^{80}Se(^{48}Ca,5nγ):SD 2021Ba03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174,1 (2021)	15-Apr-2021

This datasets contains data for super-deformed (SD) bands from the measurement of ^{80}Se(^{48}Ca,5nγ). See 2020Ba12 for data of normal-deformed bands from the same measurement.

2021Ba03: E=207 MeV ^{48}Ca beam was produced from the ATLAS accelerator at ANL. Target was 0.6 mg/cm^2 ^{80}Se on a 0.3 mg/cm^2 Au backing. γ rays were detected with the Gammasphere array of 101 Compton-suppressed Ge detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma\gamma$-coin, γ angular intensity ratios. Deduced levels, J, π, band structures, γ-ray multipolarities. Comparisons with Cranked Nilsson-Strutinsky (CNS) calculations.

The four highly-deformed bands are found to feed the normal-deformed (ND) levels of ^{123}Xe observed in 2020Ba12.

^{123}Xe Levels

E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
z+4640[f]	(37/2$^+$)	y+12242[d]	(61/2$^-$)	z+17901[e]	(77/2$^+$)	z+25263[e]	(93/2$^+$)
z+5576[f]	(41/2$^+$)	w+12393[@]	(61/2$^-$)	w+18014[#]	(77/2$^-$)	y+25443[c]	(93/2$^-$)
z+6655[f]	(45/2$^+$)	w+12400[#]	(61/2$^-$)	y+18207[c]	(77/2$^-$)	x+26702[b]	(95/2$^-$)
z+7873[f]	(49/2$^+$)	x+13300[b]	(63/2$^-$)	x+19315[b]	(79/2$^-$)	w+27008[#]	(97/2$^-$)
z+9224[f]	(53/2$^+$)	z+13354[e]	(65/2$^+$)	z+19610[e]	(81/2$^+$)	z+27276[e]	(97/2$^+$)
y+9346[d]	(53/2$^-$)	w+13687[#]	(65/2$^-$)	w+19617[#]	(81/2$^-$)	y+27506[c]	(97/2$^-$)
z+9387	(53/2$^+$)	y+13700[c]	(65/2$^-$)	y+19869[c]	(81/2$^-$)	w+29105[#]	(101/2$^-$)
w+9999[&]	(53/2$^-$)	y+13750	(65/2$^-$)	x+21077[b]	(83/2$^-$)	z+29341[e]	(101/2$^+$)
z+10646	(57/2$^+$)	x+14649[b]	(67/2$^-$)	w+21313[#]	(85/2$^-$)	y+29665[c]	(101/2$^-$)
z+10657[f]	(57/2$^+$)	z+14772[e]	(69/2$^+$)	z+21413[e]	(85/2$^+$)	w+31159[a]	(105/2$^-$)
z+10706	(57/2$^+$)	w+15054[#]	(69/2$^-$)	y+21627[c]	(85/2$^-$)	w+31327[#]	(105/2$^-$)
y+10718[d]	(57/2$^-$)	y+15140[c]	(69/2$^-$)	x+22907[b]	(87/2$^-$)	z+31493[e]	(105/2$^+$)
z+10811	(57/2$^+$)	x+16099[b]	(71/2$^-$)	w+23108[#]	(89/2$^-$)	y+31922[c]	(105/2$^-$)
w+11027[@]	(57/2$^-$)	z+16289[e]	(73/2$^+$)	z+23299[e]	(89/2$^+$)	w+33278[a]	(109/2$^-$)
w+11114	(57/2$^-$)	w+16496[#]	(73/2$^-$)	y+23485[c]	(89/2$^-$)	w+33631[#]	(109/2$^-$)
w+11192[&]	(57/2$^-$)	y+16633[c]	(73/2$^-$)	x+24761[b]	(91/2$^-$)	z+33683[e]	(109/2$^+$)
z+12000[e]	(61/2$^+$)	x+17655[b]	(75/2$^-$)	w+25006[#]	(93/2$^-$)		

† From 2021Ba03. x, y, z and w in E(level) are unknown excitations (2021Ba03).
‡ From 2021Ba03, based on measured γ angular intensity ratios and band assignments.
[#] Band(A): Band L1 based on (65/2$^-$).
[@] Band(B): Band L1a based on (57/2$^-$).
[&] Band(C): Band L1b based on (52/2$^-$).
[a] Band(D): Band L1c based on (105/2$^-$).
[b] Band(E): Band L2 based on (63/2$^-$).
[c] Band(F): Band L3 based on (65/2$^-$).
[d] Band(G): Band L3a based on (53/2$^-$).
[e] Band(H): Band L4 based on (61/2$^+$).
[f] Band(I): Band L4a based on (37/2$^+$).

^{80}Se(^{48}Ca,5nγ):SD 2021Ba03 (continued)

$\gamma(^{123}Xe)$

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
936[#] *1*	z+5576	(41/2$^+$)	z+4640	(37/2$^+$)		
1079[#] *1*	z+6655	(45/2$^+$)	z+5576	(41/2$^+$)		
1189 *1*	z+12000	(61/2$^+$)	z+10811	(57/2$^+$)		
1193 *1*	w+11192	(57/2$^-$)	w+9999	(53/2$^-$)		
1208 *1*	w+12400	(61/2$^-$)	w+11192	(57/2$^-$)		
1218 *1*	z+7873	(49/2$^+$)	z+6655	(45/2$^+$)	Q	1.45 *16.*
1270 *1*	z+10657	(57/2$^+$)	z+9387	(53/2$^+$)		
1286 *1*	w+12400	(61/2$^-$)	w+11114	(57/2$^-$)		
1287.1 *6*	w+13687	(65/2$^-$)	w+12400	(61/2$^-$)	Q	1.66 *17.*
1294 *1*	z+12000	(61/2$^+$)	z+10706	(57/2$^+$)		
1294 *1*	w+13687	(65/2$^-$)	w+12393	(61/2$^-$)		
1343 *1*	z+12000	(61/2$^+$)	z+10657	(57/2$^+$)		
1349 *1*	x+14649	(67/2$^-$)	x+13300	(63/2$^-$)		
1351 *1*	z+9224	(53/2$^+$)	z+7873	(49/2$^+$)		
1354 *1*	z+12000	(61/2$^+$)	z+10646	(57/2$^+$)		
1354 *1*	z+13354	(65/2$^+$)	z+12000	(61/2$^+$)		
1366 *1*	w+12393	(61/2$^-$)	w+11027	(57/2$^-$)		
1367 *1*	w+15054	(69/2$^-$)	w+13687	(65/2$^-$)	Q	1.36 *14.*
1372 *1*	y+10718	(57/2$^-$)	y+9346	(53/2$^-$)		
1390 *1*	y+15140	(69/2$^-$)	y+13750	(65/2$^-$)		
1418 *1*	z+14772	(69/2$^+$)	z+13354	(65/2$^+$)	Q	1.70 *20.*
1433 *1*	z+10657	(57/2$^+$)	z+9224	(53/2$^+$)		
1440 *1*	y+15140	(69/2$^-$)	y+13700	(65/2$^-$)		
1441.5 *6*	w+16496	(73/2$^-$)	w+15054	(69/2$^-$)	Q	1.45 *16.*
1450 *2*	x+16099	(71/2$^-$)	x+14649	(67/2$^-$)		
1458 *1*	y+13700	(65/2$^-$)	y+12242	(61/2$^-$)		
1483 *1*	z+10706	(57/2$^+$)	z+9224	(53/2$^+$)		
1493 *1*	y+16633	(73/2$^-$)	y+15140	(69/2$^-$)		
1517 *1*	z+16289	(73/2$^+$)	z+14772	(69/2$^+$)		
1518.4 *6*	w+18014	(77/2$^-$)	w+16496	(73/2$^-$)	Q	1.52 *17.*
1524 *1*	y+12242	(61/2$^-$)	y+10718	(57/2$^-$)		
1556 *2*	x+17655	(75/2$^-$)	x+16099	(71/2$^-$)		
1574 *1*	y+18207	(77/2$^-$)	y+16633	(73/2$^-$)		
1603.0 *8*	w+19617	(81/2$^-$)	w+18014	(77/2$^-$)	Q	1.40 *17.*
1612 *1*	z+17901	(77/2$^+$)	z+16289	(73/2$^+$)		
1660 *2*	x+19315	(79/2$^-$)	x+17655	(75/2$^-$)		
1662 *1*	y+19869	(81/2$^-$)	y+18207	(77/2$^-$)		
1696 *1*	w+21313	(85/2$^-$)	w+19617	(81/2$^-$)	Q	1.42 *18.*
1709 *1*	z+19610	(81/2$^+$)	z+17901	(77/2$^+$)		
1758 *1*	y+21627	(85/2$^-$)	y+19869	(81/2$^-$)		
1762 *2*	x+21077	(83/2$^-$)	x+19315	(79/2$^-$)		
1795 *1*	w+23108	(89/2$^-$)	w+21313	(85/2$^-$)		
1803 *1*	z+21413	(85/2$^+$)	z+19610	(81/2$^+$)		
1830 *3*	x+22907	(87/2$^-$)	x+21077	(83/2$^-$)		
1854 *3*	x+24761	(91/2$^-$)	x+22907	(87/2$^-$)		
1858 *1*	y+23485	(89/2$^-$)	y+21627	(85/2$^-$)		
1886 *1*	z+23299	(89/2$^+$)	z+21413	(85/2$^+$)		
1898 *1*	w+25006	(93/2$^-$)	w+23108	(89/2$^-$)		
1941 *3*	x+26702	(95/2$^-$)	x+24761	(91/2$^-$)		
1958 *2*	y+25443	(93/2$^-$)	y+23485	(89/2$^-$)		
1964 *2*	z+25263	(93/2$^+$)	z+23299	(89/2$^+$)		
2002 *1*	w+27008	(97/2$^-$)	w+25006	(93/2$^-$)		
2013 *3*	z+27276	(97/2$^+$)	z+25263	(93/2$^+$)		
2054 *2*	w+31159	(105/2$^-$)	w+29105	(101/2$^-$)		
2063 *2*	y+27506	(97/2$^-$)	y+25443	(93/2$^-$)		

Continued on next page (footnotes at end of table)

^{80}Se(^{48}Ca,5nγ):SD 2021Ba03 (continued)

$\gamma(^{123}Xe)$ (continued)

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π
2065 *2*	z+29341	$(101/2^+)$	z+27276	$(97/2^+)$	2190 *3*	z+33683	$(109/2^+)$	z+31493	$(105/2^+)$
2097 *2*	w+29105	$(101/2^-)$	w+27008	$(97/2^-)$	2222 *2*	w+31327	$(105/2^-)$	w+29105	$(101/2^-)$
2119 *3*	w+33278	$(109/2^-)$	w+31159	$(105/2^-)$	2257 *3*	y+31922	$(105/2^-)$	y+29665	$(101/2^-)$
2152 *2*	z+31493	$(105/2^+)$	z+29341	$(101/2^+)$	2304 *3*	w+33631	$(109/2^-)$	w+31327	$(105/2^-)$
2159 *2*	y+29665	$(101/2^-)$	y+27506	$(97/2^-)$					

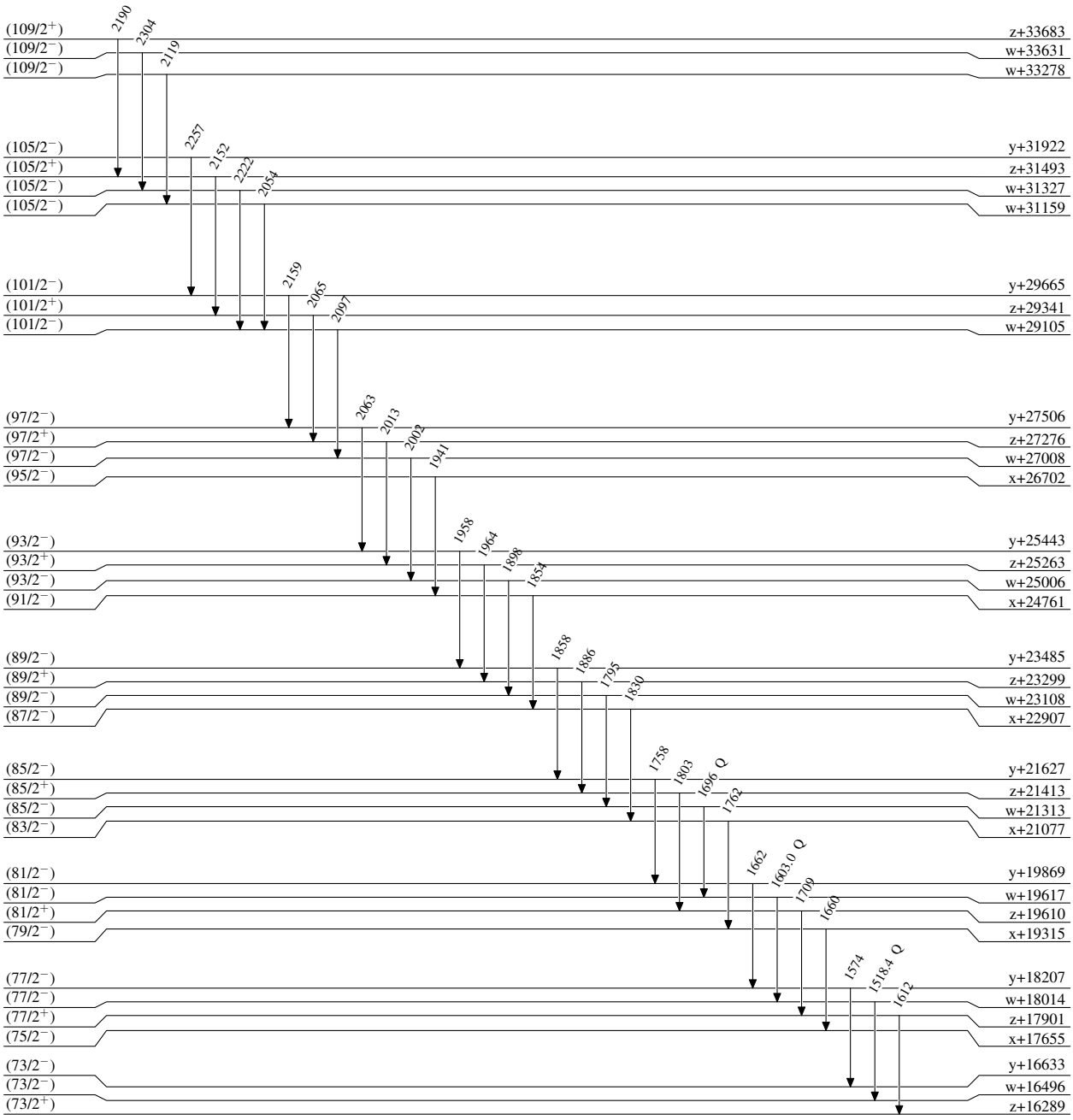
† From 2021Ba03.

‡ From 2021Ba03 based on measured γ angular intensity ratios R_θ given under comments. Expected R_θ values are ≈0.6 and 1.4 for stretched dipole and stretched quadrupole transitions, respectively. Original assignments are given by 2020Ba12 as M1+E2, E1 and E2 with definite electric or magnetic natures, but have been replaced by the evaluator with D+Q, D and Q, respectively, due to lack of experimental evidence from this work for the electric or magnetic natures.

Placement of transition in the level scheme is uncertain.

^{80}Se(^{48}Ca,5nγ):SD 2021Ba03

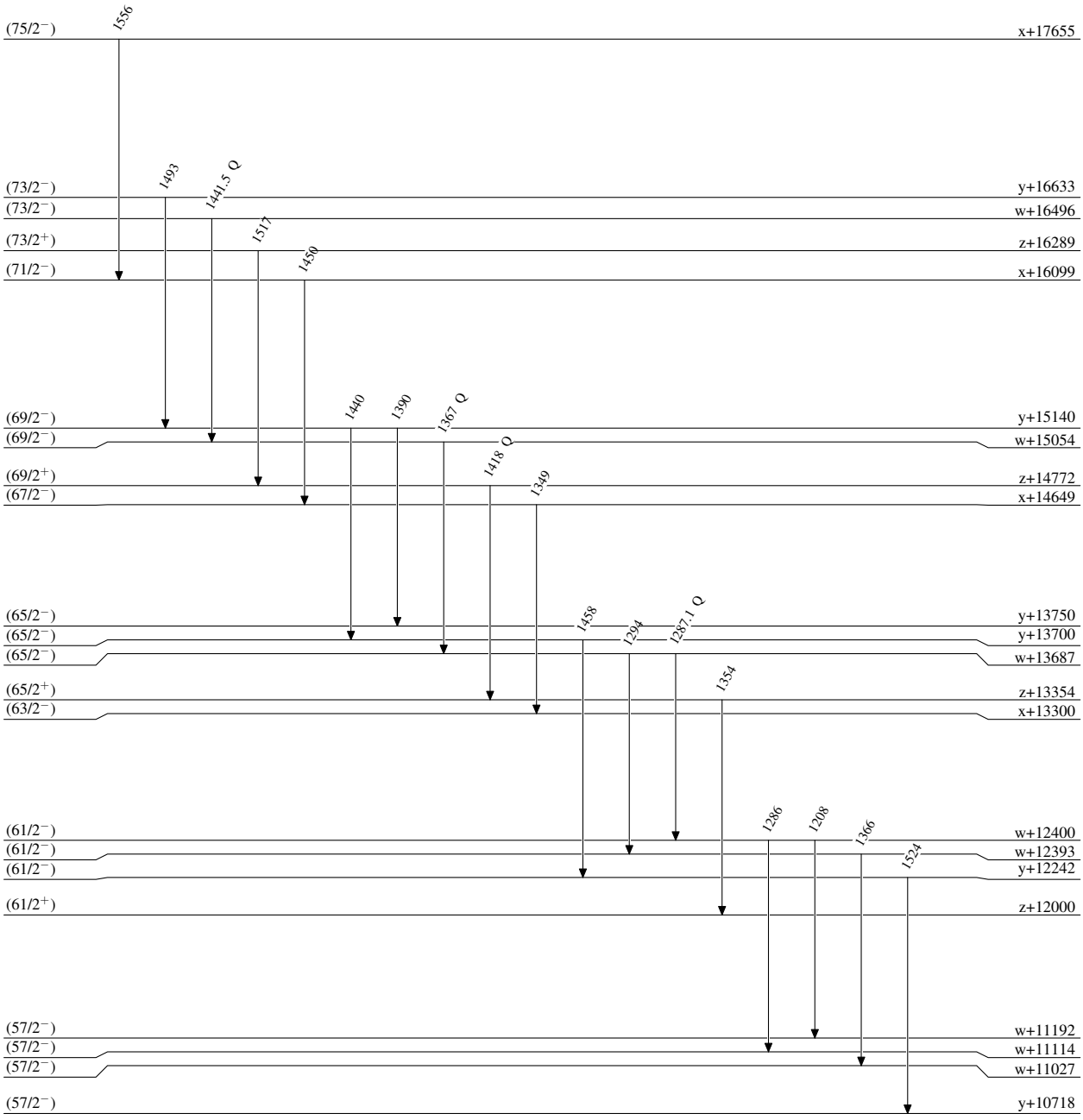
Level Scheme



$^{123}_{54}Xe_{69}$

^{80}Se(^{48}Ca,5nγ):SD 2021Ba03

Level Scheme (continued)



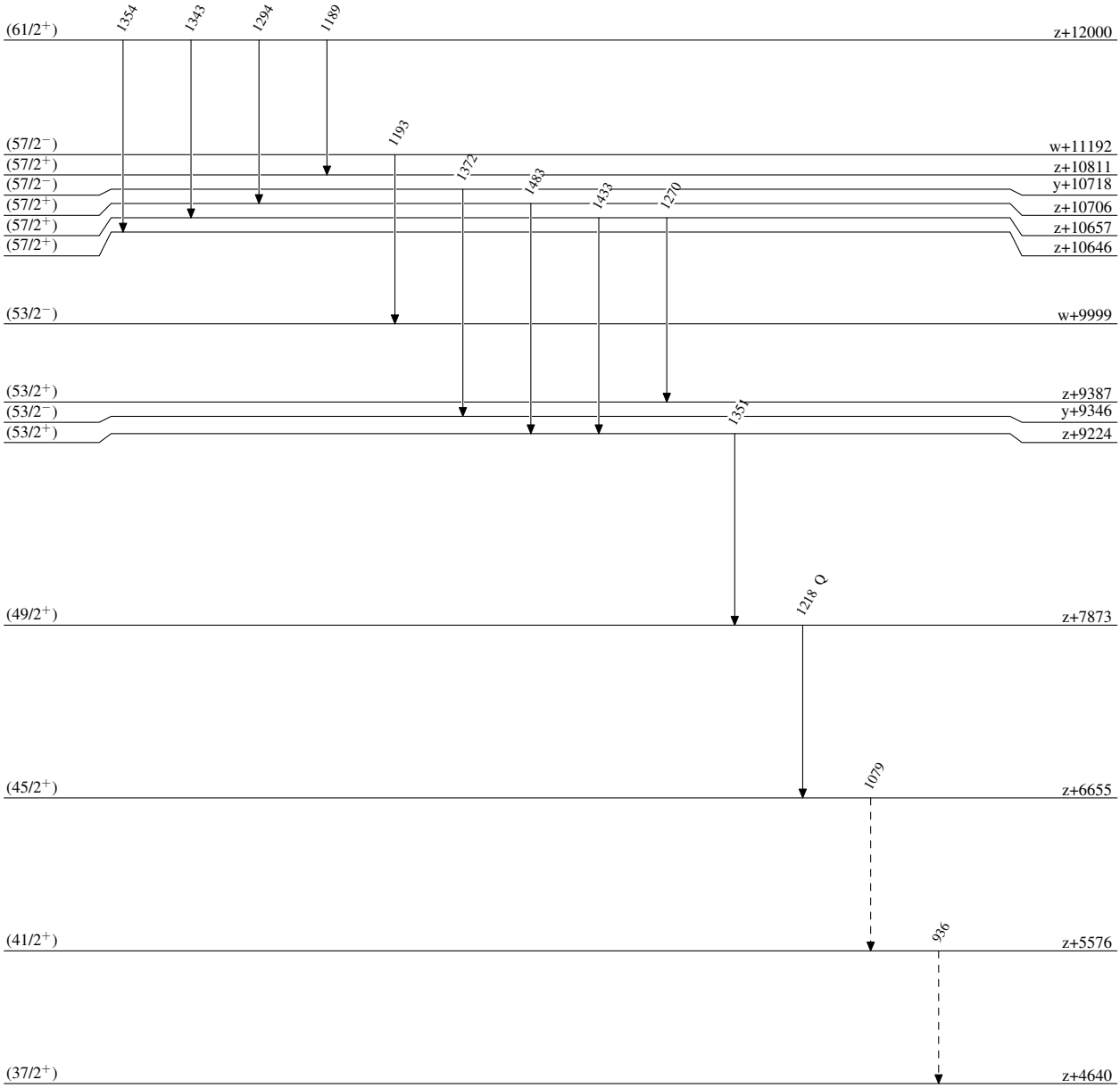
$^{123}_{54}Xe_{69}$

Legend

^{80}Se(^{48}Ca,5nγ):SD 2021Ba03

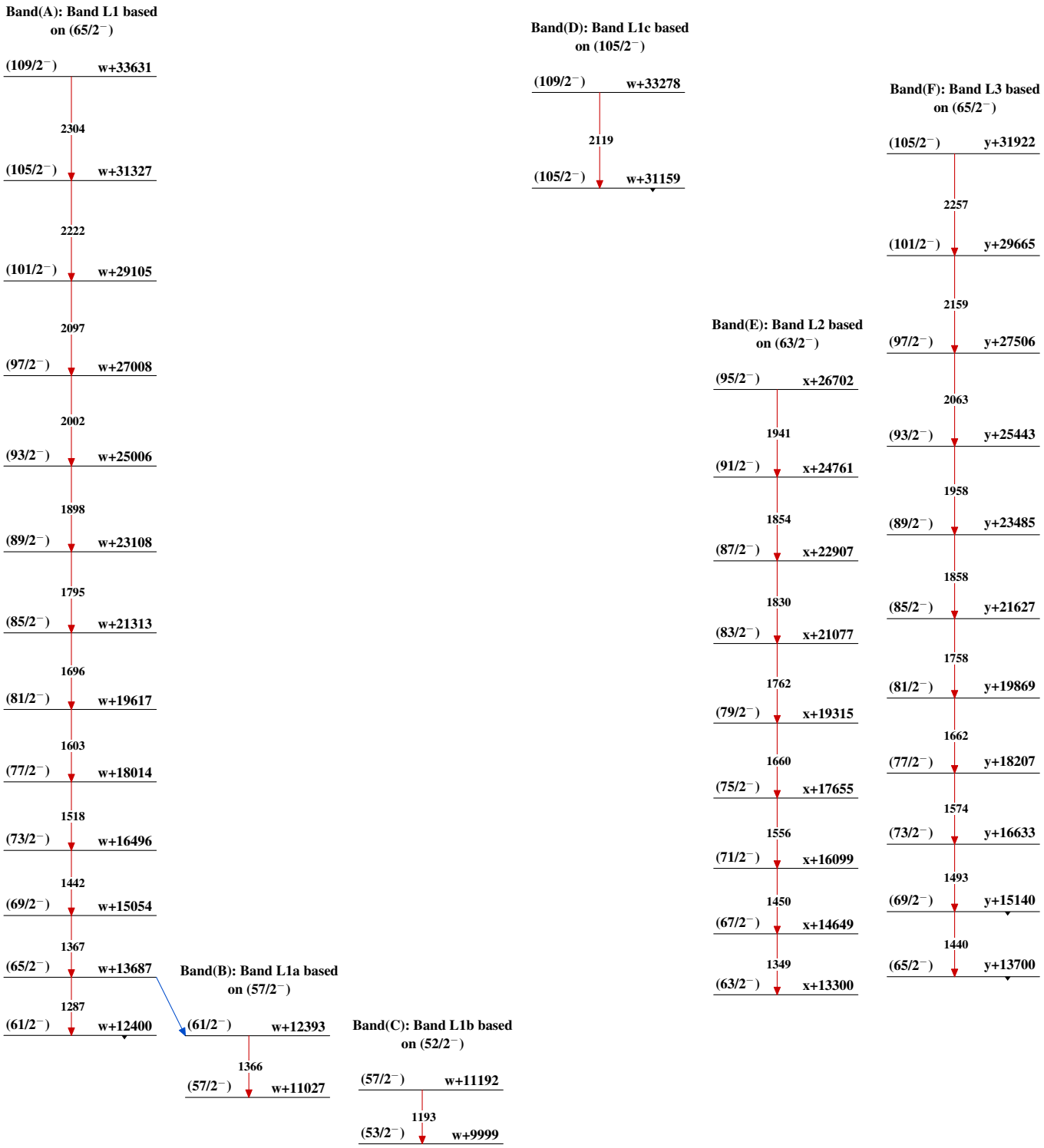
Level Scheme (continued)

γ Decay (Uncertain)



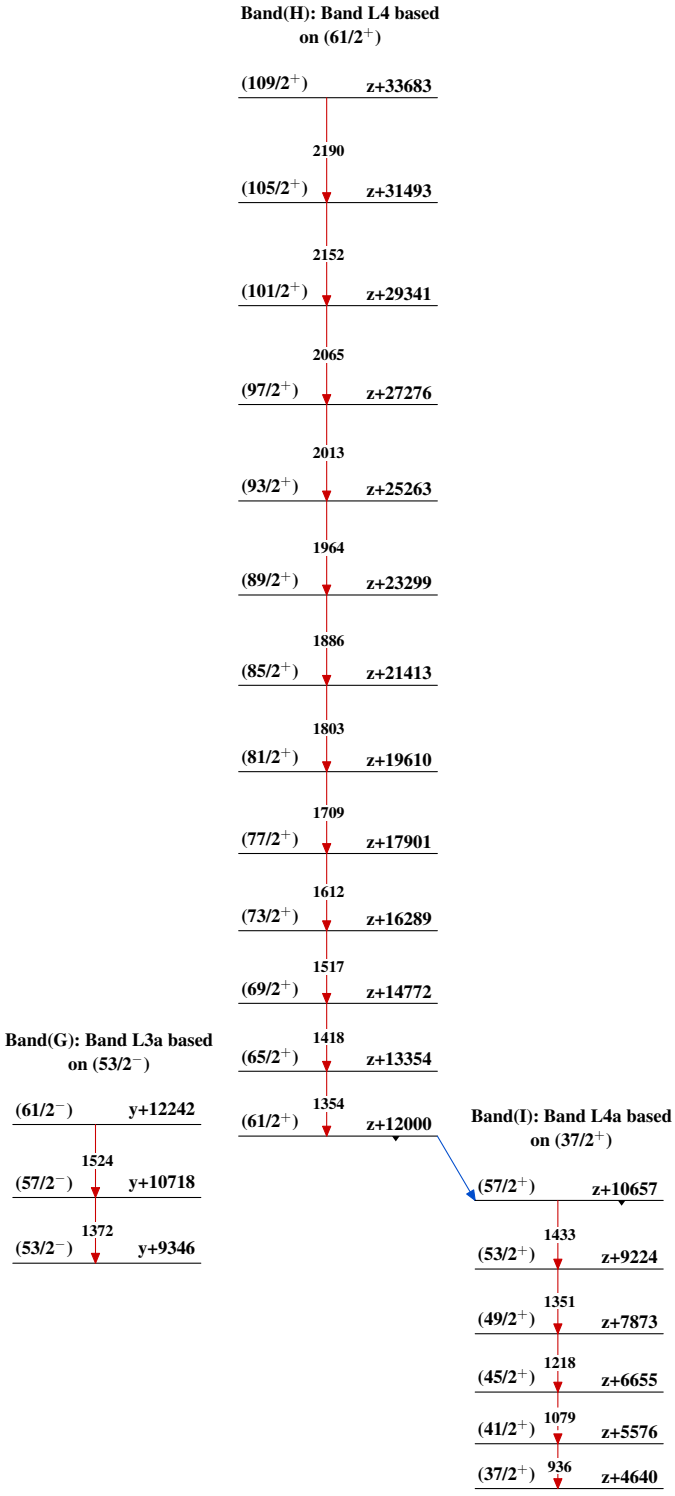
$^{123}_{54}Xe_{69}$

^{80}Se(^{48}Ca,5nγ):SD 2021Ba03



$^{123}_{54}Xe_{69}$

^{80}Se(^{48}Ca,5nγ):SD 2021Ba03 (continued)



$^{123}_{54}Xe_{69}$