^{112}Sn(^{32}S,2pnγ) 1993Mu05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

1993Mu05: ^{112}Sn(^{32}S,2pnγ) E=155 MeV and ^{112}Sn(^{33}S,2n2pγ) E=170 MeV. Measured γ, $\gamma\gamma$ using 8π array with 20 Ge detectors and 70 BGO inner-ball detectors. Evaporated charged particles detected with array of 24 CsI(Tl) crystals.

1993Ca14: ^{112}Sn(^{35}Cl,αpnγ) E=159 MeV and ^{89}Y(^{58}Ni,αpnγ) E=250 MeV. Measured γ, $\gamma\gamma$ using an array of six Ge detectors and 14 BaF_2 detectors.

The level scheme from 1993Ca14 is less complete than that from 1993Mu05. There are two differences in the placement of transitions in partial level scheme of 1993Ca14: 1. Ordering of 243-624 is reversed. 2. The 287 transition is placed above 2447 level instead of its location much higher up in the level scheme as given by 1993Mu05.

^{141}Gd Levels

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
0.0	1/2$^+$	1661.1 *14*	17/2$^-$	3232.7[#] *22*	21/2$^{(+)}$	5213[#] *3*	33/2$^{(+)}$
112.6 *8*	3/2$^+$	1670.8[c] *15*	19/2$^-$	3277.8[@] *19*	23/2$^-$	5265[@] *3*	35/2$^-$
197.1 *8*	3/2$^+$	1872.5[b] *16*	(13/2$^-$)	3307.4[&] *18*	27/2$^-$	5775 *3*	39/2$^{(-)}$
257.6 *7*	5/2$^+$	2136.2 *16*	19/2$^-$	3383.0[a] *24*	27/2$^{(-)}$	6035[#] *3*	37/2$^{(+)}$
377.4[c] *10*	11/2$^-$	2149.4[#] *16*	13/2$^{(+)}$	3593.9[&] *21*	29/2$^-$	6124[@] *3*	39/2$^-$
491.2 *11*	(5/2$^+$)	2253.7 *15*	15/2$^-$	3778.5[@] *22*	27/2$^-$	6925[#] *3*	41/2$^{(+)}$
514.0 *12*	9/2$^-$	2275.8 *15*	15/2$^-$	3807.9[a] *25*	29/2$^{(-)}$	7030[@] *3*	43/2$^-$
550.9 *10*	7/2$^-$	2447.2 *16*	21/2$^-$	3813.4[#] *24*	25/2$^{(+)}$	7873[#] *4*	45/2$^{(+)}$
894.5 *11*	(7/2$^-$)	2516.3[a] *19*	23/2$^{(-)}$	3915.3[&] *23*	31/2$^-$	8111[@] *3*	47/2$^-$
907.0[c] *13*	15/2$^-$	2561.0[c] *17*	23/2$^-$	4057.8[a] *25*	31/2$^{(-)}$	8854[#] *4*	49/2$^{(+)}$
940.0 *11*	7/2$^-$	2596.8[b] *19*	(17/2$^-$)	4299.5[&] *25*	33/2$^-$	9379?[@]	(51/2)
989.4 *14*	7/2$^-$	2684.7[#] *19*	17/2$^{(+)}$	4449.0[@] *24*	31/2$^-$	9883[#] *4*	53/2$^{(+)}$
994.6 *13*	13/2$^-$	2759.0[a] *21*	25/2$^{(-)}$	4470[#] *3*	29/2$^{(+)}$	10958[#] *4*	57/2$^{(+)}$
1281.7[b] *12*	9/2$^-$	2874.3[@] *16*	19/2$^-$	4679[&] *3*	35/2$^-$	12108[#] *4*	61/2$^{(+)}$
1547.0 *13*	11/2$^-$	3147.8[&] *18*	25/2$^-$	4894 *3*	35/2$^{(-)}$	13320?[#]	(65/2$^+$)

[†] From least-squares fit to Eγ data with ΔEγ=1 keV for Eγ's without uncertainty assigned by evaluator.
[‡] Based on rotational band structure and DCO ratios.
[#] Band(A): neutron $i_{13/2}$ band, α=+1/2.
[@] Band(B): ΔJ=2, based on 19/2$^-$.
[&] Band(C): ΔJ=1, based on 25/2$^-$.
[a] Band(D): ΔJ=1, based on 23/2$^-$.
[b] Band(E): ΔJ=2, based on 9/2$^-$.
[c] Band(F): ΔJ=2, based on 11/2$^-$.

γ(^{141}Gd)

E$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	E$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
59.8	257.6	5/2$^+$	197.1	3/2$^+$	257.9	257.6	5/2$^+$	0.0	1/2$^+$
113.1	112.6	3/2$^+$	0.0	1/2$^+$	265.7	1547.0	11/2$^-$	1281.7	9/2$^-$
119.5	377.4	11/2$^-$	257.6	5/2$^+$	286.5[#]	3593.9	29/2$^-$	3307.4	27/2$^-$
136.5	514.0	9/2$^-$	377.4	11/2$^-$	293.1	550.9	7/2$^-$	257.6	5/2$^+$
145.0	257.6	5/2$^+$	112.6	3/2$^+$	321.4	3915.3	31/2$^-$	3593.9	29/2$^-$
159.5	3307.4	27/2$^-$	3147.8	25/2$^-$	342.0	1281.7	9/2$^-$	940.0	7/2$^-$
173.5	550.9	7/2$^-$	377.4	11/2$^-$	343.3	894.5	(7/2$^-$)	550.9	7/2$^-$
196.3	197.1	3/2$^+$	0.0	1/2$^+$	379.1	491.2	(5/2$^+$)	112.6	3/2$^+$
242.7[‡]	2759.0	25/2$^{(-)}$	2516.3	23/2$^{(-)}$	379.1	4679	35/2$^-$	4299.5	33/2$^-$
250.0	4057.8	31/2$^{(-)}$	3807.9	29/2$^{(-)}$	380.1	2516.3	23/2$^{(-)}$	2136.2	19/2$^-$

^{112}Sn(^{32}S,2pnγ) 1993Mu05 (continued)

γ(^{141}Gd) (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]
384.2	4299.5	33/2$^-$	3915.3	31/2$^-$	
387.5	1281.7	9/2$^-$	894.5	(7/2$^-$)	
389.0	940.0	7/2$^-$	550.9	7/2$^-$	
403.6	3277.8	23/2$^-$	2874.3	19/2$^-$	
403.7	894.5	(7/2$^-$)	491.2	(5/2$^+$)	
425.0	3807.9	29/2$^{(-)}$	3383.0	27/2$^{(-)}$	
426.1	940.0	7/2$^-$	514.0	9/2$^-$	
465.4	2136.2	19/2$^-$	1670.8	19/2$^-$	
475.0	2136.2	19/2$^-$	1661.1	17/2$^-$	
475.1	989.4	7/2$^-$	514.0	9/2$^-$	
500.6	3778.5	27/2$^-$	3277.8	23/2$^-$	
529.6	907.0	15/2$^-$	377.4	11/2$^-$	
535.3	2684.7	17/2$^{(+)}$	2149.4	13/2$^{(+)}$	E2
548.0	3232.7	21/2$^{(+)}$	2684.7	17/2$^{(+)}$	E2
557.3	1547.0	11/2$^-$	989.4	7/2$^-$	
562.5	940.0	7/2$^-$	377.4	11/2$^-$	
580.7	3813.4	25/2$^{(+)}$	3232.7	21/2$^{(+)}$	E2
590.8	1872.5	(13/2$^-$)	1281.7	9/2$^-$	
598.5	2874.3	19/2$^-$	2275.8	15/2$^-$	
602.4	2149.4	13/2$^{(+)}$	1547.0	11/2$^-$	(D)[@]
606.9	1547.0	11/2$^-$	940.0	7/2$^-$	
617.3	994.6	13/2$^-$	377.4	11/2$^-$	
620.5	2874.3	19/2$^-$	2253.7	15/2$^-$	
624.0[‡]	3383.0	27/2$^{(-)}$	2759.0	25/2$^{(-)}$	
657.1	4470	29/2$^{(+)}$	3813.4	25/2$^{(+)}$	E2
666.5	1661.1	17/2$^-$	994.6	13/2$^-$	
670.5	4449.0	31/2$^-$	3778.5	27/2$^-$	
674.8	4057.8	31/2$^{(-)}$	3383.0	27/2$^{(-)}$	
700.4	3147.8	25/2$^-$	2447.2	21/2$^-$	
706.7	2253.7	15/2$^-$	1547.0	11/2$^-$	
724.3	2596.8	(17/2$^-$)	1872.5	(13/2$^-$)	
728.8	2275.8	15/2$^-$	1547.0	11/2$^-$	
742.6	5213	33/2$^{(+)}$	4470	29/2$^{(+)}$	E2
746.6	3307.4	27/2$^-$	2561.0	23/2$^-$	
754.0	1661.1	17/2$^-$	907.0	15/2$^-$	
763.9	1670.8	19/2$^-$	907.0	15/2$^-$	
776.2	2447.2	21/2$^-$	1670.8	19/2$^-$	
786.1	2447.2	21/2$^-$	1661.1	17/2$^-$	
815.9	5265	35/2$^-$	4449.0	31/2$^-$	
822.4	6035	37/2$^{(+)}$	5213	33/2$^{(+)}$	E2
836.1	4894	35/2$^{(-)}$	4057.8	31/2$^{(-)}$	
859.0	6124	39/2$^-$	5265	35/2$^-$	
880.6	5775	39/2$^{(-)}$	4894	35/2$^{(-)}$	
889.6	6925	41/2$^{(+)}$	6035	37/2$^{(+)}$	E2
890.3	2561.0	23/2$^-$	1670.8	19/2$^-$	
906.4	7030	43/2$^-$	6124	39/2$^-$	
948.3	7873	45/2$^{(+)}$	6925	41/2$^{(+)}$	E2
981.0	8854	49/2$^{(+)}$	7873	45/2$^{(+)}$	E2
1028.9	9883	53/2$^{(+)}$	8854	49/2$^{(+)}$	E2
1075	10958	57/2$^{(+)}$	9883	53/2$^{(+)}$	E2
1081.2	8111	47/2$^-$	7030	43/2$^-$	
1150	12108	61/2$^{(+)}$	10958	57/2$^{(+)}$	E2

Continued on next page (footnotes at end of table)

^{112}Sn(^{32}S,2pnγ) 1993Mu05 (continued)

$\gamma(^{141}Gd)$ (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]
1212[&]	13320?	(65/2$^+$)	12108	61/2$^{(+)}$	(E2)
1268[&]	9379?	(51/2)	8111	47/2$^-$	

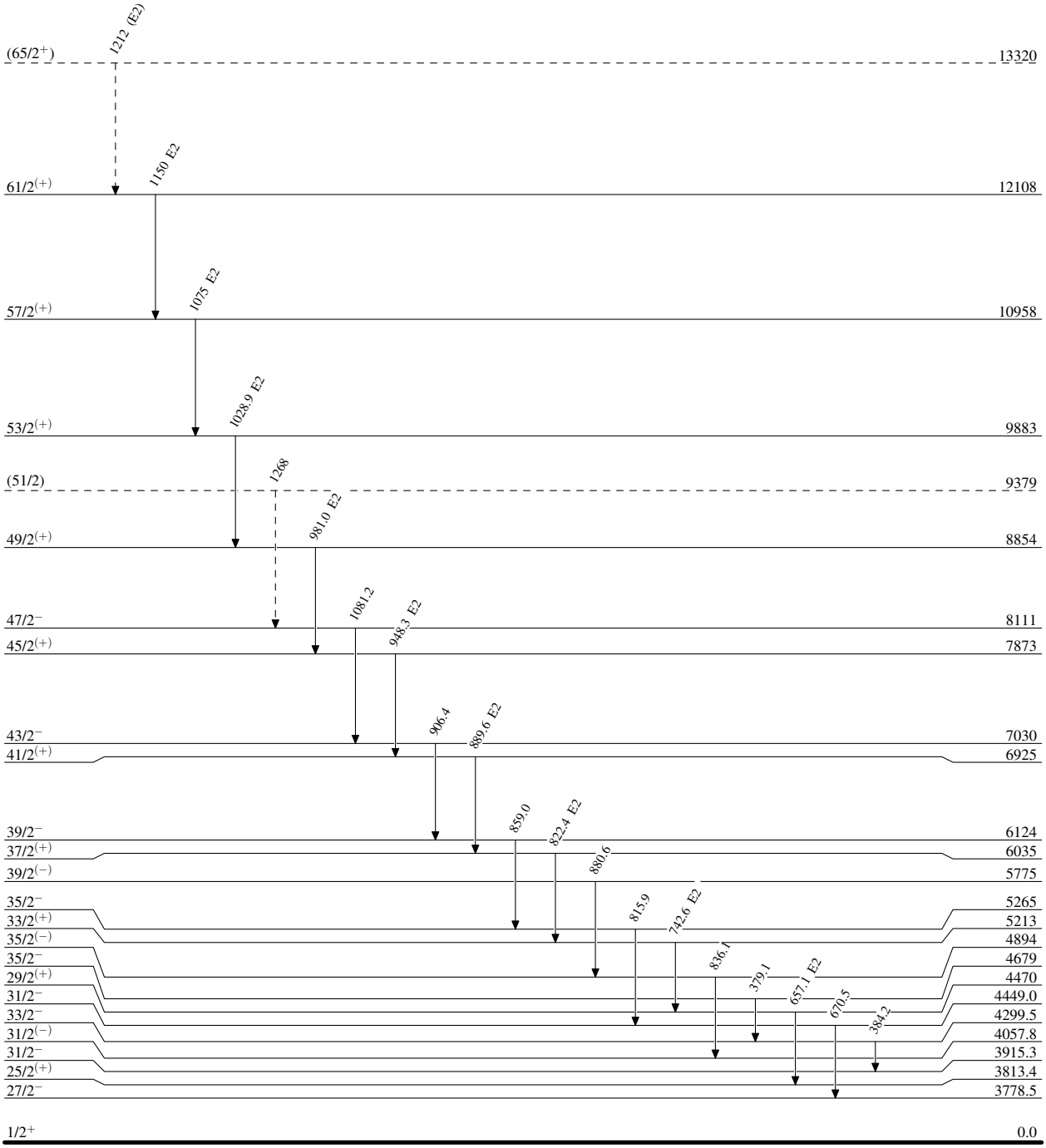
[†] Stretched quadrupole transitions connecting members of i13/2 band have a mean DCO=1.9 and are assumed stretched E2.
[‡] Reversed ordering of 243-624 cascade in 1993Ca14.
[#] This transition is placed above 2447 level by 1993Ca14.
[@] ΔJ=1, DCO=1.1, δ=−0.025 indicating probable E1.
[&] Placement of transition in the level scheme is uncertain.

Legend

^{112}Sn(^{32}S,2pnγ) 1993Mu05

Level Scheme

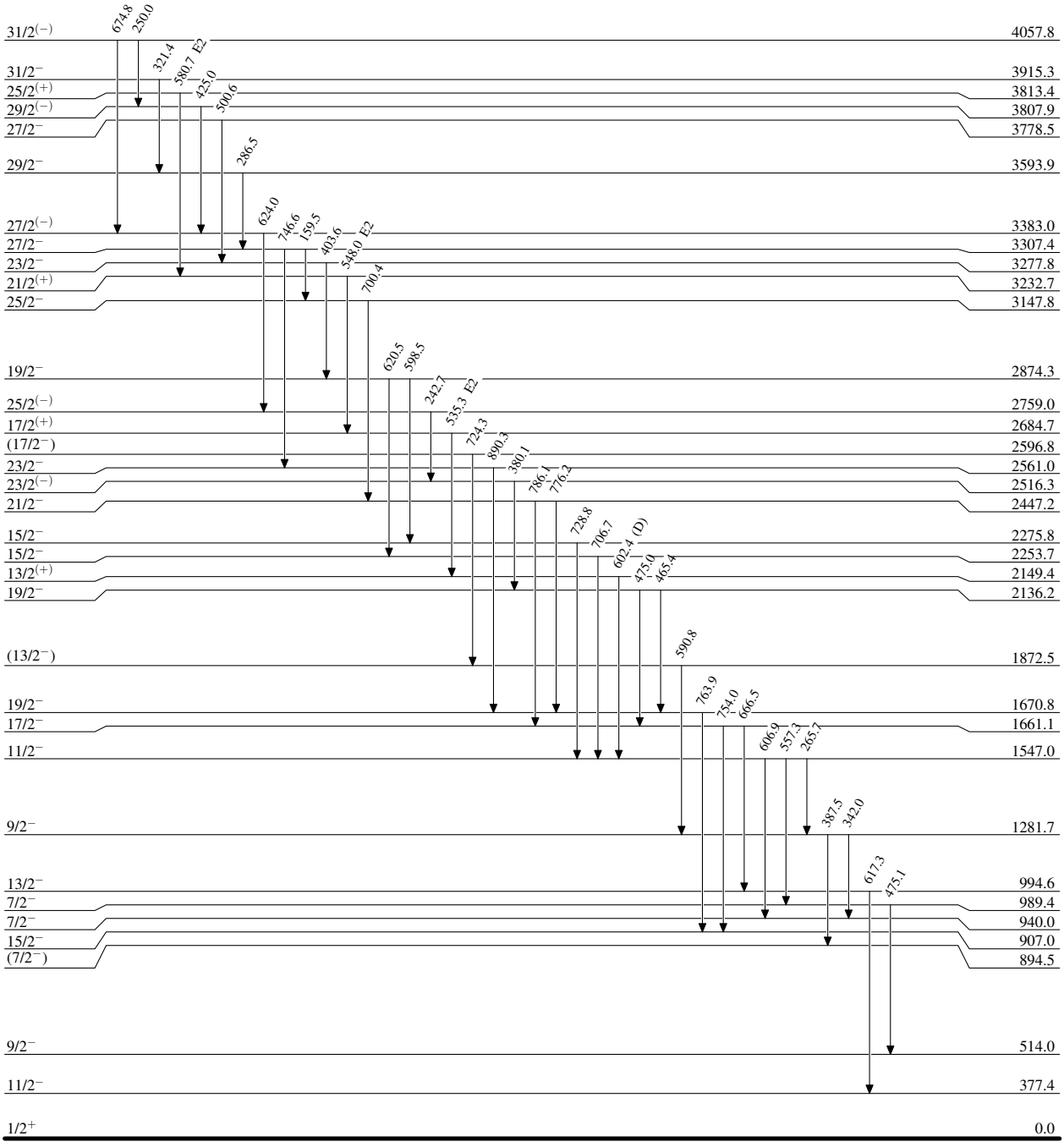
γ Decay (Uncertain)



$^{141}_{64}Gd_{77}$

^{112}Sn(^{32}S,2pnγ) 1993Mu05

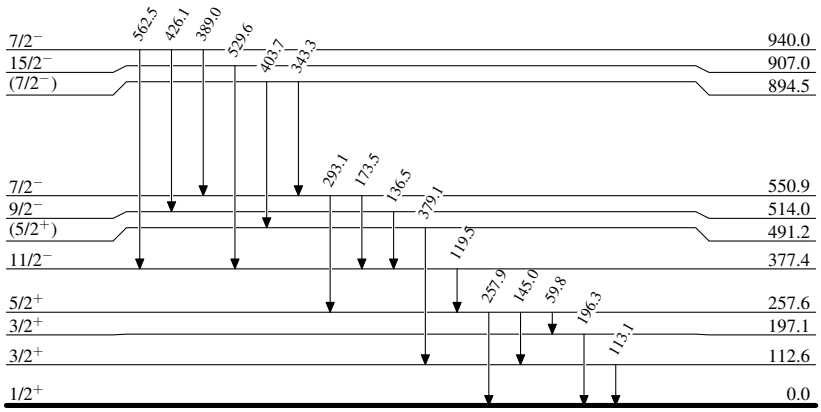
Level Scheme (continued)



$^{141}_{64}Gd_{77}$

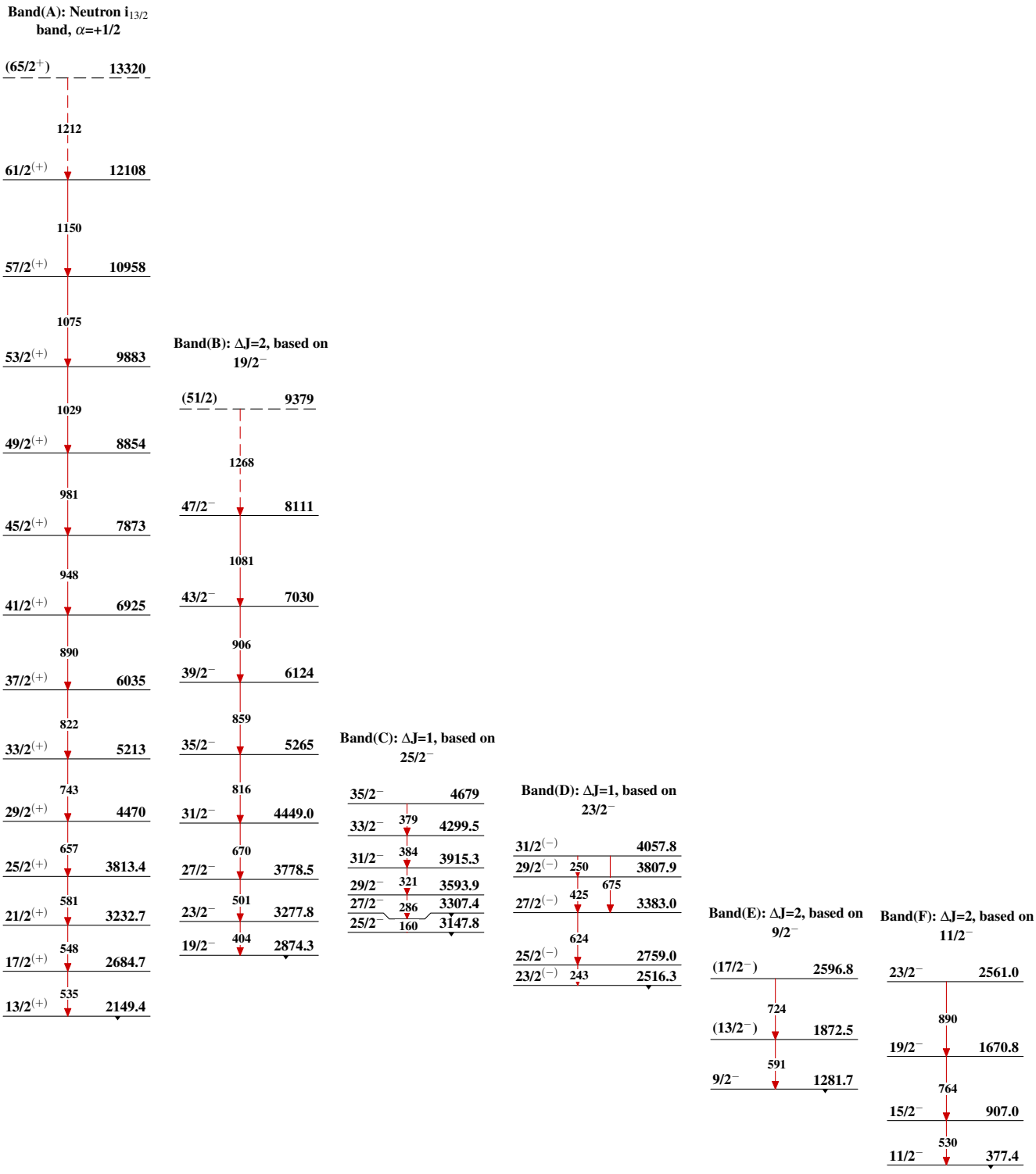
^{112}Sn(^{32}S,2pnγ) 1993Mu05

Level Scheme (continued)



$^{141}_{64}Gd_{77}$

^{112}Sn(^{32}S,2pnγ) 1993Mu05



$^{141}_{64}Gd_{77}$