

¹¹⁶Cd(²⁹Si,4n γ) 1991Ca24,1993La10

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

Includes ¹⁴²Nd(α ,5n γ) from 1993La10.

1991Ca24: ¹¹⁶Cd(²⁹Si,4n γ) E=128 MeV. Measured γ , $\gamma\gamma$ using an array of six Ge detectors and 14 BaF2 detectors.

1993La10: ¹⁴²Nd(α ,5n γ) E=77, 80 MeV. Measured γ , $\gamma\gamma$, ce, $\gamma(\theta)$.

Level scheme is from 1991Ca24.

¹⁴¹Sm Levels

E(level)	J π^{\dagger} #	Comments
(0.0)	1/2 ⁺	
(1.6)	3/2 ⁺	
175.8 ^e	11/2 ⁻	%IT=0.31 3
810.6 ^e	(15/2 ⁻)	
1085.3 ^e	(13/2 ⁻)	
1899.5 ^e	(19/2 ⁻)	
1911.3	(15/2 ⁺)	
1935.0 ^e	(17/2 ⁻)	
2139.5	(17/2 ⁺)	
2394.6 ^e	(21/2 ⁻)	
2418.7	(23/2 ⁻)	
2563.2	(19/2 ⁺)	
2641.1	(23/2 ⁺)	
2722.5 ^f	(21/2 ⁺)	
2822.8 ^f	(23/2 ⁺)	
2977.2 ^f	(25/2 ⁺)	
3191.0 ^f	(27/2 ⁺)	
3206.5 [‡]	(27/2 ⁻)	
3317.8 ^e	(23/2 ⁻)	
3376.4 ^e	(25/2 ⁻)	
3508.9 ^d	(27/2 ⁻)	
3579.7 ^a	(27/2 ⁻)	
3624.0 ^f	(29/2 ⁺)	
3818.4 ^d	(29/2 ⁻)	
3972.8 ^f	(31/2 ⁺)	
4066.7 ^a	(31/2 ⁻)	
4265.0 ^d	(31/2 ⁻)	
4482 [@]	(31/2)	
4577		
4769 [@]	(33/2)	
4792.8 ^d	(33/2 ⁻)	
4859.2 ^a	(35/2 ⁻)	
4886.8		
5001.7 ^b	(35/2)	
5097 [@]	(35/2)	
5206		
5323		
5340.9 ^d	(35/2 ⁻)	
5434 [@]	(37/2)	

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¹¹⁶Cd(²⁹Si,4nγ) **1991Ca24,1993La10** (continued)

¹⁴¹Sm Levels (continued)

E(level)	J ^π †#	E(level)	J ^π †#	E(level)	J ^π †#	E(level)	J ^π †#
5459 ^b	(39/2)	6207 ^b	(43/2)	7376 ^{&}	(45/2)	9477 ^c	(57/2)
5576 ^{&}	(37/2)	6350 ^{&}	(41/2)	7833 ^c	(49/2)	10586 ^c	(61/2)
5595		6414 ^d	(41/2 ⁻)	7987 ^b	(51/2)	11238	(63/2)
5640.9 ^d	(37/2 ⁻)	6896 ^d	(43/2 ⁻)	8284 ^{&}	(49/2)		
5903 ^a	(39/2)	7049 ^b	(47/2)	8348 ^a	(47/2)		
5941 ^d	(39/2 ⁻)	7143 ^a	(43/2)	8558 ^c	(53/2)		

† Based on mult and rotational structure.

‡ From 1993La10 only.

According to 1991Ca24, bands are based on excitations of ¹⁴⁰Nd core (Z=60, N=80) denoted generically as “core^N” for band “N”, coupled to excitations of valence configurations.

@ Band(A): ΔJ=1 band, based on 31/2.

& Band(B): ΔJ=2 band, Configuration=((ν h_{11/2})⁻¹(π h_{11/2})²) ⊗ core^B.

^a Band(C): ΔJ=2 band, Configuration=((ν h_{11/2})⁻¹(π h_{11/2})²) ⊗ core^C.

^b Band(D): ΔJ=2 band, Configuration=((ν h_{11/2})⁻¹(π h_{11/2})²) ⊗ core^D.

^c Band(d): ΔJ=2 band, Configuration=((ν h_{11/2})⁻¹(π h_{11/2})²) ⊗ core^d.

^d Band(E): ΔJ=1 band, Configuration=((ν h_{11/2})⁻¹(π h_{11/2})²) ⊗ core^E.

^e Band(F): Configuration=(ν h_{11/2})⁻¹ ⊗ core^F.

^f Band(G): ΔJ=1 band.

γ(¹⁴¹Sm)

E _γ †	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. ‡
(1.58 [#])	(1.6)	3/2 ⁺	0.0?	1/2 ⁺	
58.7	3376.4	(25/2 ⁻)	3317.8	(23/2 ⁻)	(M1)
100.2	2822.8	(23/2 ⁺)	2722.5	(21/2 ⁺)	(M1)
132.5	3508.9	(27/2 ⁻)	3376.4	(25/2 ⁻)	(M1)
154.5	2977.2	(25/2 ⁺)	2822.8	(23/2 ⁺)	(M1)
159.3	2722.5	(21/2 ⁺)	2563.2	(19/2 ⁺)	
174.2 [#]	175.8	11/2 ⁻	1.6?	3/2 ⁺	M4
181.6	2822.8	(23/2 ⁺)	2641.1	(23/2 ⁺)	
203.2	3579.7	(27/2 ⁻)	3376.4	(25/2 ⁻)	(M1)
213.8	3191.0	(27/2 ⁺)	2977.2	(25/2 ⁺)	(M1)
222.5	2641.1	(23/2 ⁺)	2418.7	(23/2 ⁻)	(E1)
228.2	2139.5	(17/2 ⁺)	1911.3	(15/2 ⁺)	
254	5595		5340.9	(35/2 ⁻)	
287	4769	(33/2)	4482	(31/2)	
299.9	5640.9	(37/2 ⁻)	5340.9	(35/2 ⁻)	
300	5941	(39/2 ⁻)	5640.9	(37/2 ⁻)	
309.5	3818.4	(29/2 ⁻)	3508.9	(27/2 ⁻)	(M1)
318	5640.9	(37/2 ⁻)	5323		
328	5097	(35/2)	4769	(33/2)	
336.1	2977.2	(25/2 ⁺)	2641.1	(23/2 ⁺)	
337	5434	(37/2)	5097	(35/2)	
346	5941	(39/2 ⁻)	5595		
348.9	3972.8	(31/2 ⁺)	3624.0	(29/2 ⁺)	
423.7	2563.2	(19/2 ⁺)	2139.5	(17/2 ⁺)	
433.1	3624.0	(29/2 ⁺)	3191.0	(27/2 ⁺)	
446.6	4265.0	(31/2 ⁻)	3818.4	(29/2 ⁻)	(M1)
447	6350	(41/2)	5903	(39/2)	

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$^{116}\text{Cd}(^{29}\text{Si},4n\gamma)$ **1991Ca24,1993La10** (continued) $\gamma(^{141}\text{Sm})$ (continued)

E_γ †	E_i (level)	J_i^π	E_f	J_f^π	Mult. ‡
457	5459	(39/2)	5001.7	(35/2)	
473	6414	(41/2 ⁻)	5941	(39/2 ⁻)	
482	6896	(43/2 ⁻)	6414	(41/2 ⁻)	
487.0	4066.7	(31/2 ⁻)	3579.7	(27/2 ⁻)	(E2)
495	2394.6	(21/2 ⁻)	1899.5	(19/2 ⁻)	
519.2	2418.7	(23/2 ⁻)	1899.5	(19/2 ⁻)	(E2)
527.8	4792.8	(33/2 ⁻)	4265.0	(31/2 ⁻)	(M1)
530	5323		4792.8	(33/2 ⁻)	
548.1	5340.9	(35/2 ⁻)	4792.8	(33/2 ⁻)	
553.6	3376.4	(25/2 ⁻)	2822.8	(23/2 ⁺)	
571	8558	(53/2)	7987	(51/2)	
595.5	3317.8	(23/2 ⁻)	2722.5	(21/2 ⁺)	
602.5	3579.7	(27/2 ⁻)	2977.2	(25/2 ⁺)	
604	4577		3972.8	(31/2 ⁺)	
628.3	2563.2	(19/2 ⁺)	1935.0	(17/2 ⁻)	(E1)
634.8	810.6	(15/2 ⁻)	175.8	11/2 ⁻	(E2)
651.9	2563.2	(19/2 ⁺)	1911.3	(15/2 ⁺)	
652	11238	(63/2)	10586	(61/2)	
663.6	2563.2	(19/2 ⁺)	1899.5	(19/2 ⁻)	
717	5576	(37/2)	4859.2	(35/2 ⁻)	
725	8558	(53/2)	7833	(49/2)	
748	6207	(43/2)	5459	(39/2)	
774	6350	(41/2)	5576	(37/2)	
781.6	3972.8	(31/2 ⁺)	3191.0	(27/2 ⁺)	(E2)
784	7833	(49/2)	7049	(47/2)	
787.8 @	3206.5	(27/2 ⁻)	2418.7	(23/2 ⁻)	
792.5	4859.2	(35/2 ⁻)	4066.7	(31/2 ⁻)	(E2)
823.1	2722.5	(21/2 ⁺)	1899.5	(19/2 ⁻)	
826.0	1911.3	(15/2 ⁺)	1085.3	(13/2 ⁻)	(E1)
842	7049	(47/2)	6207	(43/2)	
858	4482	(31/2)	3624.0	(29/2 ⁺)	
908	8284	(49/2)	7376	(45/2)	
909.6	1085.3	(13/2 ⁻)	175.8	11/2 ⁻	(M1)
914	4886.8		3972.8	(31/2 ⁺)	
919	9477	(57/2)	8558	(53/2)	
923	3317.8	(23/2 ⁻)	2394.6	(21/2 ⁻)	
935	5001.7	(35/2)	4066.7	(31/2 ⁻)	
938	7987	(51/2)	7049	(47/2)	
1026	7376	(45/2)	6350	(41/2)	
1044	5903	(39/2)	4859.2	(35/2 ⁻)	
1088.8	1899.5	(19/2 ⁻)	810.6	(15/2 ⁻)	(E2)
1109	10586	(61/2)	9477	(57/2)	
1124.5	1935.0	(17/2 ⁻)	810.6	(15/2 ⁻)	
1205	8348	(47/2)	7143	(43/2)	
1233	5206		3972.8	(31/2 ⁺)	
1240	7143	(43/2)	5903	(39/2)	
1329.0	2139.5	(17/2 ⁺)	810.6	(15/2 ⁻)	
1418.3	3317.8	(23/2 ⁻)	1899.5	(19/2 ⁻)	

† From **1993La10** when quoted to nearest tenth of a keV, others are from **1991Ca24**.

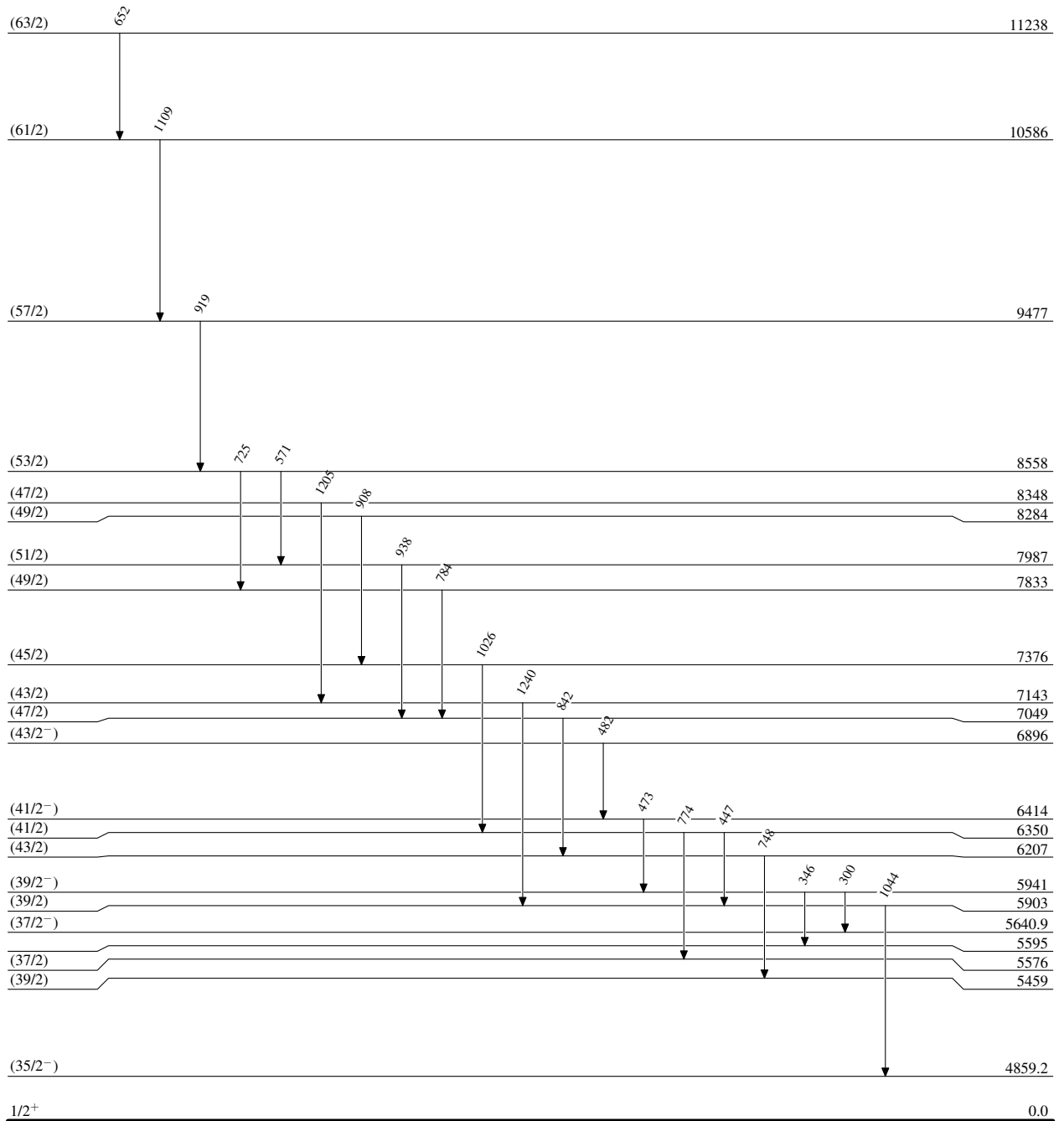
‡ From **1993La10** based on ce measurements and **1991Ca24** based on angular distributions and DCO-ratio measurements. With no given evidence mult values are tentative (E2 admixture not excluded from M1).

From adopted gammas.

@ From **1993La10** only.

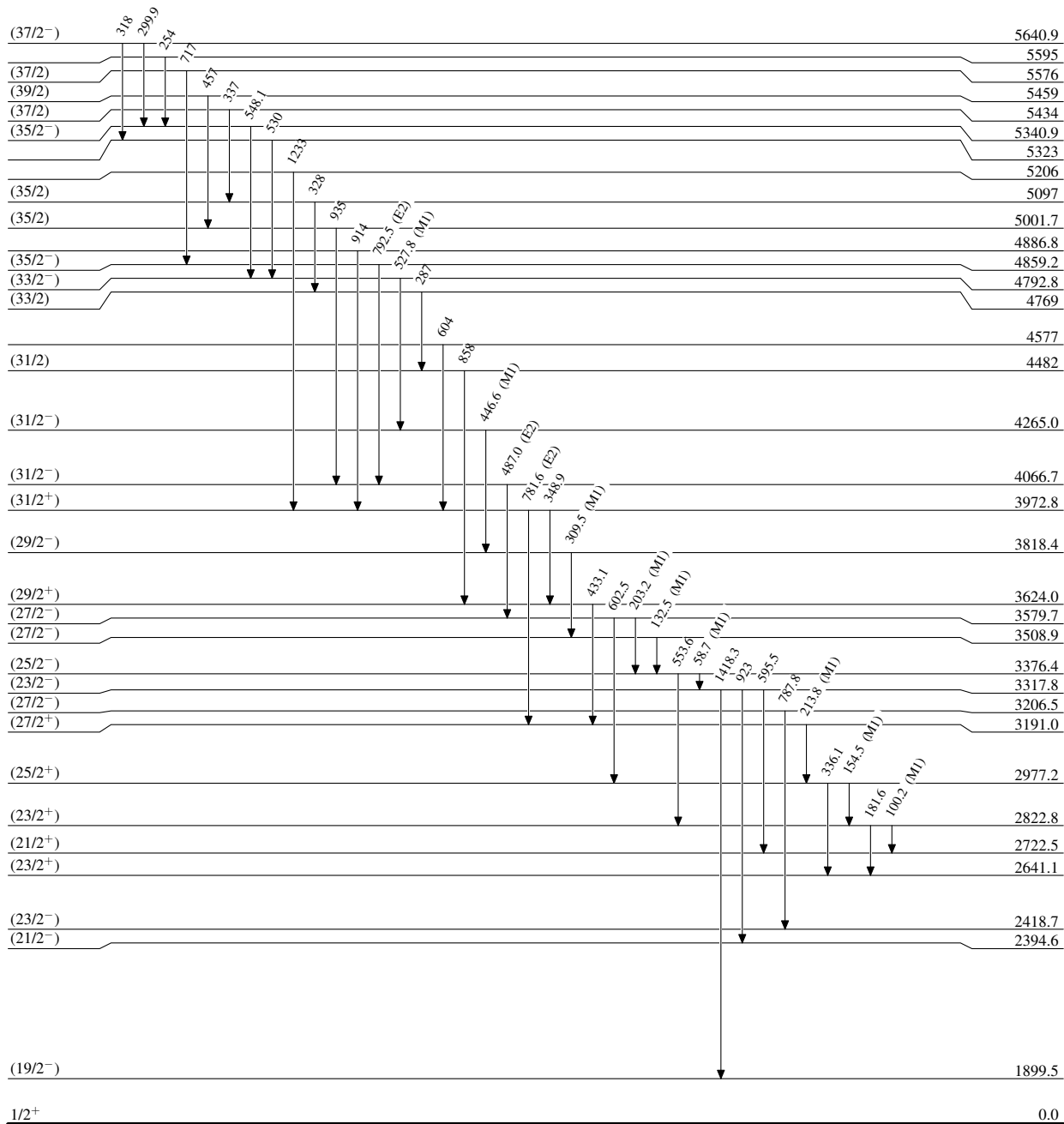
$^{116}\text{Cd}(^{29}\text{Si},4n\gamma)$ 1991Ca24,1993La10

Level Scheme

 $^{141}_{62}\text{Sm}_{79}$

$^{116}\text{Cd}(^{29}\text{Si},4n\gamma)$ 1991Ca24,1993La10

Level Scheme (continued)

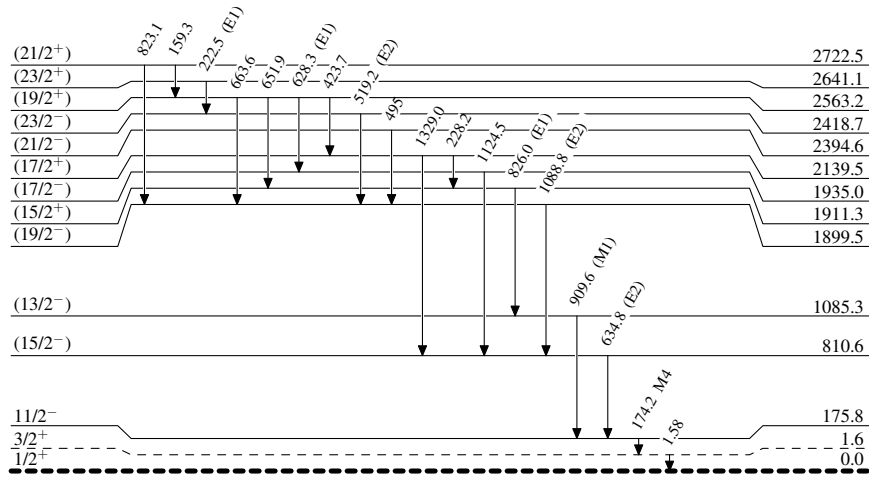


$^{116}\text{Cd}(^{29}\text{Si},4n\gamma)$ 1991Ca24,1993La10

Legend

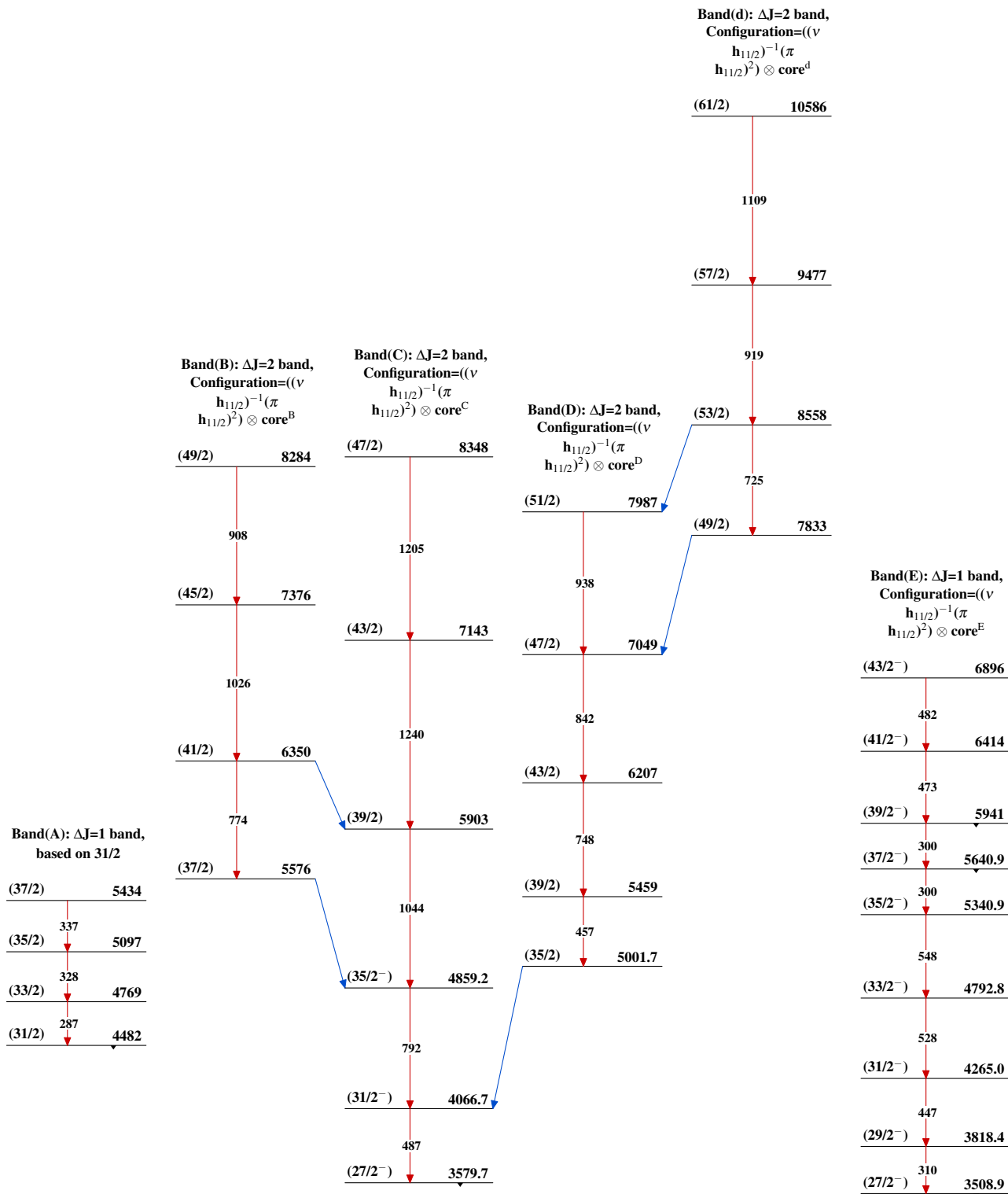
Level Scheme (continued)

-----> γ Decay (Uncertain)

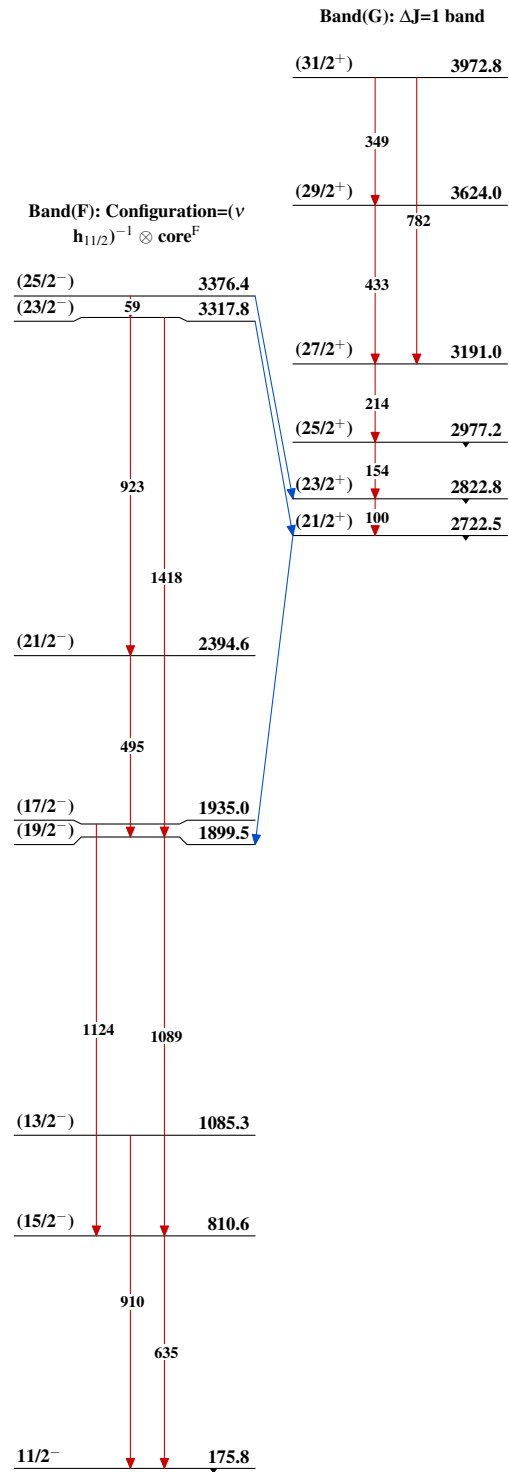


$^{141}_{62}\text{Sm}_{79}$

$^{116}\text{Cd}(^{29}\text{Si},4n\gamma)$ 1991Ca24,1993La10



$^{116}\text{Cd}(^{29}\text{Si},4n\gamma)$ 1991Ca24,1993La10 (continued)



$^{141}_{62}\text{Sm}_{79}$