, not corrected for side feeding is 0.12 ps +27−6.
17925.6[r] 11	(59/2+)[a]		$T_{1/2}$: effective half-life, not corrected for side feeding is 0.028 ps +63−28.
18257.7[n] 17	(61/2+)[a]		
18839.1?[p] 9	(59/2+)		Jπ: Supported by tentative band placement.
18892.4[j] 23	(61/2−)[b]		
x[d]	J		Jπ: ≈ (35/2) from 1997La02.
1250+x[d]	J+2		
1258+x			
2679+x[d]	J+4		
4251+x[d]	J+6		
5970+x[d]	J+8		
7849+x[d]	J+10		
9894+x[d]	J+12		
12110+x[d]	J+14		
14505+x[d]	J+16		
17090+x[d]	J+18		

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

^{87}Nb Levels (continued)

E(level)[†‡#]	J$^\pi$[@]	Comments
y[e]	J1	J$^\pi$: ≈ (41/2) from 1997La02.
1492+y[e]	J1+2	
1870+y[f]	J1+2	
3134+y[e]	J1+4	
3378+y[f]	J1+4	
4924+y[e]	J1+6	
5035+y[f]	J1+6	
6795+y[f]	J1+8	
6916+y[e]	J1+8	
8759+y[f]	J1+10	
8994+y[e]	J1+10	
10876+y[e]	J1+12	
11170+y[e]	J1+12	
13150+y[e]	J1+14	
13438+y[e]	J1+14	
15582+y[f]	J1+16	
15831+y[e]	J1+16	
18169+y[f]	J1+18	
18374+y[e]	J1+18	
z[g]	J2	J$^\pi$: ≈ (39/2) from 1997La02.
1697+z[g]	J2+2	
3563+z[g]	J2+4	
5604+z[g]	J2+6	
7815+z[g]	J2+8	
10199+z[g]	J2+10	
12736+z[g]	J2+12	

† From least-squares fit to Eγ′s (by evaluators).

‡ Note that 1991Ju05 report a tentative level at 6299 fed by a 675 γ transition from the (33/2$^-$) level at 6973 and depopulated by a tentative 997 γ transition. Similarly, a level at 2694 from 1991Ju05 were deexcited by 282 and 717 γ transitions which have alternate placements in 1993Pa09.

Note a 5553 level was assigned in 1997We04, depopulated by 963.7 and 1253.7 γ transitions. a 1253.7 γ transition was placed from the 7644.5 level in 2003Pa09, and it seems unlikely that this level would have been missed in both 2003Pa09 and 1991Ju05, and so is not included here. a level at 7151 keV was also assigned in 1997We04, depopulated by a 408.7γ. As it also unlikely this level would have been missed in 1991Ju05 and 2003Pa09, it is not included here.

@ From DCO ratios (2003Pa09) when available. Good agreement with comparisons (1991Ju05) of $\gamma(\theta)$ distributions with theoretical results obtained from a model with compound nucleus alignment. These assignments have been included in the Adopted Levels.

& From 2003Pa09, unless otherwise noted.

[a] Supported by DCO ratios and band placement.

[b] Suggested by band placement.

[c] From 1991Ju05.

[d] Band(A): SD-1 band (1997La02). percent feeding=2.0 *2*. Q(intrinsic)=5.2 *+11−8*.

[e] Band(B): SD-2 band (1997La02). percent feeding=1.9 *2*. Q(intrinsic)=5.0 *+7−10*.

[f] Band(C): SD-3 band (1997La02). percent feeding=3.2 *3*. Q(intrinsic)=5.3 *+12−10*.

[g] Band(D): SD-4 band (1997La02). percent feeding=1.3 *3*.

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

^{87}Nb Levels (continued)

[h] Band(E): Band based on (19/2$^-$).
[i] Band(F): Band based on (3/2$^-$).
[j] Band(G): Band based on (25/2$^-$).
[k] Band(H): Band based on (31/2$^-$).
[l] Band(I): Band based on (17/2$^-$).
[m] Band(J): g.s. band.
[n] Band(K): Band based on (53/2$^+$).
[o] Band(L): Band based on (41/2$^+$).
[p] Band(M): Band based on (51/2$^+$).
[q] Band(N): Band based on (21/2$^+$).
[r] Band(O): Band based on (23/2$^+$).
[s] Band(P): Band based on (9/2)$^+$.
[t] Band(Q): Band based on 7/2$^{(+)}$.

γ(^{87}Nb)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
67.0 *3*	0.43 *4*	332.9	(5/2$^-$)	264.9	(7/2)$^+$	[E1]		I_γ: From branching ratio found from ^{87}Mo β^+ decay, (1991Mi15). E_γ: From 1991Mil5.
104.6 *3*		2410.2	(17/2$^-$)	2305.5	(15/2$^+$)	(E1)	0.1051	α(K)=0.0924 *13*; α(L)=0.01055 *15*; α(M)=0.00185 *3*; α(N+..)=0.000279 *4* α(N)=0.000265 *4*; α(O)=1.379×10^{-5} *20*
135.2 *1*	30 *7*	2410.2	(17/2$^-$)	2275.2	(15/2$^-$)	(M1+E2)	0.0969	DCO=0.50 *+16−13* α(K)=0.0850 *12*; α(L)=0.00992 *14*; α(M)=0.001752 *25*; α(N+..)=0.000270 *4* α(N)=0.000256 *4*; α(O)=1.455×10^{-5} *21*
140[c]		8569.0	(41/2$^+$)	8429.9	(41/2)$^+$			
154.1 *5*	1.2 *11*	4283.5	(25/2$^-$)	4128.5	(25/2$^-$)			DCO=0.38 *+8−7*
168.9 *1*	5.0 *10*	2579.0	(17/2$^-$)	2410.2	(17/2$^-$)			DCO=1.10 *12* Since this appears to be the 169 γ assigned to the 2905 *19*/2 in 1991Ju05, this γ energy is used.
172.0[b]	1.4 *10*	6537.1	(33/2$^+$)	6364.7	(33/2)$^+$			
200.1 *5*	3.0 *6*	199.6	(3/2$^-$)	0	(1/2)$^-$			DCO=0.56 *+8−7*
220.9 *2*	1.8 *6*	5838.6	(33/2)$^+$	5617.7	(31/2$^+$)	(M1)	0.0270	DCO=0.37 *+7−6* α(K)=0.0238 *4*; α(L)=0.00273 *4*; α(M)=0.000482 *7*; α(N+..)=7.46×10^{-5} *11* α(N)=7.05×10^{-5} *10*; α(O)=4.05×10^{-6} *6* Mult.: M1 or E1 from RULs and DCO. M1 from level scheme placement.
223[b]		10457.5	(45/2$^-$)	10234.5	(45/2$^-$)			
226.3 *1*	23.5 *24*	3444.6	(25/2)$^+$	3217.3	(23/2$^+$)	[M1]	0.0250	DCO=0.47 *2* α(K)=0.0220 *3*; α(L)=0.00253 *4*; α(M)=0.000446 *7*; α(N+..)=6.89×10^{-5} *10* α(N)=6.52×10^{-5} *10*; α(O)=3.75×10^{-6} *6* Angular distribution A_2=−0.36 *1*, A_4=+0.06 *1*, 1991Ju05.
230.8 *1*	4.9 *8*	3216.7	(21/2$^-$)	2986.0	(19/2$^-$)	[M1]	0.0236	DCO=0.82 *27* α(K)=0.0208 *3*; α(L)=0.00239 *4*; α(M)=0.000421 *6*; α(N+..)=6.51×10^{-5} *10* α(N)=6.16×10^{-5} *9*; α(O)=3.54×10^{-6} *5*
263.0 *1*	8.4 *8*	264.9	(7/2)$^+$	1.9	(9/2)$^+$	M1	0.01690	DCO=0.65 *4*

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

$\gamma(^{87}Nb)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								α(K)=0.01485 *21*; α(L)=0.001700 *24*; α(M)=0.000300 *5*; α(N+..)=4.64×10^{-5} *7* α(N)=4.39×10^{-5} *7*; α(O)=2.53×10^{-6} *4* Angular distribution A_2=−0.17 *1*, A_4=+0.04 *1*, 1991Ju05. Mult.: established in 1991Mi15 fixing $\Delta\pi$.
267.0 *1*	2.1 *8*	1049.2	(11/2)$^+$	781.9	(13/2)$^+$	(M1+E2)		I_γ: Deduced from branching ratios in 1991Ju05. Angular distribution A_2=−0.40 *9*, A_4=+0.13 *11*, 1991Ju05.
269.1[b]	4.7 *9*	6807.8	(35/2$^+$)	6537.1	(33/2$^+$)	(M1)	0.01608	DCO=0.48 *4* α(K)=0.01413 *20*; α(L)=0.001616 *23*; α(M)=0.000285 *4*; α(N+..)=4.41×10^{-5} *7* α(N)=4.17×10^{-5} *6*; α(O)=2.40×10^{-6} *4*
282 *1*	4.3 *4*	8533.2	(41/2$^-$)	8251.4	(39/2$^-$)	(M1)	0.01428	DCO=0.47 *+7−6* α(K)=0.01255 *18*; α(L)=0.001434 *20*; α(M)=0.000253 *4*; α(N+..)=3.91×10^{-5} *6* α(N)=3.70×10^{-5} *6*; α(O)=2.13×10^{-6} *3*
290.9 *1*	10.2 *10*	4589.2	(29/2)$^+$	4298.5	(27/2$^+$)	(M1+E2)		DCO=0.55 *5* α(K)=0.01169 *20*; α(L)=0.001337 *24*; α(M)=0.000236 *5*; α(N+..)=3.65×10^{-5} *7* α(N)=3.45×10^{-5} *6*; α(O)=1.98×10^{-6} *4* E_γ: Possibly the 293.9 depopulating a 2988 keV level shown in 1991Ju05. Comparing branching ratios from intensities for the 291γ and 1145γ transitions obtained from (^{50}Cr,3pγ), the result is comparable to (^{32}S,3pγ), although for the same reaction 1991Ju05 is about half of that in 2003Pa09. Angular distribution A_2=−0.58 *4*, A_4=+0.15 *5*, 1991Ju05.
297.9 *3*	5.4 *11*	2410.2	(17/2$^-$)	2112.2	(15/2$^+$)	(E1)	0.00527	DCO=0.65 *3* α(K)=0.00465 *7*; α(L)=0.000519 *8*; α(M)=9.11×10^{-5} *13*; α(N+..)=1.401×10^{-5} *20* α(N)=1.326×10^{-5} *19*; α(O)=7.44×10^{-7} *11* E_γ: likely the 297.9 γ seen in 1991Ju05 depopulating the earlier proposed 1349 keV level as several coincidences match.
300.6 *1*	3.4 *7*	2275.2	(15/2$^-$)	1974.8	(13/2$^-$)	(M1+E2)		DCO=0.59 *+4−9*
313.4 *1*	14.2 *14*	3216.7	(21/2$^-$)	2903.4	(19/2$^-$)	[M1]	0.01093	DCO=0.51 *3* α(K)=0.00961 *14*; α(L)=0.001094 *16*; α(M)=0.000193 *3*; α(N+..)=2.99×10^{-5} *5* α(N)=2.82×10^{-5} *4*; α(O)=1.633×10^{-6} *23* B(M1)(W.u.)=0.11 *3* Angular distribution A_2=−0.39 *2*, A_4=+0.05 *12*, 1991Ju05.
324.5 *1*	17.9 *18*	2903.4	(19/2$^-$)	2579.0	(17/2$^-$)	(M1+E2)		DCO=0.46 *2* 324 γ assigned to the 2736.6 level in 1991Ju05.
329.2 *1*	4.4 *4*	7137.2	(37/2)$^+$	6807.8	(35/2$^+$)	(M1)	0.00968	DCO=0.52 *4* α(K)=0.00851 *12*; α(L)=0.000968 *14*; α(M)=0.0001706 *24*; α(N+..)=2.64×10^{-5} *4* α(N)=2.50×10^{-5} *4*; α(O)=1.446×10^{-6} *21*
334.0 *1*	5.8 *6*	332.9	(5/2$^-$)	0	(1/2)$^-$	(E2)	0.01613	DCO=1.03 *6*

Continued on next page (footnotes at end of table)

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ‡	I_γ#	E_i(level)	J_i^π	E_f	J_f^π	Mult.@&	α†	Comments
								α(K)=0.01404 *20*; α(L)=0.001744 *25*; α(M)=0.000308 *5*; α(N+..)=4.63×10^{-5} *7* α(N)=4.41×10^{-5} *7*; α(O)=2.22×10^{-6} *4* B(E2)(W.u.)=0.21 *4* Other: R(DCO)=1.18 *13* 1997We04. Angular distribution A_2=+0.15 *1*, A_4=−0.01 *2*, 1991Ju05.
342.7[b]	1.0 *5*	6537.1	(33/2$^+$)	6194.4	(33/2$^+$)			
351.6 *1*	4.0 *4*	6742.5	(35/2$^-$)	6390.9	(33/2$^-$)	(M1)	0.00825	DCO=0.64 *3* α(K)=0.00726 *11*; α(L)=0.000823 *12*; α(M)=0.0001451 *21*; α(N+..)=2.25×10^{-5} *4* α(N)=2.12×10^{-5} *3*; α(O)=1.231×10^{-6} *18*
358.1 *2*	1.7 *6*	3217.3	(23/2$^+$)	2858.7	(21/2)$^+$	(M1+E2)	0.00791 *12*	α(K)=0.00696 *11*; α(L)=0.000790 *13*; α(M)=0.0001393 *22*; α(N+..)=2.16×10^{-5} *4* α(N)=2.04×10^{-5} *4*; α(O)=1.180×10^{-6} *18*
370.0 *2*	15.2 *15*	2858.7	(21/2)$^+$	2488.4	(21/2)$^+$	(M1)	0.00729	DCO=0.60 *3* α(K)=0.00641 *10*; α(L)=0.000727 *12*; α(M)=0.0001282 *20*; α(N+..)=1.99×10^{-5} *3* α(N)=1.88×10^{-5} *3*; α(O)=1.087×10^{-6} *16*
370 *1*	6.9 *14*	8429.9	(41/2)$^+$	8059.6	(39/2$^+$)	(M1)	0.00728	DCO=0.58 *3* α(K)=0.00640 *9*; α(L)=0.000725 *11*; α(M)=0.0001279 *18*; α(N+..)=1.98×10^{-5} *3* α(N)=1.87×10^{-5} *3*; α(O)=1.086×10^{-6} *16*
399.3[b]	2.2 *4*	8932.4	(41/2$^-$)	8533.2	(41/2$^-$)	[M1]	0.00603	α(K)=0.00530 *8*; α(L)=0.000600 *9*; α(M)=0.0001056 *15*; α(N+..)=1.638×10^{-5} *23* α(N)=1.548×10^{-5} *22*; α(O)=8.99×10^{-7} *13*
422.2[b]	0.9 *5*	7644.9	(37/2$^-$)	7223.4	(37/2$^-$)	(M1+E2)	0.00529	DCO=0.59 *26* α(K)=0.00465 *7*; α(L)=0.000526 *8*; α(M)=9.26×10^{-5} *14*; α(N+..)=1.436×10^{-5} *22* α(N)=1.357×10^{-5} *20*; α(O)=7.88×10^{-7} *12*
434.9 *1*	8.2 *8*	1601.8	(11/2$^-$)	1167.1	(9/2$^-$)	(M1+E2)		DCO=0.82 *4*
435.6 *1*		2410.2	(17/2$^-$)	1974.8	(13/2$^-$)	[E2]	0.00682	α(K)=0.00596 *9*; α(L)=0.000715 *10*; α(M)=0.0001261 *18*; α(N+..)=1.91×10^{-5} *3* α(N)=1.82×10^{-5} *3*; α(O)=9.60×10^{-7} *14*
437.6[b]		12015.1	(49/2$^-$)	11577.6	(47/2$^-$)	(M1+E2)	0.00485	DCO=0.48 *+12−10* α(K)=0.00427 *7*; α(L)=0.000482 *7*; α(M)=8.49×10^{-5} *13*; α(N+..)=1.316×10^{-5} *20* α(N)=1.243×10^{-5} *19*; α(O)=7.22×10^{-7} *11*
441.6[b]	0.5 *3*	8871.2	(41/2$^+$)	8429.9	(41/2)$^+$			
442.9 *1*	4.8 *5*	8059.6	(39/2$^+$)	7616.7	(37/2$^+$)	(M1+E2)	0.00471	DCO=0.47 *4* α(K)=0.00414 *6*; α(L)=0.000467 *7*; α(M)=8.23×10^{-5} *12*; α(N+..)=1.277×10^{-5} *18* α(N)=1.206×10^{-5} *17*; α(O)=7.02×10^{-7} *10*

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

$\gamma(^{87}Nb)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
447.0 *4*	15.6 *16*	6037.0	(33/2$^-$)	5590.2	(31/2$^-$)	(M1+E2)	0.00459	DCO=0.57 *2* α(K)=0.00405 *6*; α(L)=0.000456 *7*; α(M)=8.03×10^{-5} *12*; α(N+..)=1.246×10^{-5} *18* α(N)=1.177×10^{-5} *17*; α(O)=6.85×10^{-7} *10* Angular distribution A_2=0.−39 *2*, A_4=+0.08 *3*, 1991Ju05.
458.0 *1*	15.8 *16*	2410.2	(17/2$^-$)	1952.1	(15/2)$^+$	(E1+M2)	0.00185 *14*	DCO=0.59 *3* α(K)=0.00163 *12*; α(L)=0.000182 *14*; α(M)=3.20×10^{-5} *25*; α(N+..)=4.9×10^{-6} *4* α(N)=4.7×10^{-6} *4*; α(O)=2.67×10^{-7} *21* Angular distribution A_2=−0.26 *1*, A_4=0.05 *1*, 1991Ju05.
475.0 *4*	3.7 *4*	5774.0	(31/2$^-$)	5299.2	(29/2$^-$)	(M1+E2)	0.00397	DCO=0.74 *+8−7* α(K)=0.00350 *5*; α(L)=0.000393 *6*; α(M)=6.93×10^{-5} *10*; α(N+..)=1.075×10^{-5} *15* α(N)=1.016×10^{-5} *15*; α(O)=5.92×10^{-7} *9*
480.9 *1*	16.5 *17*	7223.4	(37/2$^-$)	6742.5	(35/2$^-$)	(M1+E2)	0.00387	DCO=0.54 *2* α(K)=0.00341 *5*; α(L)=0.000383 *6*; α(M)=6.75×10^{-5} *10*; α(N+..)=1.047×10^{-5} *15* α(N)=9.89×10^{-6} *14*; α(O)=5.76×10^{-7} *8*
493.3 *1*	4.7 *5*	4776.8	(27/2$^-$)	4283.5	(25/2$^-$)	[M1+E2]		DCO=0.9 *3* E_γ: Assigned to 2905 keV level in 1991Ju05. The 493γ and 997γ branching agrees with 2003Pa09 for placement from the 4776.8 keV level.
499.6[b]	2.8 *6*	9512.1	(43/2$^+$)	9012.4	(41/2$^+$)	[M1+E2]	0.00352	α(K)=0.00310 *5*; α(L)=0.000348 *5*; α(M)=6.14×10^{-5} *9*; α(N+..)=9.52×10^{-6} *14* α(N)=9.00×10^{-6} *13*; α(O)=5.25×10^{-7} *8*
505.8 *1*	16.1 *16*	838.1	(7/2$^-$)	332.9	(5/2$^-$)	(M1+E2)		DCO=0.62 *3* Angular distribution A_2=−0.48 *1*, A_4=+0.17 *2*, 1991Ju05.
521.8 *8*	2.4 *5*	5299.2	(29/2$^-$)	4776.8	(27/2$^-$)	(M1+E2)		DCO=0.32 *+21−9* E_γ: Assigned to a 6300 keV level in 1991Ju05.
522.1 *1*	1.8 *9*	3739.4	(25/2$^+$)	3217.3	(23/2$^+$)	(M1+E2)		DCO=0.51 *4* α(K)=0.00282 *4*; α(L)=0.000317 *5*; α(M)=5.58×10^{-5} *8*; α(N+..)=8.66×10^{-6} *13* α(N)=8.18×10^{-6} *12*; α(O)=4.77×10^{-7} *7* Angular distribution A_2=−0.41 *2*, A_4=+0.13 *2*, 1991Ju05.
529.9 *3*	3.2 *3*	6971.3	35/2$^-$	6441.3	(33/2$^-$)	[M1]	0.00307	α(K)=0.00270 *4*; α(L)=0.000303 *5*; α(M)=5.34×10^{-5} *8*; α(N+..)=8.28×10^{-6} *12* α(N)=7.82×10^{-6} *11*; α(O)=4.57×10^{-7} *7*
559.1 *1*	8.9 *9*	4298.5	(27/2$^+$)	3739.4	(25/2$^+$)	(M1+E2)		DCO=0.49 *3*
568.9[b]	3.8 *4*	8932.4	(41/2$^-$)	8363.4	(39/2$^-$)	(M1+E2)	0.00260	DCO=0.47 *+9−8* α(K)=0.00229 *4*; α(L)=0.000256 *4*;

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ‡	I_γ#	E_i(level)	J_i^π	E_f	J_f^π	Mult.@&	α†	Comments
								α(M)=4.51×10^{-5} *7*; α(N+..)=7.01×10^{-6} *10* α(N)=6.62×10^{-6} *10*; α(O)=3.87×10^{-7} *6*
573.1 *1*	<2	838.1	(7/2$^-$)	264.9	(7/2)$^+$			E_γ: Reported only in 1991Ju05.
575.8 *1*	4.4 *4*	2986.0	(19/2$^-$)	2410.2	(17/2$^-$)			
582.8 *1*	35 *4*	5590.2	(31/2$^-$)	5007.5	(29/2$^-$)	(M1+E2)		DCO=0.54 *2* Angular distribution A_2=−0.31 *1*, A_4=+0.09 *1*, 1991Ju05.
616.3[b]	2.6 *4*	10457.5	(45/2$^-$)	9841.3	(43/2$^-$)	[M1]	0.00216	α(K)=0.00190 *3*; α(L)=0.000213 *3*; α(M)=3.74×10^{-5} *6*; α(N+..)=5.81×10^{-6} *9* α(N)=5.49×10^{-6} *8*; α(O)=3.21×10^{-7} *5* Mult.: E1 or M1 from RUL.
628.2 *1*	9.0 *18*	2903.4	(19/2$^-$)	2275.2	(15/2$^-$)	(E2)	0.00231	DCO=1.05 *+10−9* α(K)=0.00203 *3*; α(L)=0.000235 *4*; α(M)=4.14×10^{-5} *6*; α(N+..)=6.35×10^{-6} *9* α(N)=6.02×10^{-6} *9*; α(O)=3.33×10^{-7} *5* Other: R(DCO)=1.13 *4* (1991Ju05).
637.9 *3*	1.4 *7*	3216.7	(21/2$^-$)	2579.0	(17/2$^-$)			DCO=0.62 *3*
639.5 *7*	<2	838.1	(7/2$^-$)	199.6	(3/2$^-$)	(E2)	0.00222	α(K)=0.00195 *3*; α(L)=0.000225 *4*; α(M)=3.96×10^{-5} *6*; α(N+..)=6.08×10^{-6} *9* α(N)=5.76×10^{-6} *8*; α(O)=3.19×10^{-7} *5* Mult.: from R(DCO)=1.22 *11* (1991Ju05).
641.1[b]	0.9 *5*	9512.1	(43/2$^+$)	8871.2	(41/2$^+$)	[M1+E2]	0.00197	α(K)=0.001740 *25*; α(L)=0.000194 *3*; α(M)=3.42×10^{-5} *5*; α(N+..)=5.31×10^{-6} *8* α(N)=5.02×10^{-6} *7*; α(O)=2.93×10^{-7} *5*
666.9[b]	0.8 *4*	6441.3	(33/2$^-$)	5774.0	(31/2$^-$)			
673.4[b]	3.3 *7*	7644.9	(37/2$^-$)	6971.3	35/2$^-$	[M1+E2]	1.76×10^{-3}	α(K)=0.001555 *22*; α(L)=0.0001735 *25*; α(M)=3.05×10^{-5} *5*; α(N+..)=4.74×10^{-6} *7* α(N)=4.48×10^{-6} *7*; α(O)=2.62×10^{-7} *4*
673.6 *1*	4.4 *9*	2275.2	(15/2$^-$)	1601.8	(11/2$^-$)	E2	0.00192	DCO=0.97 *+5−4* α(K)=0.001688 *24*; α(L)=0.000194 *3*; α(M)=3.42×10^{-5} *5*; α(N+..)=5.26×10^{-6} *8* α(N)=4.98×10^{-6} *7*; α(O)=2.77×10^{-7} *4* other: R(DCO)=1.09 *3* (1995Ju05). Angular distribution A_2=+0.27 *1*, A_4=−0.07 *1*, 1991Ju05. E_γ: Branching comparing 1991Ju05 with 2003Pa09 suggests multiple placement.
675.2 *1*	25 *5*	2410.2	(17/2$^-$)	1734.7	(17/2)$^+$	[E1]	6.92×10^{-4}	DCO=1.08 *+11−10* α(K)=0.000611 *9*; α(L)=6.73×10^{-5} *10*; α(M)=1.183×10^{-5} *17*; α(N+..)=1.83×10^{-6} *3* α(N)=1.731×10^{-6} *25*; α(O)=1.000×10^{-7} *14*
680.7 *2*	4.4 *9*	5617.7	(31/2$^+$)	4937.3	(29/2)$^+$	(M1+E2)		DCO=0.46 *4*

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
705.5 *1*	17.9 *18*	6742.5	(35/2$^-$)	6037.0	(33/2$^-$)	(M1+E2)	1.59×10^{-3}	DCO=0.51 *2* α(K)=0.001402 *20*; α(L)=0.0001561 *22*; α(M)=2.75×10^{-5} *4*; α(N+..)=4.27×10^{-6} *6* α(N)=4.03×10^{-6} *6*; α(O)=2.36×10^{-7} *4*
718.2[b]	3.1 *6*	8363.4	(39/2$^-$)	7644.9	(37/2$^-$)	[M1+E2]	1.52×10^{-3}	α(K)=0.001344 *19*; α(L)=0.0001497 *21*; α(M)=2.64×10^{-5} *4*; α(N+..)=4.09×10^{-6} *6* α(N)=3.87×10^{-6} *6*; α(O)=2.27×10^{-7} *4*
729.0 *1*	27 *3*	3217.3	(23/2$^+$)	2488.4	(21/2)$^+$	(M1+E2)	1.48×10^{-3}	DCO=0.49 *2* α(K)=0.001303 *19*; α(L)=0.0001450 *21*; α(M)=2.55×10^{-5} *4*; α(N+..)=3.97×10^{-6} *6* α(N)=3.75×10^{-6} *6*; α(O)=2.19×10^{-7} *3* Angular distribution A_2=−0.46 *1*, A_4=+0.10 *1*, 1991Ju05.
747.5 *3*	0.9 *5*	6364.7	(33/2)$^+$	5617.7	(31/2$^+$)	[M1+E2]	1.39×10^{-3}	α(K)=0.001229 *18*; α(L)=0.0001367 *20*; α(M)=2.41×10^{-5} *4*; α(N+..)=3.74×10^{-6} *6* α(N)=3.53×10^{-6} *5*; α(O)=2.07×10^{-7} *3*
753.7 *1*	59 *6*	2488.4	(21/2)$^+$	1734.7	(17/2)$^+$	E2	1.43×10^{-3}	DCO=1.09 *3* α(K)=0.001261 *18*; α(L)=0.0001440 *21*; α(M)=2.54×10^{-5} *4*; α(N+..)=3.90×10^{-6} *6* α(N)=3.69×10^{-6} *6*; α(O)=2.08×10^{-7} *3* other: R(DCO)=1.06 *1* (1995Ju05) and 0.97 *4* (1997We04). Angular distribution A_2=0.30 *1*, A_4=−0.10 *3*, 1991Ju05.
763.7 *1*	23.1 *23*	1601.8	(11/2$^-$)	838.1	(7/2$^-$)	E2	1.39×10^{-3}	DCO=1.05 *+7−6* α(K)=0.001218 *17*; α(L)=0.0001390 *20*; α(M)=2.45×10^{-5} *4*; α(N+..)=3.77×10^{-6} *6* α(N)=3.56×10^{-6} *5*; α(O)=2.01×10^{-7} *3* Angular distribution A_2=+0.32 *1*, A_4=−0.08 *2*, 1991Ju05. other: R(DCO)=1.24 *14* (1997We04).
780.7 *1*	100 *10*	781.9	(13/2)$^+$	1.9	(9/2)$^+$	E2	1.31×10^{-3}	DCO=0.97 *1* α(K)=0.001153 *17*; α(L)=0.0001314 *19*; α(M)=2.31×10^{-5} *4*; α(N+..)=3.56×10^{-6} *5* α(N)=3.37×10^{-6} *5*; α(O)=1.90×10^{-7} *3* B(E2)(W.u.)=48 *8* Other: R(DCO)=1.09 *2* from 1997We04. Angular distribution A_2=+0.13 *1*, A_4=−0.09 *1*, 1991Ju05.
784.5 *1*	8.3 *26*	1049.2	(11/2)$^+$	264.9	(7/2)$^+$	E2	1.30×10^{-3}	DCO=0.88 *+9−8* α(K)=0.001140 *16*; α(L)=0.0001298 *19*; α(M)=2.29×10^{-5} *4*; α(N+..)=3.52×10^{-6} *5* α(N)=3.33×10^{-6} *5*; α(O)=1.88×10^{-7} *3* Other: R(DCO)=1.15 *14* (1997We04). Angular distribution A_2=+0.26 *2*, A_4=−0.09 *3*, 1991Ju05.
800.5 *5*	6.3 *6*	6390.9	(33/2$^-$)	5590.2	(31/2$^-$)	(M1+E2)	1.20×10^{-3}	DCO=0.58 *3* α(K)=0.001055 *15*; α(L)=0.0001171 *17*; α(M)=2.06×10^{-5} *3*; α(N+..)=3.20×10^{-6} *5* α(N)=3.03×10^{-6} *5*; α(O)=1.776×10^{-7} *25* E_γ: Used value from 2003Pa09 as 1991Ju05 has no uncertainties here either. Angular distribution A_2=−0.11 *2*, A_4=−0.00 *3*, 1991Ju05.
806.4 *1*	35 *7*	3216.7	(21/2$^-$)	2410.2	(17/2$^-$)	E2	1.21×10^{-3}	DCO=0.95 *3*

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

$\gamma(^{87}Nb)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								α(K)=0.001060 *15*; α(L)=0.0001206 *17*; α(M)=2.12×10^{-5} *3*; α(N+..)=3.27×10^{-6} *5* α(N)=3.09×10^{-6} *5*; α(O)=1.749×10^{-7} *25* Other: R(DCO)=1.10 *13* (1997We04). Angular distribution A_2=+0.34 *1*, A_4=−0.11 *2*, 1991Ju05.
808.0 *1*	2.0 *6*	1974.8	(13/2$^-$)	1167.1	(9/2$^-$)	E2		Angular distribution A_2=+0.31 *2*, A_4=−0.11 *3*, 1991Ju05.
809.5 *3*	8.5 *17*	7616.7	(37/2$^+$)	6807.8	(35/2$^+$)	(M1+E2)	1.17×10^{-3}	DCO=0.55 *5* α(K)=0.001031 *15*; α(L)=0.0001144 *16*; α(M)=2.01×10^{-5} *3*; α(N+..)=3.13×10^{-6} *5* α(N)=2.96×10^{-6} *5*; α(O)=1.735×10^{-7} *25*
834.7 *1*	18.8 *19*	1167.1	(9/2$^-$)	332.9	(5/2$^-$)	(E2)	1.11×10^{-3}	DCO=0.97 *3* α(K)=0.000976 *14*; α(L)=0.0001107 *16*; α(M)=1.95×10^{-5} *3*; α(N+..)=3.00×10^{-6} *5* α(N)=2.84×10^{-6} *4*; α(O)=1.610×10^{-7} *23* Other: R(DCO)=0.86 *10* (1997We04).
835.8 *1*		838.1	(7/2$^-$)	1.9	(9/2)$^+$			DCO=0.87 *4* (1991Ju05) E_γ: Reported only in 1991Ju05.
855.0 *1*	7.7 *8*	4298.5	(27/2$^+$)	3444.6	(25/2)$^+$	(M1+E2)	1.04×10^{-3}	DCO=0.46 *3* α(K)=0.000914 *13*; α(L)=0.0001014 *15*; α(M)=1.784×10^{-5} *25*; α(N+..)=2.77×10^{-6} *4* α(N)=2.62×10^{-6} *4*; α(O)=1.538×10^{-7} *22*
875.5 *3*	9 *8*	3779.0	(23/2$^-$)	2903.4	(19/2$^-$)	(E2)	9.85×10^{-4}	DCO=1.00 *+10−11* α(K)=0.000867 *13*; α(L)=9.81×10^{-5} *14*; α(M)=1.727×10^{-5} *25*; α(N+..)=2.66×10^{-6} *4* α(N)=2.52×10^{-6} *4*; α(O)=1.432×10^{-7} *20* uncertainty of +0.01 for the DCO ratio quoted by 2003Pa09 seems to be a misprint. Evaluator increased this to +0.10.
879.0 *1*	34 *7*	5007.5	(29/2$^-$)	4128.5	(25/2$^-$)	E2	9.75×10^{-4}	DCO=1.09 *3* α(K)=0.000858 *12*; α(L)=9.71×10^{-5} *14*; α(M)=1.708×10^{-5} *24*; α(N+..)=2.64×10^{-6} *4* α(N)=2.49×10^{-6} *4*; α(O)=1.418×10^{-7} *20* Other: R(DCO)=1.06 *3* (1991Ju05). Angular distribution A_2=+0.30 *1*, A_4=−0.011 *2*, 1991Ju05.
880.7 *1*	24.3 *24*	3739.4	(25/2$^+$)	2858.7	(21/2)$^+$	(E2)	9.77×10^{-4}	DCO=0.88 *+7−6* α(K)=0.000860 *12*; α(L)=9.72×10^{-5} *14*; α(M)=1.711×10^{-5} *24*; α(N+..)=2.64×10^{-6} *4* α(N)=2.50×10^{-6} *4*; α(O)=1.420×10^{-7} *20* Angular distribution A_2=+0.37 *3*, A_4=−0.13 *3*, 1991Ju05.
902.4[b]	5.5 *11*	7644.9	(37/2$^-$)	6742.5	(35/2$^-$)	(M1+E2)	9.18×10^{-4}	DCO=0.64 *+13−11* α(K)=0.000810 *12*; α(L)=8.98×10^{-5} *13*; α(M)=1.580×10^{-5} *23*; α(N+..)=2.46×10^{-6} *4* α(N)=2.32×10^{-6} *4*; α(O)=1.363×10^{-7} *19*
903.0 *1*	20.4 *20*	1952.1	(15/2)$^+$	1049.2	(11/2)$^+$	E2	9.16×10^{-4}	DCO=0.87 *8* α(K)=0.000807 *12*; α(L)=9.11×10^{-5} *13*;

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								α(M)=1.603×10^{-5} *23*; α(N+..)=2.47×10^{-6} *4* α(N)=2.34×10^{-6} *4*; α(O)=1.333×10^{-7} *19* other: R(DCO)=1.18 *13* (1991Ju05). Angular distribution A_2=0.28 *3*, A_4=−0.10 *3*, 1991Ju05.
908.8[b]		9841.3	(43/2$^-$)	8932.4	(41/2$^-$)	[M1+E2]	9.04×10^{-4}	α(K)=0.000798 *12*; α(L)=8.84×10^{-5} *13*; α(M)=1.555×10^{-5} *22*; α(N+..)=2.42×10^{-6} *4* α(N)=2.28×10^{-6} *4*; α(O)=1.342×10^{-7} *19*
911.8 *1*	54 *5*	4128.5	(25/2$^-$)	3216.7	(21/2$^-$)	(E2)	8.96×10^{-4}	DCO=0.96 *3* α(K)=0.000789 *11*; α(L)=8.90×10^{-5} *13*; α(M)=1.566×10^{-5} *22*; α(N+..)=2.42×10^{-6} *4* α(N)=2.29×10^{-6} *4*; α(O)=1.303×10^{-7} *19* Other: R(DCO)=1.04 *3* (1995Ju05) and 0.95 *11* (1997We04). Angular distribution A_2=+0.24 *1*, A_4=−0.07 *2*, 1991Ju05.
952.5 *1*	71 *14*	1734.7	(17/2)$^+$	781.9	(13/2)$^+$	E2	8.07×10^{-4}	DCO=1.02 *+3−2* α(K)=0.000711 *10*; α(L)=8.00×10^{-5} *12*; α(M)=1.407×10^{-5} *20*; α(N+..)=2.17×10^{-6} *3* α(N)=2.06×10^{-6} *3*; α(O)=1.175×10^{-7} *17* other: R(DCO)=1.08 *1* (1991Ju05) and 0.90 *5* (1997We04). Angular distribution A_2=+0.24 *1*, A_4=−0.06 *2*, 1991Ju05.
952.7[b]		9012.4	(41/2$^+$)	8059.6	(39/2$^+$)			
953.8[b]	8.9 *27*	9886.2	(43/2$^-$)	8932.4	(41/2$^-$)	[M1+E2]	8.14×10^{-4}	α(K)=0.000719 *10*; α(L)=7.95×10^{-5} *12*; α(M)=1.399×10^{-5} *20*; α(N+..)=2.17×10^{-6} *3* α(N)=2.05×10^{-6} *3*; α(O)=1.208×10^{-7} *17*
955.2 *1*	18 *4*	3444.6	(25/2)$^+$	2488.4	(21/2)$^+$	E2	8.02×10^{-4}	DCO=0.94 *2* α(K)=0.000706 *10*; α(L)=7.95×10^{-5} *12*; α(M)=1.399×10^{-5} *20*; α(N+..)=2.16×10^{-6} *3* α(N)=2.04×10^{-6} *3*; α(O)=1.168×10^{-7} *17* Other: R(DCO)=1.08 *1* (1995Ju05) and 1.19 *13* (1997We04). Angular distribution A_2=0.23 *1*, A_4=−0.05 *4*, 1991Ju05. Mult.: supported by DCO and angular distribution.
959.0 *1*	8.6 *18*	1952.1	(15/2)$^+$	993.3	(11/2$^+$)	(E2)	7.94×10^{-4}	DCO=0.99 *+15−13* α(K)=0.000699 *10*; α(L)=7.87×10^{-5} *11*; α(M)=1.384×10^{-5} *20*; α(N+..)=2.14×10^{-6} *3* α(N)=2.02×10^{-6} *3*; α(O)=1.156×10^{-7} *17* Was assigned to a 962.9 keV level in 1991Ju05.
969.2 *1*	11.3 *11*	6807.8	(35/2$^+$)	5838.6	(33/2)$^+$	(M1+E2)	7.87×10^{-4}	DCO=0.62 *+7−6* α(K)=0.000695 *10*; α(L)=7.68×10^{-5} *11*; α(M)=1.352×10^{-5} *19*; α(N+..)=2.10×10^{-6}

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								3 α(N)=1.99×10^{-6} *3*; α(O)=1.168×10^{-7} *17*
991.5 *1*	4.3 *4*	993.3	(11/2$^+$)	1.9	(9/2)$^+$	(E2)	7.36×10^{-4}	DCO=0.90 *1* α(K)=0.000648 *9*; α(L)=7.28×10^{-5} *11*; α(M)=1.281×10^{-5} *18*; α(N+..)=1.98×10^{-6} *3* α(N)=1.87×10^{-6} *3*; α(O)=1.073×10^{-7} *15* Appears to be the 992 keV γ seen in 1991Ju05, and assigned to the 1954 keV level, except the 1063 keV γ should not be in coincidence as in 1993Pa05. However, the γ energy is taken from 1991Ju05.
997		1250+x	J+2	?				
997 *1*	5.9 *12*	4776.8	(27/2$^-$)	3779.0	(23/2$^-$)	[E2]	7.25×10^{-4}	α(K)=0.000639 *9*; α(L)=7.17×10^{-5} *10*; α(M)=1.261×10^{-5} *18*; α(N+..)=1.95×10^{-6} *3* α(N)=1.84×10^{-6} *3*; α(O)=1.057×10^{-7} *15* E$_\gamma$: Assigned to 6300 keV level in 1991Ju05.
997.1 *1*	2.9 *6*	5774.0	(31/2$^-$)	4776.8	(27/2$^-$)	[E2]	7.25×10^{-4}	α(K)=0.000639 *9*; α(L)=7.18×10^{-5} *10*; α(M)=1.262×10^{-5} *18*; α(N+..)=1.95×10^{-6} *3* α(N)=1.84×10^{-6} *3*; α(O)=1.057×10^{-7} *15* E$_\gamma$: Assigned to a 6300 keV level in 1991Ju05.
1016 *1*	17.0 *17*	5299.2	(29/2$^-$)	4283.5	(25/2$^-$)	(E2)	6.95×10^{-4}	DCO=1.04 *6* α(K)=0.000612 *9*; α(L)=6.87×10^{-5} *10*; α(M)=1.208×10^{-5} *17*; α(N+..)=1.87×10^{-6} *3* α(N)=1.766×10^{-6} *25*; α(O)=1.013×10^{-7} *15*
1028 *1*	2.4 *9*	5617.7	(31/2$^+$)	4589.2	(29/2)$^+$			
1028 *1*	1.8 *8*	8251.4	(39/2$^-$)	7223.4	(37/2$^-$)	(M1+E2)	6.93×10^{-4}	DCO=0.58 *3* α(K)=0.000612 *9*; α(L)=6.76×10^{-5} *10*; α(M)=1.189×10^{-5} *17*; α(N+..)=1.85×10^{-6} *3* α(N)=1.746×10^{-6} *25*; α(O)=1.028×10^{-7} *15*
1029.4 *1*	1.6 *6*	6037.0	(33/2$^-$)	5007.5	(29/2$^-$)	(E2)	6.75×10^{-4}	DCO=0.96 *+11−10* α(K)=0.000595 *9*; α(L)=6.67×10^{-5} *10*; α(M)=1.173×10^{-5} *17*; α(N+..)=1.81×10^{-6} *3* α(N)=1.715×10^{-6} *24*; α(O)=9.85×10^{-8} *14*
1047.6 *1*	2.7 *5*	1049.2	(11/2)$^+$	1.9	(9/2)$^+$	(E2)	6.48×10^{-4}	DCO=1.16 *+20−17* α(K)=0.000571 *8*; α(L)=6.40×10^{-5} *9*; α(M)=1.126×10^{-5} *16*; α(N+..)=1.740×10^{-6} *25* α(N)=1.646×10^{-6} *23*; α(O)=9.46×10^{-8} *14*
1063.0 *1*	4.0 *4*	2112.2	(15/2$^+$)	1049.2	(11/2)$^+$			DCO=0.62 *+9−8* Was assigned to the 2411 keV level in 1991Ju05.
1067 *1*	15.2 *15*	4283.5	(25/2$^-$)	3216.7	(21/2$^-$)	(E2)	6.24×10^{-4}	DCO=1.22 *+11−10* α(K)=0.000550 *8*; α(L)=6.15×10^{-5} *9*;

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

$\gamma(^{87}Nb)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								α(M)=1.082×10^{-5} *16*; α(N+..)=1.674×10^{-6} *24*
1080.5 *3*	1.8 *4*	4298.5	(27/2$^+$)	3217.3	(23/2$^+$)	(E2)	6.05×10^{-4}	α(N)=1.583×10^{-6} *23*; α(O)=9.11×10^{-8} *13* DCO=0.95 *5* α(K)=0.000533 *8*; α(L)=5.96×10^{-5} *9*; α(M)=1.048×10^{-5} *15*; α(N+..)=1.622×10^{-6} *23* α(N)=1.533×10^{-6} *22*; α(O)=8.83×10^{-8} *13*
1123.9 *2*	7.8 *8*	2858.7	(21/2)$^+$	1734.7	(17/2)$^+$	(E2)	5.56×10^{-4}	DCO=0.99 *7* α(K)=0.000489 *7*; α(L)=5.46×10^{-5} *8*; α(M)=9.61×10^{-6} *14*; α(N+..)=2.78×10^{-6} *4* α(N)=1.405×10^{-6} *20*; α(O)=8.11×10^{-8} *12*; α(IPF)=1.295×10^{-6} *19* other: R(DCO)=1.04 *4* (1991Ju05) and 0.97 *12* (1997We04). Angular distribution A_2=+0.61 *7*, A_4=−0.21 *7*, 1991Ju05.
1141.9[b]	7.3 *7*	6441.3	(33/2$^-$)	5299.2	(29/2$^-$)			
1145.6 *1*	42 *4*	4589.2	(29/2)$^+$	3444.6	(25/2)$^+$	(E2)	5.34×10^{-4}	DCO=1.03 *5* α(K)=0.000469 *7*; α(L)=5.23×10^{-5} *8*; α(M)=9.20×10^{-6} *13*; α(N+..)=3.80×10^{-6} *6* α(N)=1.346×10^{-6} *19*; α(O)=7.77×10^{-8} *11*; α(IPF)=2.37×10^{-6} *4* Other:R(DCO)=1.14 *3* (1995Ju05) and 0.90 (11) (1997We04). Angular distribution A_2=0.33 *2*, A_4=−0.08 *2*, 1991Ju05.
1152.4 *1*	8.3 *8*	6742.5	(35/2$^-$)	5590.2	(31/2$^-$)	(E2)	5.28×10^{-4}	DCO=0.97 *5* α(K)=0.000463 *7*; α(L)=5.16×10^{-5} *8*; α(M)=9.08×10^{-6} *13*; α(N+..)=4.22×10^{-6} *6* α(N)=1.329×10^{-6} *19*; α(O)=7.67×10^{-8} *11*; α(IPF)=2.81×10^{-6} *4*
1164.8[a] *3*		1167.1	(9/2$^-$)	1.9	(9/2)$^+$			
1169.9 *1*	6.4 *6*	1952.1	(15/2)$^+$	781.9	(13/2)$^+$	(M1+E2)	5.30×10^{-4}	DCO=0.58 *5* α(K)=0.000465 *7*; α(L)=5.13×10^{-5} *8*; α(M)=9.02×10^{-6} *13*; α(N+..)=4.79×10^{-6} *7* α(N)=1.324×10^{-6} *19*; α(O)=7.81×10^{-8} *11*; α(IPF)=3.39×10^{-6} *5*
1172[a] *1*		5299.2	(29/2$^-$)	4128.5	(25/2$^-$)			
1186.4 *1*	3.3 *7*	7223.4	(37/2$^-$)	6037.0	(33/2$^-$)	(E2)	5.00×10^{-4}	DCO=0.99 *6* α(K)=0.000435 *6*; α(L)=4.85×10^{-5} *7*; α(M)=8.53×10^{-6} *12*; α(N+..)=7.24×10^{-6} *11* α(N)=1.248×10^{-6} *18*; α(O)=7.22×10^{-8} *11*; α(IPF)=5.92×10^{-6} *9*
1188.6[b]	4.2 *8*	6807.8	(35/2$^+$)	5617.7	(31/2$^+$)	[E2]	4.97×10^{-4}	α(K)=0.000433 *6*; α(L)=4.82×10^{-5} *7*; α(M)=8.47×10^{-6} *12*; α(N+..)=7.63×10^{-6} *11* α(N)=1.240×10^{-6} *18*; α(O)=7.17×10^{-8} *10*; α(IPF)=6.32×10^{-6} *9*

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
1196 *2*	4.8 *24*	6971.3	35/2$^-$	5774.0	(31/2$^-$)	(E2)	4.91×10^{-4}	DCO=0.99 *5* α(K)=0.000426 *6*; α(L)=4.75×10^{-5} *7*; α(M)=8.34×10^{-6} *12*; α(N+..)=8.66×10^{-6} *13* α(N)=1.222×10^{-6} *18*; α(O)=7.07×10^{-8} *10*; α(IPF)=7.37×10^{-6} *11* Other: R(DCO)=1.01 *8* (1991Ju05).
1197.8 *1*	17 *4*	4937.3	(29/2)$^+$	3739.4	(25/2$^+$)	(E2)	4.88×10^{-4}	DCO=1.16 *+8–7* α(K)=0.000424 *6*; α(L)=4.72×10^{-5} *7*; α(M)=8.29×10^{-6} *12*; α(N+..)=9.10×10^{-6} *13* α(N)=1.214×10^{-6} *17*; α(O)=7.03×10^{-8} *10*; α(IPF)=7.81×10^{-6} *11* Other: R(DCO)=1.04 *5* (1995Ju05).
1203.3[b]	4.8 *24*	7644.9	(37/2$^-$)	6441.3	(33/2$^-$)	[E2]	4.86×10^{-4}	α(K)=0.000422 *6*; α(L)=4.69×10^{-5} *7*; α(M)=8.25×10^{-6} *12*; α(N+..)=9.54×10^{-6} *14* α(N)=1.207×10^{-6} *17*; α(O)=6.99×10^{-8} *10*; α(IPF)=8.26×10^{-6} *12*
1249.4 *1*	38 *4*	5838.6	(33/2)$^+$	4589.2	(29/2)$^+$	E2	4.58×10^{-4}	DCO=0.99 *+5–4* α(K)=0.000390 *6*; α(L)=4.33×10^{-5} *6*; α(M)=7.62×10^{-6} *11*; α(N+..)=1.694×10^{-5} *24* α(N)=1.116×10^{-6} *16*; α(O)=6.47×10^{-8} *9*; α(IPF)=1.576×10^{-5} *22* Mult.: from R(DCO). Other: R(DCO)=1.10 *3* (1991Ju05). Angular distribution A_2=+0.25 *2*, A_4=−0.09 *2*, 1991Ju05.
1250		1250+x	J+2	x	J			
1251.2[b]	10.9 *22*	8059.6	(39/2$^+$)	6807.8	(35/2$^+$)	[E2]	4.56×10^{-4}	α(K)=0.000388 *6*; α(L)=4.31×10^{-5} *6*; α(M)=7.58×10^{-6} *11*; α(N+..)=1.753×10^{-5} *25* α(N)=1.110×10^{-6} *16*; α(O)=6.43×10^{-8} *9*; α(IPF)=1.635×10^{-5} *23*
1253.7[b]	1.8 *9*	7644.9	(37/2$^-$)	6390.9	(33/2$^-$)	(E2)	4.55×10^{-4}	DCO=0.94 *+8–7* α(K)=0.000386 *6*; α(L)=4.29×10^{-5} *6*; α(M)=7.54×10^{-6} *11*; α(N+..)=1.80×10^{-5} *3* α(N)=1.105×10^{-6} *16*; α(O)=6.40×10^{-8} *9*; α(IPF)=1.684×10^{-5} *24*
1263[c]		13750.0	(53/2$^+$)	12490.0	(49/2$^+$)			
1278[a]		9811.3?	(43/2$^-$)	8533.2	(41/2$^-$)			E_γ: Not in the Table 2 of 1991Ju05, but is shown as tentative in the level scheme.
1287.1[b]	6.8 *14*	8932.4	(41/2$^-$)	7644.9	(37/2$^-$)	(E2)	4.38×10^{-4}	DCO=1.20 *+25–20* α(K)=0.000366 *6*; α(L)=4.06×10^{-5} *6*; α(M)=7.13×10^{-6} *10*; α(N+..)=2.48×10^{-5} *4* α(N)=1.044×10^{-6} *15*; α(O)=6.06×10^{-8} *9*; α(IPF)=2.37×10^{-5} *4*
1292.8 *3*	10.9 *11*	8429.9	(41/2)$^+$	7137.2	(37/2)$^+$	(E2)	4.36×10^{-4}	DCO=1.10 *+9–3* α(K)=0.000363 *5*; α(L)=4.03×10^{-5} *6*; α(M)=7.08×10^{-6} *10*; α(N+..)=2.57×10^{-5}

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								4 α(N)=1.037×10^{-6} *15*; α(O)=6.02×10^{-8} *9*; α(IPF)=2.46×10^{-5} *4*
1298.8 *1*	11.7 *23*	7137.2	(37/2)$^+$	5838.6	(33/2)$^+$	(E2)	4.33×10^{-4}	DCO=1.02 *+9−8* α(K)=0.000359 *5*; α(L)=3.98×10^{-5} *6*; α(M)=7.00×10^{-6} *10*; α(N+..)=2.72×10^{-5} *4* α(N)=1.026×10^{-6} *15*; α(O)=5.95×10^{-8} *9*; α(IPF)=2.61×10^{-5} *4*
1301.9[b]	4.8 *10*	10234.5	(45/2$^-$)	8932.4	(41/2$^-$)	[E2]	4.31×10^{-4}	α(K)=0.000357 *5*; α(L)=3.96×10^{-5} *6*; α(M)=6.96×10^{-6} *10*; α(N+..)=2.80×10^{-5} *4* α(N)=1.019×10^{-6} *15*; α(O)=5.92×10^{-8} *9*; α(IPF)=2.69×10^{-5} *4*
1308.1[b]	1.7 *6*	9841.3	(43/2$^-$)	8533.2	(41/2$^-$)	[M1+E2]	4.41×10^{-4}	α(K)=0.000369 *6*; α(L)=4.06×10^{-5} *6*; α(M)=7.14×10^{-6} *10*; α(N+..)=2.41×10^{-5} *4* α(N)=1.049×10^{-6} *15*; α(O)=6.19×10^{-8} *9*; α(IPF)=2.30×10^{-5} *4*
1310 *1*	5.6 *6*	8533.2	(41/2$^-$)	7223.4	(37/2$^-$)	[E2]	4.28×10^{-4}	DCO=0.74 *+8−7* α(K)=0.000352 *5*; α(L)=3.91×10^{-5} *6*; α(M)=6.87×10^{-6} *10*; α(N+..)=2.98×10^{-5} *5* α(N)=1.006×10^{-6} *14*; α(O)=5.84×10^{-8} *9*; α(IPF)=2.88×10^{-5} *4*
1312.4[b]		2305.5	(15/2$^+$)	993.3	(11/2$^+$)			
1319.2 *1*	2.7 *3*	5617.7	(31/2$^+$)	4298.5	(27/2$^+$)	(E2)	4.24×10^{-4}	DCO=1.04 *5* α(K)=0.000347 *5*; α(L)=3.85×10^{-5} *6*; α(M)=6.76×10^{-6} *10*; α(N+..)=3.20×10^{-5} *5* α(N)=9.91×10^{-7} *14*; α(O)=5.76×10^{-8} *8*; α(IPF)=3.09×10^{-5} *5*
1362		1250+x	J+2	?				
1378.2 *1*	4.1 *4*	3866.6	(25/2$^+$)	2488.4	(21/2)$^+$	(E2)	4.05×10^{-4}	DCO=1.11 *+9−8* α(K)=0.000317 *5*; α(L)=3.51×10^{-5} *5*; α(M)=6.17×10^{-6} *9*; α(N+..)=4.64×10^{-5} *7* α(N)=9.04×10^{-7} *13*; α(O)=5.26×10^{-8} *8*; α(IPF)=4.54×10^{-5} *7* Angular distribution A_2=+0.182, A_4=−0.03 *3*, 1991Ju05.
1382		1250+x	J+2	?				
1392 *1*	5.2 *5*	8363.4	(39/2$^-$)	6971.3	35/2$^-$	(E2)	4.01×10^{-4}	DCO=1.02 *+18−15* α(K)=0.000311 *5*; α(L)=3.44×10^{-5} *5*; α(M)=6.05×10^{-6} *9*; α(N+..)=4.98×10^{-5} *7* α(N)=8.87×10^{-7} *13*; α(O)=5.16×10^{-8} *8*; α(IPF)=4.88×10^{-5} *7*
1421		2679+x	J+4	1258+x				This transition is shown (1997La02) to feed the level deexciting by a 2225 γ.
1426.7 *3*	6.0 *12*	6364.7	(33/2)$^+$	4937.3	(29/2)$^+$	(E2)	3.94×10^{-4}	DCO=1.00 *+29−16* α(K)=0.000296 *5*; α(L)=3.27×10^{-5} *5*;

Continued on next page (footnotes at end of table)

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

$\gamma(^{87}Nb)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								α(M)=5.75×10^{-6} *8*; α(N+..)=5.98×10^{-5} *9* α(N)=8.42×10^{-7} *12*; α(O)=4.91×10^{-8} *7*; α(IPF)=5.89×10^{-5} *9*
1429		2679+x	J+4	1250+x	J+2			
1431.8[b]	3.4 *7*	8569.0	(41/2$^+$)	7137.2	(37/2)$^+$	[E2]	3.93×10^{-4}	α(K)=0.000294 *5*; α(L)=3.25×10^{-5} *5*; α(M)=5.70×10^{-6} *8*; α(N+..)=6.13×10^{-5} *9* α(N)=8.36×10^{-7} *12*; α(O)=4.87×10^{-8} *7*; α(IPF)=6.05×10^{-5} *9*
1452.3[b]	7.0 *7*	9512.1	(43/2$^+$)	8059.6	(39/2$^+$)	(E2)	3.90×10^{-4}	DCO=1.10 *5* α(K)=0.000285 *4*; α(L)=3.15×10^{-5} *5*; α(M)=5.54×10^{-6} *8*; α(N+..)=6.78×10^{-5} *10* α(N)=8.12×10^{-7} *12*; α(O)=4.73×10^{-8} *7*; α(IPF)=6.70×10^{-5} *10*
1492		1492+y	J1+2	y	J1			
1492.9 *2*	3.5 *4*	2275.2	(15/2$^-$)	781.9	(13/2)$^+$	(E1+M2)	3.90×10^{-4} *7*	DCO=0.52 *+7−16* α(K)=0.000138 *5*; α(L)=1.50×10^{-5} *6*; α(M)=2.64×10^{-6} *10*; α(N+..)=0.000234 *4* α(N)=3.88×10^{-7} *14*; α(O)=2.28×10^{-8} *9*; α(IPF)=0.000234 *4*
1508		3378+y	J1+4	1870+y	J1+2			
1510 *1*	21.5 *22*	8251.4	(39/2$^-$)	6742.5	(35/2$^-$)	[E2]	3.86×10^{-4}	α(K)=0.000265 *4*; α(L)=2.92×10^{-5} *4*; α(M)=5.13×10^{-6} *8*; α(N+..)=8.74×10^{-5} *13* α(N)=7.52×10^{-7} *11*; α(O)=4.39×10^{-8} *7*; α(IPF)=8.66×10^{-5} *13*
1522 *2*	2.4 *6*	9886.2	(43/2$^-$)	8363.4	(39/2$^-$)	(E2)	3.86×10^{-4}	α(K)=0.000260 *4*; α(L)=2.86×10^{-5} *4*; α(M)=5.03×10^{-6} *7*; α(N+..)=9.29×10^{-5} *13* α(N)=7.38×10^{-7} *11*; α(O)=4.31×10^{-8} *6*; α(IPF)=9.21×10^{-5} *13*
1523.4[b]		2305.5	(15/2$^+$)	781.9	(13/2)$^+$			
1525.1[b]	1.8 *9*	10457.5	(45/2$^-$)	8932.4	(41/2$^-$)	(E2)	3.86×10^{-4}	DCO=0.95 *+13−12* α(K)=0.000259 *4*; α(L)=2.85×10^{-5} *4*; α(M)=5.02×10^{-6} *7*; α(N+..)=9.38×10^{-5} *14* α(N)=7.36×10^{-7} *11*; α(O)=4.30×10^{-8} *6*; α(IPF)=9.30×10^{-5} *13*
1557.6[b]	5.8 *6*	12015.1	(49/2$^-$)	10457.5	(45/2$^-$)	(E2)	3.87×10^{-4}	DCO=0.93 *+11−10* α(K)=0.000248 *4*; α(L)=2.74×10^{-5} *4*; α(M)=4.81×10^{-6} *7*; α(N+..)=0.0001067 *15*

Continued on next page (footnotes at end of table)

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
								α(N)=7.05×10^{-7} *10*; α(O)=4.12×10^{-8} *6*; α(IPF)=0.0001060 *15*
1560[a] *2*		9811.3?	(43/2$^-$)	8251.4	(39/2$^-$)			
1565 *1*	10.1 *10*	9994.9	(45/2$^+$)	8429.9	(41/2)$^+$	(E2)	3.88×10^{-4}	DCO=1.03 *4* α(K)=0.000246 *4*; α(L)=2.71×10^{-5} *4*; α(M)=4.76×10^{-6} *7*; α(N+..)=0.0001098 *16* α(N)=6.99×10^{-7} *10*; α(O)=4.08×10^{-8} *6*; α(IPF)=0.0001090 *16*
1572		4251+x	J+6	2679+x	J+4			
1575.0[b]	4.0 *8*	7939.7	(37/2$^+$)	6364.7	(33/2)$^+$	[E2]	3.88×10^{-4}	α(K)=0.000243 *4*; α(L)=2.68×10^{-5} *4*; α(M)=4.70×10^{-6} *7*; α(N+..)=0.0001138 *16* α(N)=6.90×10^{-7} *10*; α(O)=4.03×10^{-8} *6*; α(IPF)=0.0001131 *16*
1590.1[b]	2.8 *6*	9841.3	(43/2$^-$)	8251.4	(39/2$^-$)	[E2]	3.90×10^{-4}	α(K)=0.000239 *4*; α(L)=2.63×10^{-5} *4*; α(M)=4.62×10^{-6} *7*; α(N+..)=0.0001201 *17* α(N)=6.77×10^{-7} *10*; α(O)=3.96×10^{-8} *6*; α(IPF)=0.0001194 *17*
1598.7[b]	0.9 *5*	6537.1	(33/2$^+$)	4937.3	(29/2)$^+$			
1605.1 *3*	1.7 *6*	6194.4	(33/2$^+$)	4589.2	(29/2)$^+$			DCO=0.56 *7*
1633.0[b]	2.0 *6*	9572.7	(41/2$^+$)	7939.7	(37/2$^+$)	[E2]	3.94×10^{-4}	α(K)=0.000226 *4*; α(L)=2.49×10^{-5} *4*; α(M)=4.38×10^{-6} *7*; α(N+..)=0.0001384 *20* α(N)=6.42×10^{-7} *9*; α(O)=3.76×10^{-8} *6*; α(IPF)=0.0001377 *20*
1642		3134+y	J1+4	1492+y	J1+2			
1656.7[b]	6.1 *6*	11542.9	(47/2$^-$)	9886.2	(43/2$^-$)	[E2]	3.97×10^{-4}	α(K)=0.000220 *3*; α(L)=2.42×10^{-5} *4*; α(M)=4.26×10^{-6} *6*; α(N+..)=0.0001486 *21* α(N)=6.24×10^{-7} *9*; α(O)=3.65×10^{-8} *6*; α(IPF)=0.0001479 *21*
1657		5035+y	J1+6	3378+y	J1+4			
1672.4[b]	4.4 *4*	11184.5	(47/2$^+$)	9512.1	(43/2$^+$)	(E2)	4.00×10^{-4}	DCO=1.01 *6* α(K)=0.000216 *3*; α(L)=2.38×10^{-5} *4*; α(M)=4.18×10^{-6} *6*; α(N+..)=0.0001554 *22* α(N)=6.13×10^{-7} *9*; α(O)=3.59×10^{-8} *5*; α(IPF)=0.0001547 *22*
1697		1697+z	J2+2	z	J2			
1701 *2*	8.2 *8*	10234.5	(45/2$^-$)	8533.2	(41/2$^-$)	(E2)	4.04×10^{-4}	DCO=0.84 *+12−10* α(K)=0.000209 *3*; α(L)=2.30×10^{-5} *4*; α(M)=4.04×10^{-6} *6*; α(N+..)=0.0001680 *24* α(N)=5.93×10^{-7} *9*; α(O)=3.47×10^{-8} *5*; α(IPF)=0.0001673 *24*
1719		5970+x	J+8	4251+x	J+6			
1736.3[b]	2.4 *8*	11577.6	(47/2$^-$)	9841.3	(43/2$^-$)	[E2]	4.11×10^{-4}	α(K)=0.000201 *3*; α(L)=2.21×10^{-5} *3*; α(M)=3.88×10^{-6} *6*; α(N+..)=0.000183 *3* α(N)=5.70×10^{-7} *8*; α(O)=3.34×10^{-8} *5*; α(IPF)=0.000183 *3*

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
1760		6795+y	J1+8	5035+y	J1+6	(E2)	4.15×10^{-4}	α(K)=0.000196 *3*; α(L)=2.15×10^{-5} *3*; α(M)=3.78×10^{-6} *6*; α(N+..)=0.000194 *3* α(N)=5.55×10^{-7} *8*; α(O)=3.26×10^{-8} *5*; α(IPF)=0.000193 *3* Mult.: From R(DCO)=0.94 *12* (1997La02).
1777.6 *3*	6.9 *7*	7616.7	(37/2$^+$)	5838.6	(33/2)$^+$	(E2)	4.19×10^{-4}	DCO=0.95 *7* α(K)=0.000192 *3*; α(L)=2.11×10^{-5} *3*; α(M)=3.71×10^{-6} *6*; α(N+..)=0.000202 *3* α(N)=5.45×10^{-7} *8*; α(O)=3.19×10^{-8} *5*; α(IPF)=0.000201 *3* Other: R(DCO)=1.18 *9* (1991Ju05).
1778 *2*	7.3 *7*	12015.1	(49/2$^-$)	10234.5	(45/2$^-$)	(E2)	4.20×10^{-4}	DCO=1.19 *+25−21* α(K)=0.000192 *3*; α(L)=2.11×10^{-5} *3*; α(M)=3.70×10^{-6} *6*; α(N+..)=0.000203 *3* α(N)=5.43×10^{-7} *8*; α(O)=3.18×10^{-8} *5*; α(IPF)=0.000203 *3*
1790		4924+y	J1+6	3134+y	J1+4			
1804.1[b]	0.8 *4*	13750.0	(53/2$^+$)	11945.9	(49/2$^+$)			
1862 *2*	5.7 *6*	13877.1	(53/2$^-$)	12015.1	(49/2$^-$)	(E2)	4.40×10^{-4}	DCO=0.98 *+9−8* α(K)=0.0001766 *25*; α(L)=1.94×10^{-5} *3*; α(M)=3.40×10^{-6} *5*; α(N+..)=0.000240 *4* α(N)=4.99×10^{-7} *7*; α(O)=2.93×10^{-8} *5*; α(IPF)=0.000240 *4*
1866		3563+z	J2+4	1697+z	J2+2			
1871		6795+y	J1+8	4924+y	J1+6	(E2)	4.42×10^{-4}	α(K)=0.0001749 *25*; α(L)=1.92×10^{-5} *3*; α(M)=3.37×10^{-6} *5*; α(N+..)=0.000245 *4* α(N)=4.94×10^{-7} *7*; α(O)=2.90×10^{-8} *4*; α(IPF)=0.000245 *4* Mult.: From R(DCO)=0.97 *17* (1997La02).
1879		7849+x	J+10	5970+x	J+8			
1881		6916+y	J1+8	5035+y	J1+6	(E2)	4.45×10^{-4}	α(K)=0.0001731 *25*; α(L)=1.90×10^{-5} *3*; α(M)=3.33×10^{-6} *5*; α(N+..)=0.000250 *4* α(N)=4.89×10^{-7} *7*; α(O)=2.87×10^{-8} *4*; α(IPF)=0.000249 *4* Mult.: From R(DCO)=0.89 *13* (1997La02).
1931.0[b]	3.9 *4*	13473.9	(51/2$^-$)	11542.9	(47/2$^-$)	[E2]	4.60×10^{-4}	α(K)=0.0001649 *23*; α(L)=1.81×10^{-5} *3*; α(M)=3.17×10^{-6} *5*; α(N+..)=0.000274 *4* α(N)=4.66×10^{-7} *7*; α(O)=2.74×10^{-8} *4*; α(IPF)=0.000273 *4*
1933.0[b]	4.8 *5*	13117.5	(51/2$^+$)	11184.5	(47/2$^+$)	[E2]	4.60×10^{-4}	α(K)=0.0001646 *23*; α(L)=1.80×10^{-5} *3*; α(M)=3.17×10^{-6} *5*; α(N+..)=0.000275 *4* α(N)=4.65×10^{-7} *7*; α(O)=2.73×10^{-8} *4*; α(IPF)=0.000274 *4*
1951 *1*	6.3 *6*	11945.9	(49/2$^+$)	9994.9	(45/2$^+$)	(E2)	4.67×10^{-4}	DCO=1.04 *7* α(K)=0.0001613 *23*; α(L)=1.766×10^{-5} *25*; α(M)=3.10×10^{-6} *5*; α(N+..)=0.000285 *4* α(N)=4.55×10^{-7} *7*; α(O)=2.68×10^{-8} *4*; α(IPF)=0.000284 *4*
1964		8759+y	J1+10	6795+y	J1+8			
1992		6916+y	J1+8	4924+y	J1+6	(E2)	4.79×10^{-4}	α(K)=0.0001557 *22*; α(L)=1.704×10^{-5} *24*; α(M)=2.99×10^{-6} *5*; α(N+..)=0.000303 *5* α(N)=4.39×10^{-7} *7*; α(O)=2.58×10^{-8} *4*; α(IPF)=0.000303 *5* Mult.: From R(DCO)=1.06 *16* (1997La02).

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
1998.1[b]	2.3 *10*	13575.7	(51/2$^-$)	11577.6	(47/2$^-$)			
2041		5604+z	J2+6	3563+z	J2+4			
2045		9894+x	J+12	7849+x	J+10			
2071[bc]		15327.2	(55/2$^+$)	13256.5	(51/2$^+$)	[E2]	5.05×10^{-4}	α(K)=0.0001451 *21*; α(L)=1.586×10^{-5} *23*; α(M)=2.79×10^{-6} *4*; α(N+..)=0.000341 *5* α(N)=4.09×10^{-7} *6*; α(O)=2.41×10^{-8} *4*; α(IPF)=0.000341 *5*
2072.0[b]	1.4 *7*	13256.5	(51/2$^+$)	11184.5	(47/2$^+$)	[E2]		
2078		8994+y	J1+10	6916+y	J1+8			
2114.7[b]		15864.8	(57/2$^+$)	13750.0	(53/2$^+$)			
2117		10876+y	J1+12	8759+y	J1+10			
2176		11170+y	J1+12	8994+y	J1+10			
2196.0[b]	1.4 *7*	15670.0	(55/2$^-$)	13473.9	(51/2$^-$)			
2209.6[b]	2.7 *9*	15327.2	(55/2$^+$)	13117.5	(51/2$^+$)	[E2]	5.54×10^{-4}	α(K)=0.0001291 *18*; α(L)=1.409×10^{-5} *20*; α(M)=2.48×10^{-6} *4*; α(N+..)=0.000408 *6* α(N)=3.63×10^{-7} *5*; α(O)=2.14×10^{-8} *3*; α(IPF)=0.000408 *6*
2211		7815+z	J2+8	5604+z	J2+6			
2216		12110+x	J+14	9894+x	J+12			
2225		1258+x		?				
2253.1[b]	1.3 *6*	14199.1	(53/2$^+$)	11945.9	(49/2$^+$)			
2268		13438+y	J1+14	11170+y	J1+12			
2274		13150+y	J1+14	10876+y	J1+12			
2308.4[b]	3.1 *6*	16185.5	(57/2$^-$)	13877.1	(53/2$^-$)	[E2]	5.91×10^{-4}	α(K)=0.0001194 *17*; α(L)=1.302×10^{-5} *19*; α(M)=2.29×10^{-6} *4*; α(N+..)=0.000456 *7* α(N)=3.36×10^{-7} *5*; α(O)=1.98×10^{-8} *3*; α(IPF)=0.000456 *7*
2364[bc]		15938	(55/2$^-$)	13575.7	(51/2$^-$)	[E2]	6.13×10^{-4}	α(K)=0.0001145 *16*; α(L)=1.248×10^{-5} *18*; α(M)=2.19×10^{-6} *3*; α(N+..)=0.000483 *7* α(N)=3.22×10^{-7} *5*; α(O)=1.90×10^{-8} *3*; α(IPF)=0.000483 *7*
2384		10199+z	J2+10	7815+z	J2+8			
2392.9[b]	0.5 *3*	18257.7	(61/2$^+$)	15864.8	(57/2$^+$)			DCO=0.90 *+10−9*
2393		15831+y	J1+16	13438+y	J1+14			
2395		14505+x	J+16	12110+x	J+14			
2432		15582+y	J1+16	13150+y	J1+14			
2452.3[b]	1.4 *5*	11021.3	(45/2$^+$)	8569.0	(41/2$^+$)			
2495.1[b]	0.3 *2*	12490.0	(49/2$^+$)	9994.9	(45/2$^+$)			
2537		12736+z	J2+12	10199+z	J2+10			
2543		18374+y	J1+18	15831+y	J1+16			
2573.0[b]	1.9 *9*	14588.1	(53/2$^-$)	12015.1	(49/2$^-$)			
2585		17090+x	J+18	14505+x	J+16			
2587		18169+y	J1+18	15582+y	J1+16			
2598.4[b]	2.3 *5*	17925.6	(59/2$^+$)	15327.2	(55/2$^+$)	(E2)	7.03×10^{-4}	DCO=0.95 *+16−14* α(K)=9.72×10^{-5} *14*; α(L)=1.057×10^{-5} *15*; α(M)=1.86×10^{-6} *3*; α(N+..)=0.000594 *9* α(N)=2.73×10^{-7} *4*; α(O)=1.612×10^{-8} *23*; α(IPF)=0.000594 *9*

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^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

γ(^{87}Nb) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@&]	α[†]	Comments
2674.0[bc]		15927.0?	(55/2$^+$)	13256.5	(51/2$^+$)			
2706.8[b]	1.5 *8*	18892.4	(61/2$^-$)	16185.5	(57/2$^-$)	[E2]	7.46×10^{-4}	α(K)=9.06×10^{-5} *13*; α(L)=9.85×10^{-6} *14*; α(M)=1.730×10^{-6} *25*; α(N+..)=0.000644 *9* α(N)=2.54×10^{-7} *4*; α(O)=1.503×10^{-8} *21*; α(IPF)=0.000644 *9*
2846[bc]		14860?	(53/2$^-$)	12015.1	(49/2$^-$)			
2912[bc]		18839.1?	(59/2$^+$)	15927.0?	(55/2$^+$)			

[†] Additional information 1.
[‡] For SD bands, values are from 1997La02. For other levels, from 1991Ju05, when available. Exceptions noted; when values are from 2003Pa09, an uncertainty of 0.5 keV is assumed for fitting the levels. Note that for fitting the energy levels a χ^2 of 7.3 is obtained compared to the critical value 1.42, so the fit is not very good. One of the main contributors to the χ^2 is the 780.7 γ transition. If the 779.9 value from 2003Pa09 is used with the assumed uncertainty of 0.5 keV this is brought down to 2.5.
[#] From 2003Pa09 for ^{58}Ni(^{32}S,3p) at 135 MeV, unless otherwise noted. Other: see 1991Ju05 and 1997We04.
[@] Based on R(DCO)s unless otherwise noted. Where both DCO ratios and angular distributions show stretched quadrupole (DCO=1), E2 was assumed. a DCO between 0.35 and 0.55 indicates a dipole character, assuming either E1 or M1, and based on systematics, is assumed to have a small to neglible mixing ratio (2003Pa09). Level scheme placement indicates either E1 or M1.
[&] For SD-1, SD-2 and SD-3 bands, $\gamma\gamma(\theta)$ (DCO) results (1997La02) give $\Delta J=2$, quadrupole for all the strong transitions and these are presumed to be E2 rather than M2.
[a] From 1991Ju05.
[b] From 2003Pa09.
[c] Placement of transition in the level scheme is uncertain.

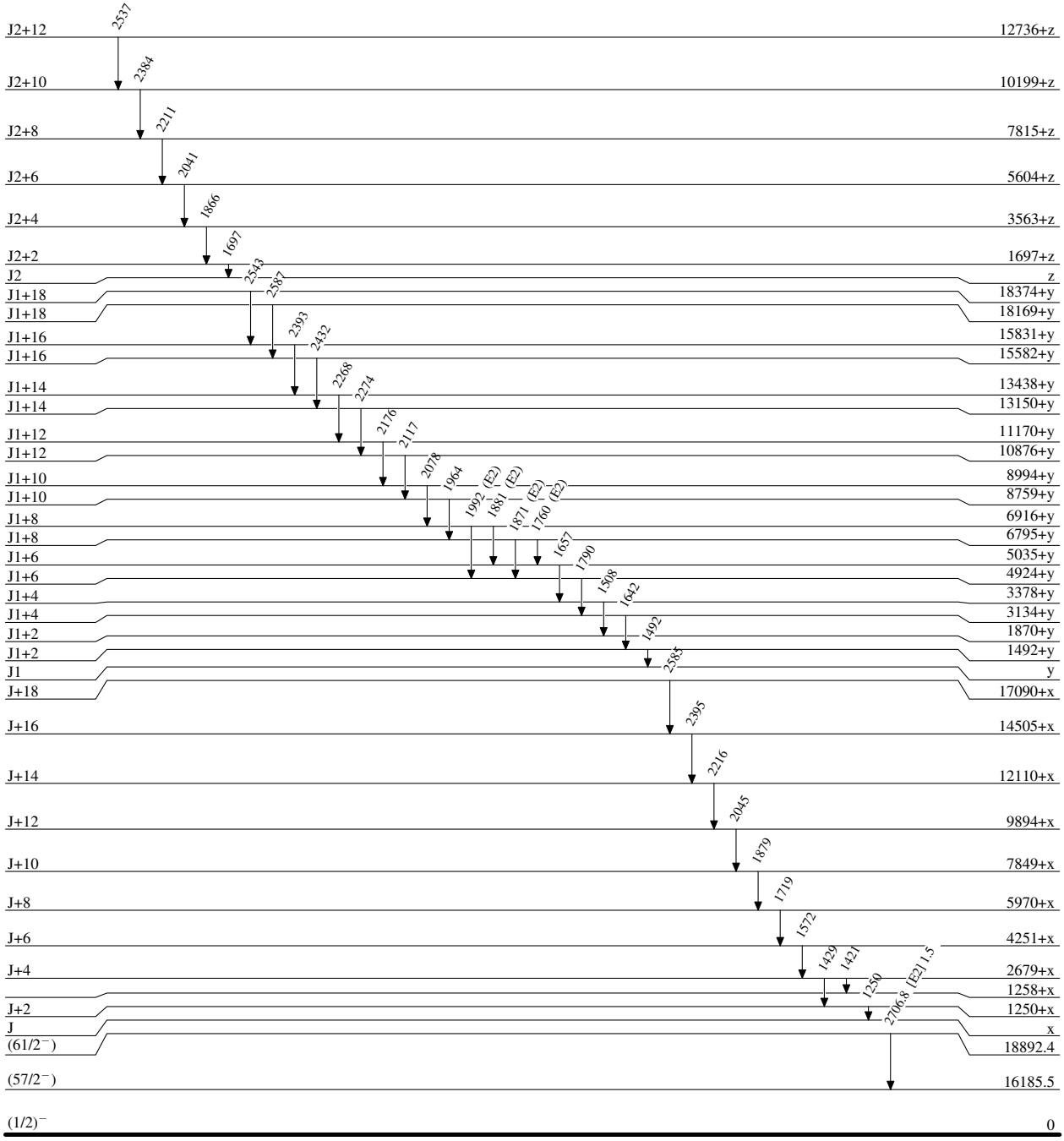
^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) **2003Pa09**

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$

Level Scheme

Intensities: Type not specified



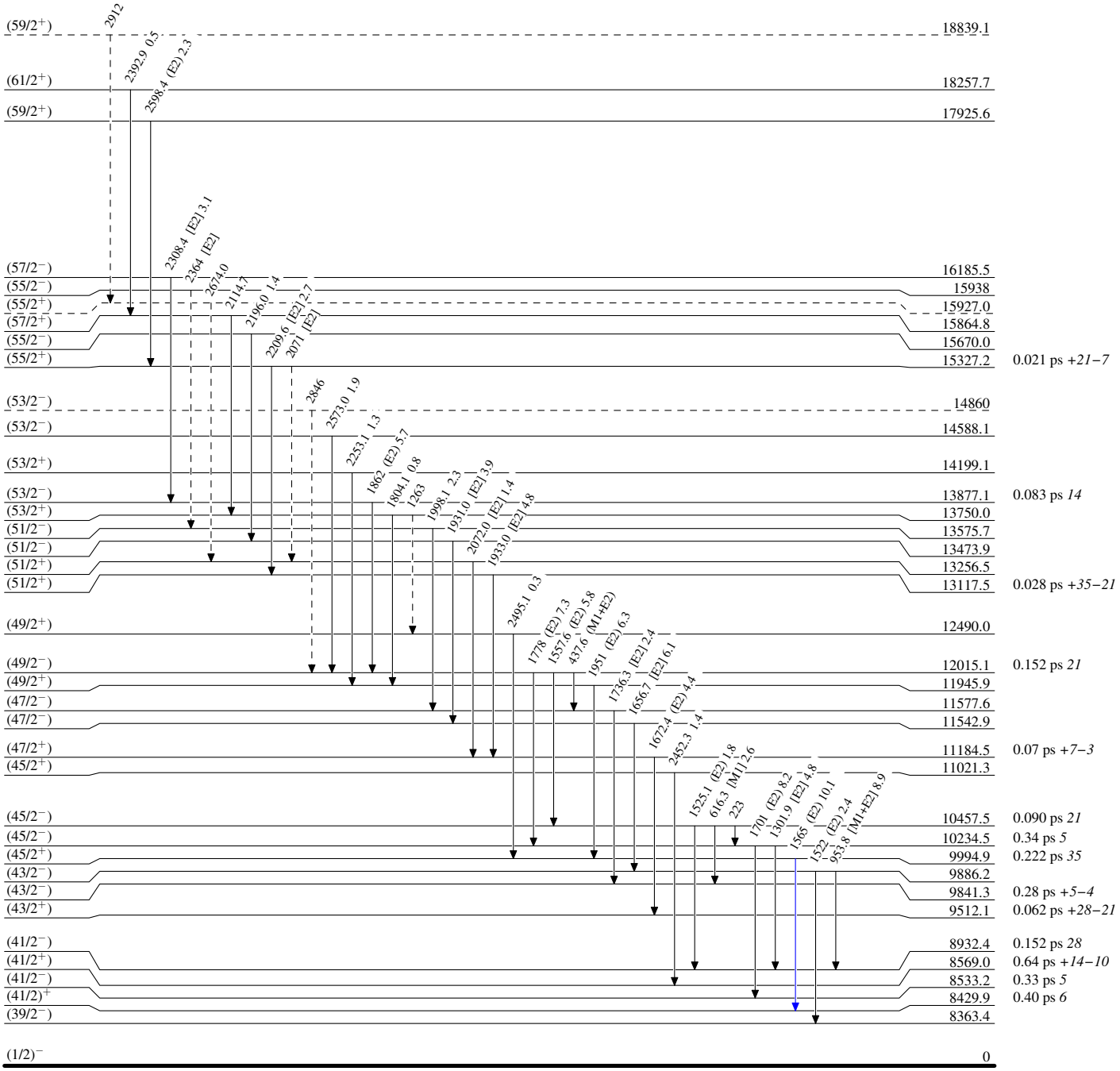
$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) **2003Pa09**

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)

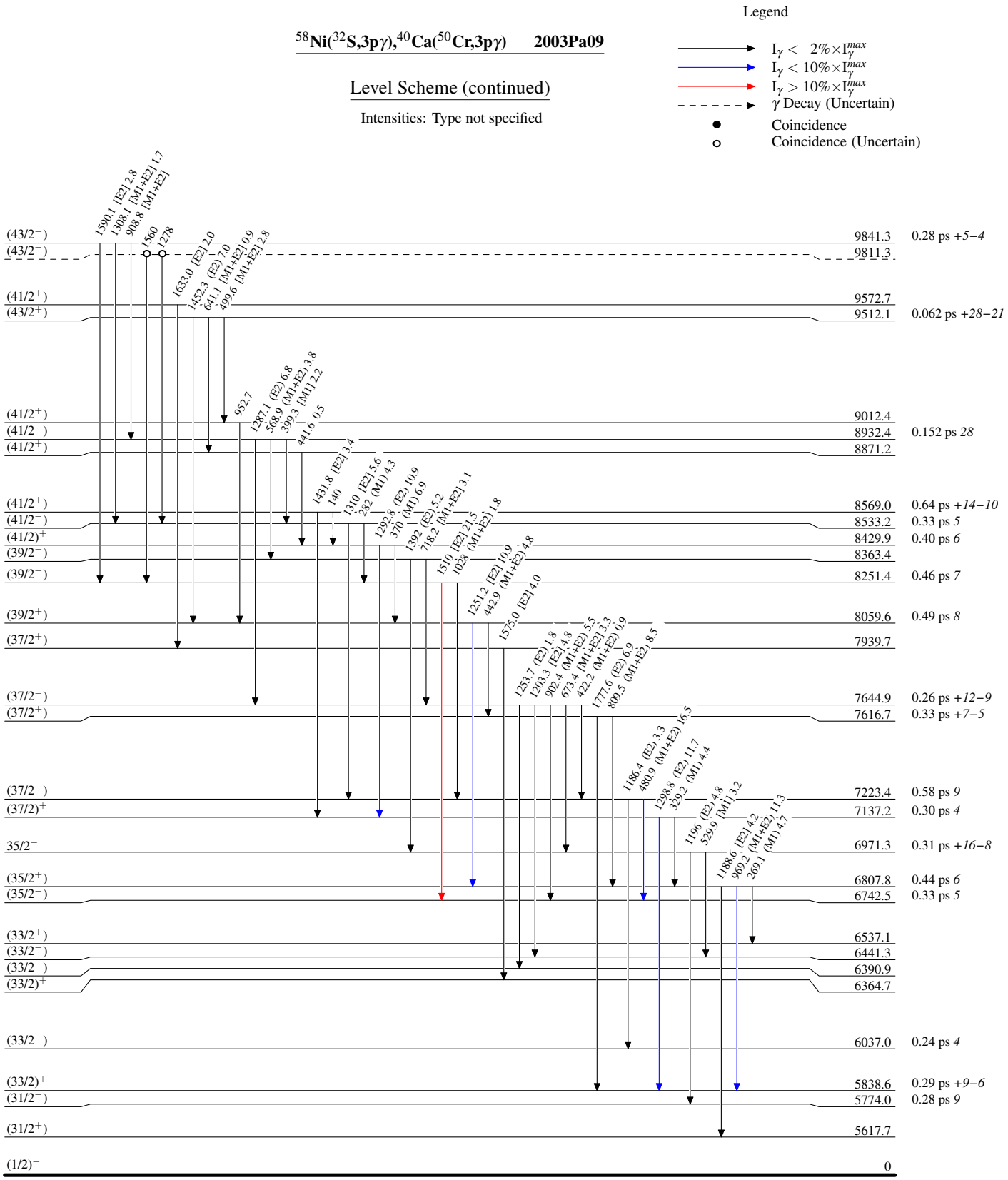


$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) **2003Pa09**

Level Scheme (continued)

Intensities: Type not specified

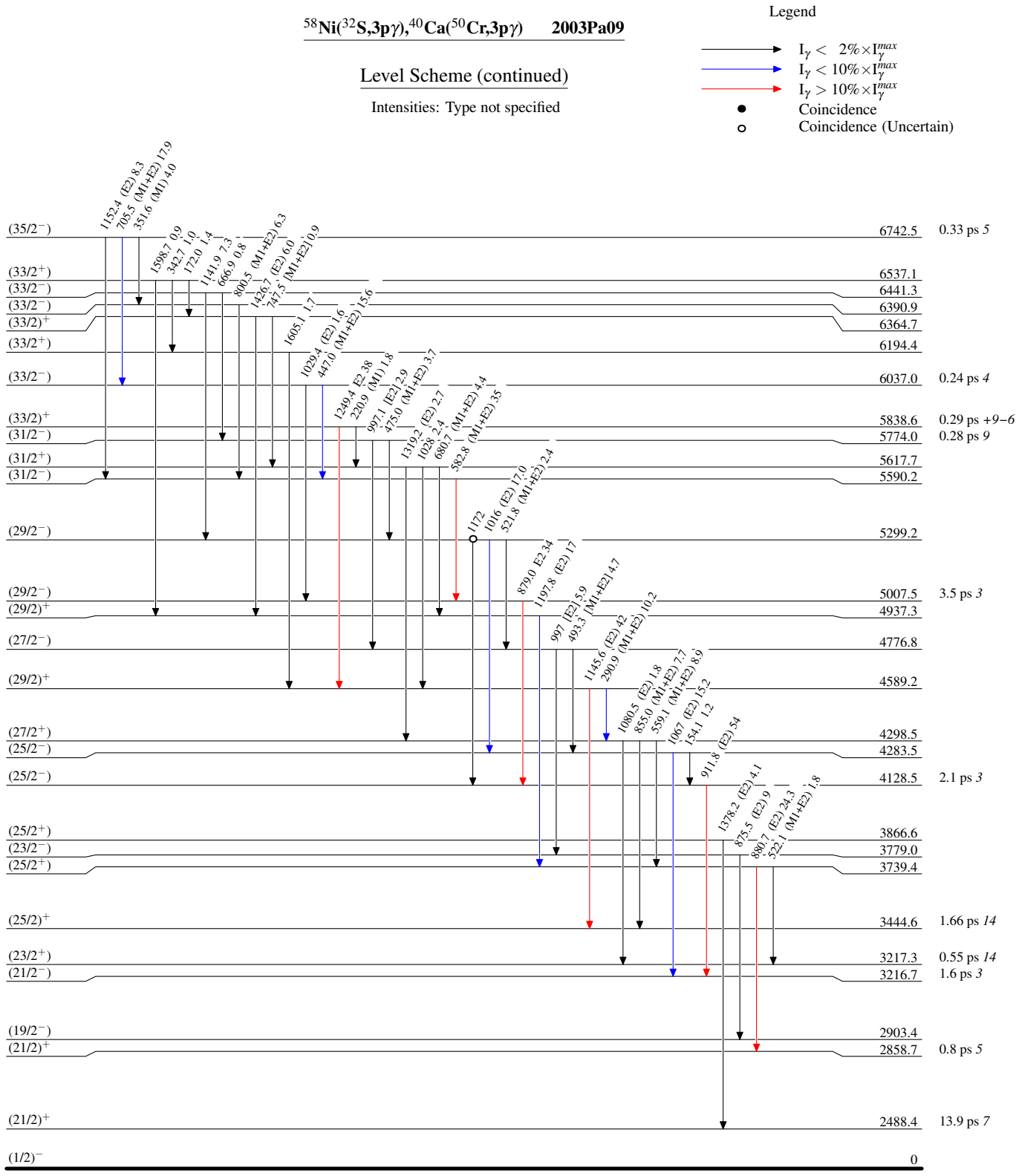


$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) **2003Pa09**

Level Scheme (continued)

Intensities: Type not specified

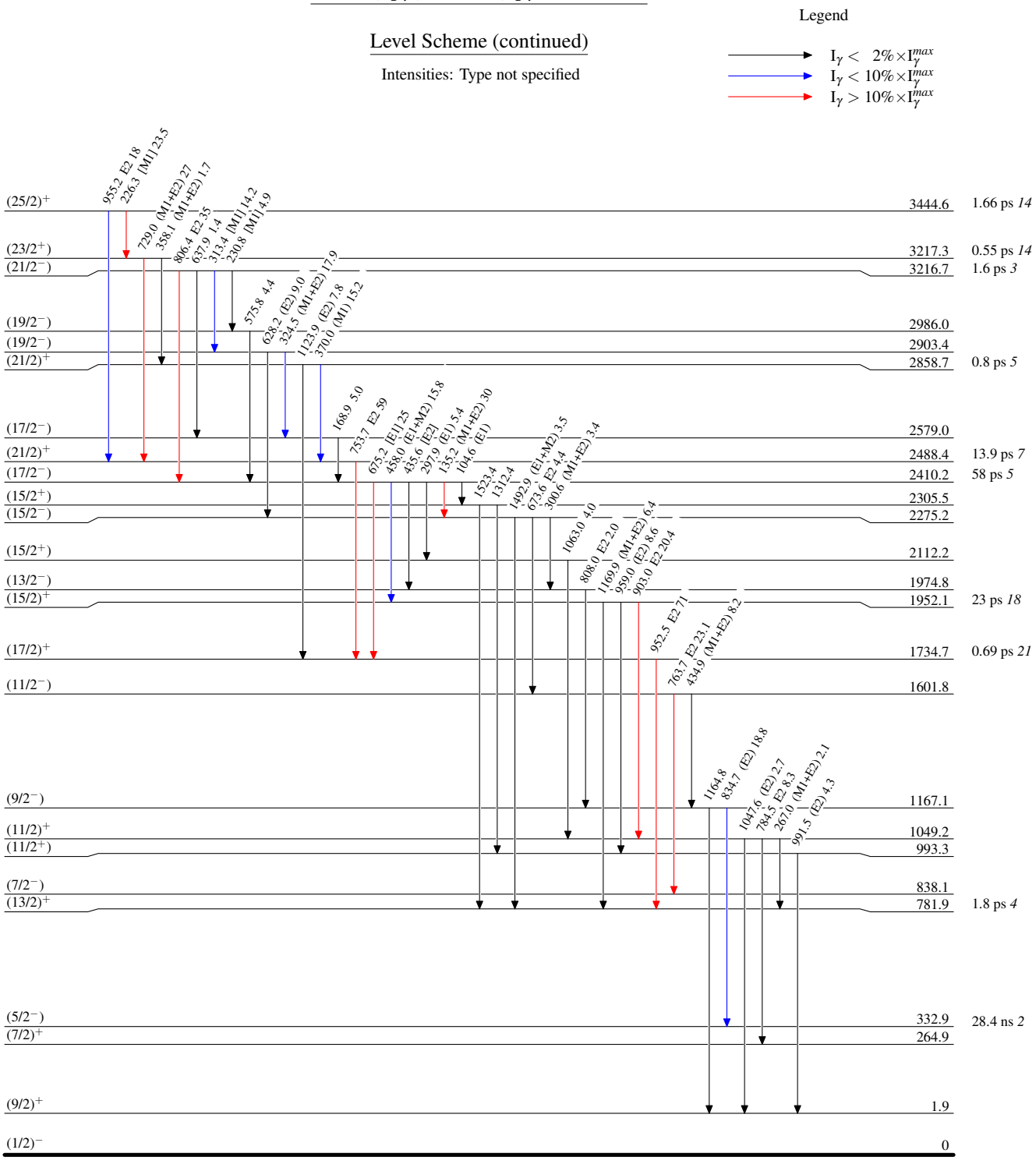


$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) **2003Pa09**

Level Scheme (continued)

Intensities: Type not specified

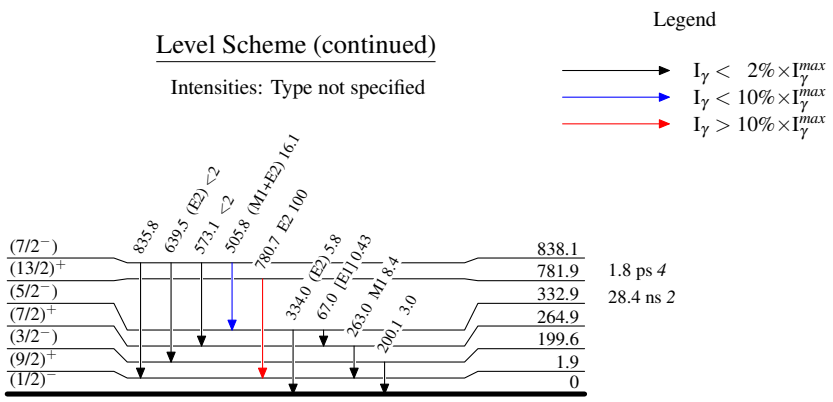


$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09

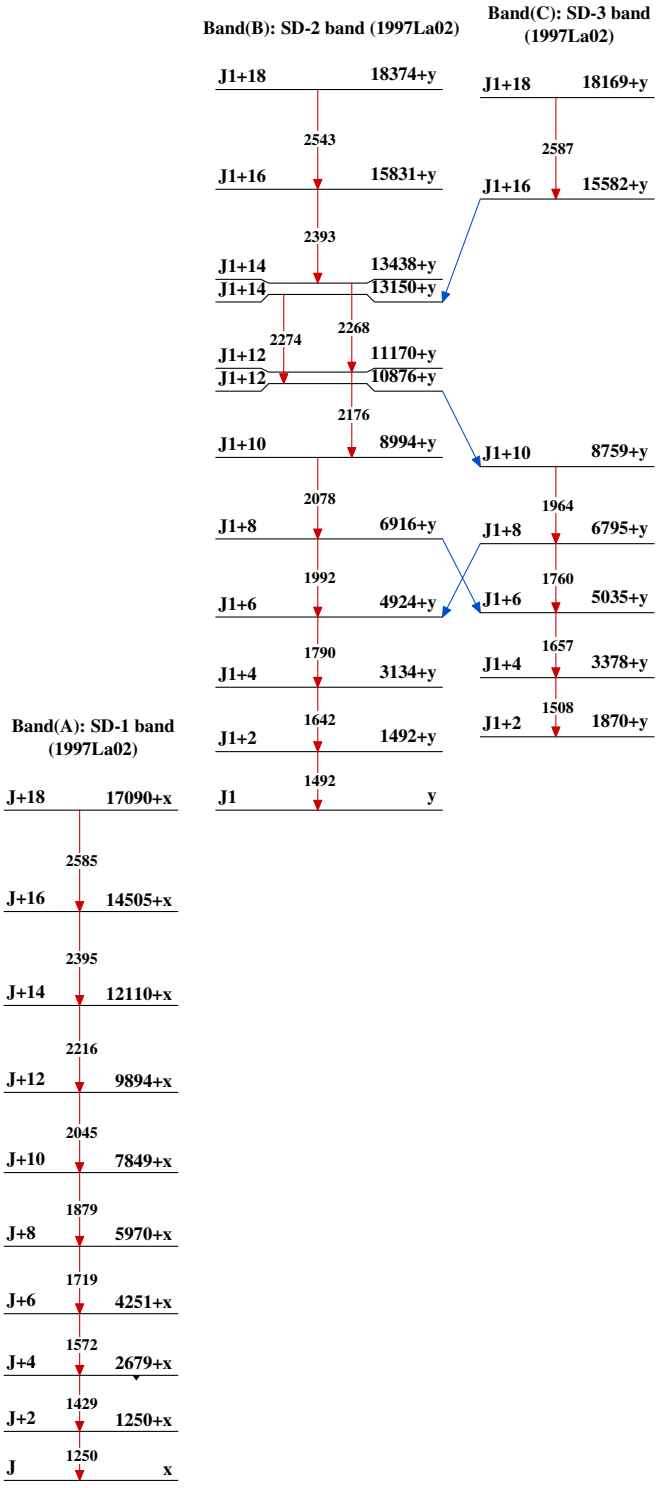
Level Scheme (continued)

Intensities: Type not specified



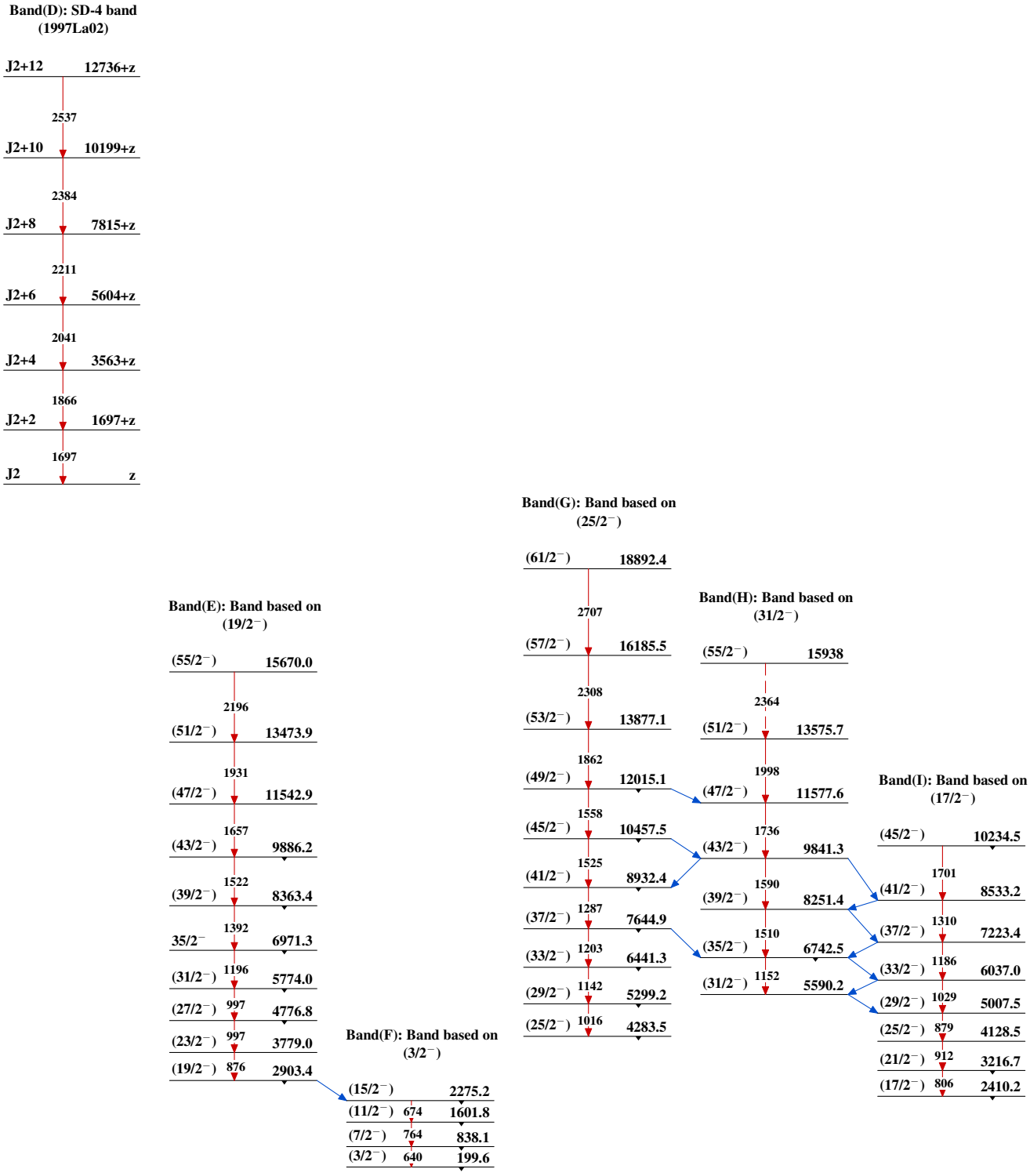
$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09



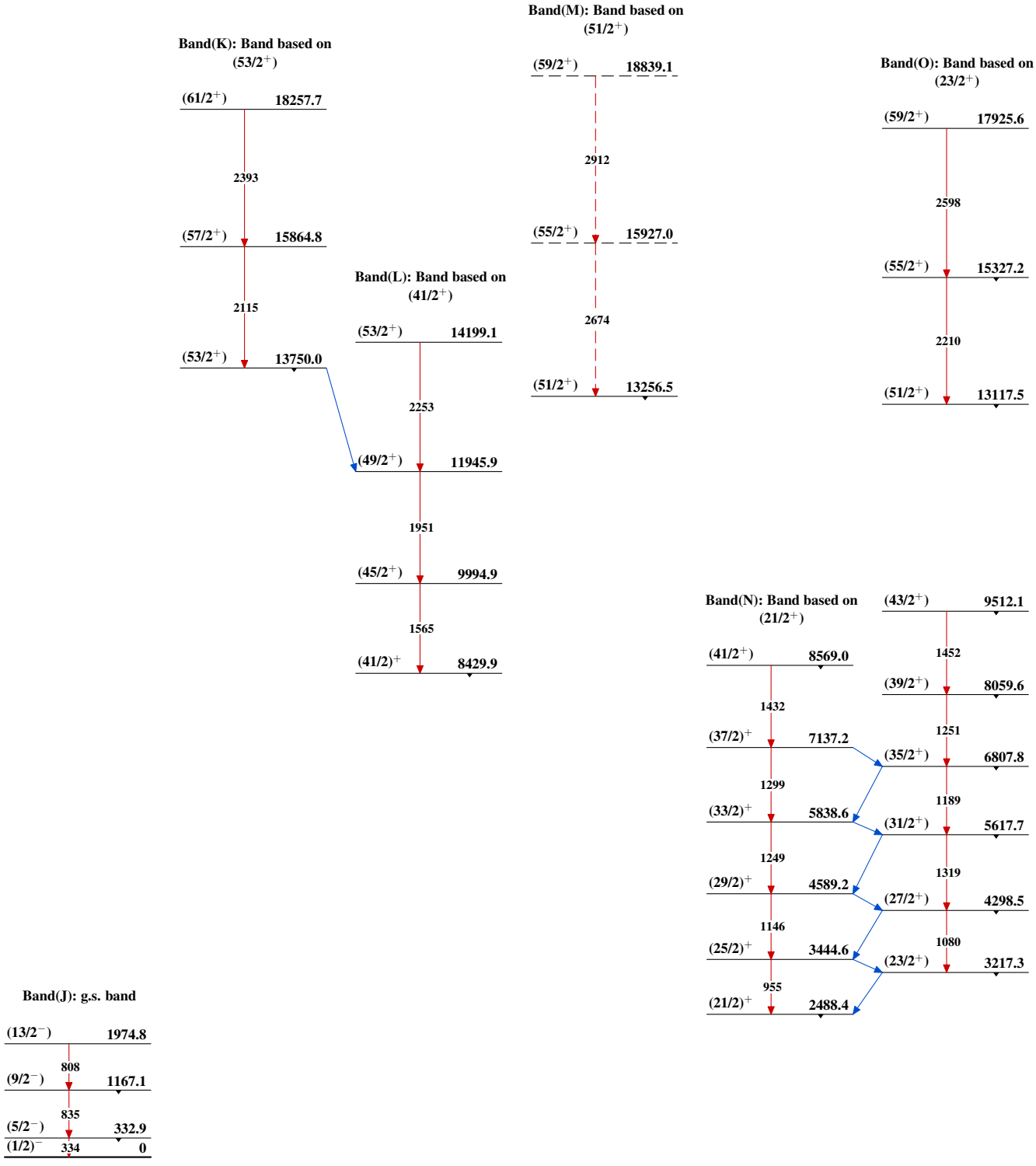
$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)

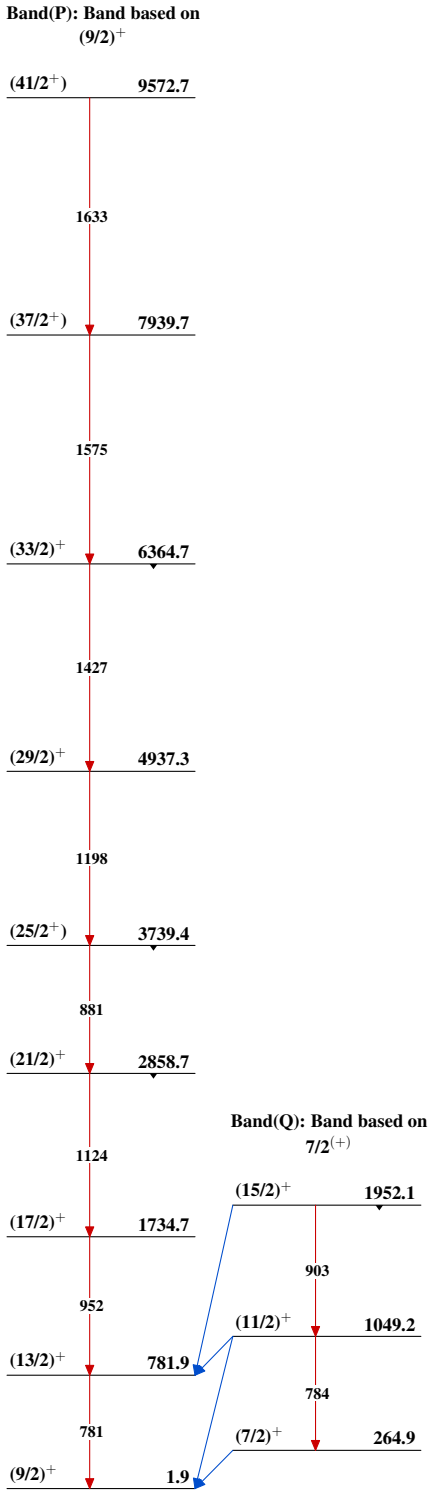


$^{87}_{41}Nb_{46}$

^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)



^{58}Ni(^{32}S,3pγ),^{40}Ca(^{50}Cr,3pγ) 2003Pa09 (continued)



$^{87}_{41}Nb_{46}$