

$^{152}\text{Sm}(^{19}\text{F},5n\gamma)$ **2000Zh51**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 1103 (2008)	1-Mar-2008

E=97 MeV; array of ten HPGE detectors, each equipped with a BGO Compton-suppression shield; measured $E\gamma, \gamma\gamma$ coin, unenumerated DCO ratios ($\theta=38^\circ, 90^\circ, 144^\circ$, for some transitions).

 ^{166}Lu Levels

E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]
0.0+x ^{@l}	(7) ⁺	428.3+u ^d	11 ⁻	1319.6+x [#]	14 ⁺	2737.7+u ^c	20 ⁻
0.0+y ^{&k}	(8) ⁻	470.4+v ^f	11 ⁺	1474.9+u ^c	16 ⁻	2873.6+x [@]	19 ⁺
0.0+z ^{bj}	(6) ⁺	548.8+u ^c	12 ⁻	1486.0+v ^f	15 ⁺	2877.9+y ^a	21 ⁻
0.0+u ^{ci}	(8) ⁻	578.1+y ^a	13 ⁻	1564.9+y ^a	17 ⁻	3015.9+u ^d	21 ⁻
0.0+v ^e	(8) ⁺	595.4+x [@]	11 ⁺	1606.4+x [@]	15 ⁺	3085.6+z ^b	20 ⁺
53.8+y ^a	9 ⁻	690.4+v ^e	12 ⁺	1752.4+u ^d	17 ⁻	3204.9+y ^{&}	22 ⁻
100.2+x [#]	8 ⁺	764.1+z ^b	12 ⁺	1785.7+v ^e	16 ⁺	3234.4+x [#]	20 ⁺
130.3+v ^f	9 ⁺	787.5+u ^d	13 ⁻	1792.2+z ^b	16 ⁺	3458.2+u ^c	22 ⁻
138.4+y ^{&}	10 ⁻	793.1+y ^{&}	14 ⁻	1859.4+y ^{&}	18 ⁻	3576.6+x ^{?@}	21 ⁺
139.3+z ^b	8 ⁺	813.1+x [#]	12 ⁺	1902.7+x [#]	16 ⁺	3744.4+u ^d	23 ⁻
147.6+u ^d	9 ⁻	928.6+v ^f	13 ⁺	2070.1+u ^c	18 ⁻	3774.6+z ^b	22 ⁺
229.7+u ^c	10 ⁻	964.7+u ^c	14 ⁻	2114.0+v ^f	17 ⁺	3923.7+y ^{?&}	24 ^{-h}
235.0+x [@]	9 ⁺	1022.0+y ^a	15 ⁻	2189.6+y ^a	19 ⁻	3953.4+x ^{?#}	22 ^{+g}
250.0+y ^a	11 ⁻	1058.4+x [@]	13 ⁺	2222.2+x [@]	17 ⁺	4230.7+u ^c	24 ⁻
286.7+v ^e	10 ⁺	1197.8+v ^e	14 ⁺	2350.2+u ^d	19 ⁻	4323.6+x ^{?@}	23 ⁺
394.7+z ^b	10 ⁺	1230.0+u ^d	15 ⁻	2415.6+z ^b	18 ⁺		
400.4+x [#]	10 ⁺	1235.1+z ^b	14 ⁺	2506.6+y ^{&}	20 ⁻		
405.2+y ^{&}	12 ⁻	1283.3+y ^{&}	16 ⁻	2544.7+x [#]	18 ⁺		

[†] From least-squares fit to $E\gamma$, assigning equal weight to all $E\gamma$ data.

[‡] Authors' values.

[#] Band(A): $K^\pi=6^+, \alpha=0$ (π 7/2[404])+(ν 5/2[642]) band. J values are based on level energy systematics for similar bands in neighboring odd-odd nuclei and checked by the alignment additivity rule; they are one unit higher than suggested in independent ($^{12}\text{C},5n\gamma$) (1992Ho02) and ($^{30}\text{Si},3n\gamma$) (2000Le25) studies.

[@] Band(a): $K^\pi=6^+, \alpha=1$ (π 7/2[404])+(ν 5/2[642]) band. See comment on signature partner band.

[&] Band(B): $K^\pi=7^-, \alpha=0$ (π 9/2[514])+(ν 5/2[642]) band.

^a Band(b): $K^\pi=7^-, \alpha=1$ (π 9/2[514])+(ν 5/2[642]) band.

^b Band(C): $K^\pi=2^+, \alpha=0$ (π 1/2[411])-(ν 5/2[642]) band. Assigned As $\pi=^-, \alpha=1$ (π 1/2[541])-(ν 5/2[642]) band (with J values one unit higher than here) in two independent (HI,xn γ) studies (1992Ho02 and 2000Le25). present assignment supported by similarity of level structure to that for $\alpha=0$ band in ^{162}Tm with same configuration assignment.

^c Band(D): $K^\pi=2^-, \alpha=0$ (π 1/2[541])-(ν 5/2[642]) band. Configuration assignment supported by similarity of band structure to that for bands in ^{162}Tm and ^{164}Tm with the same configuration assignment (large signature splitting, low-spin signature inversion, delayed BC crossing and small B(M1) to B(E2) in-band cascade to crossover transition probability ratios) (2000Zh51).

^d Band(d): $K^\pi=2^-, \alpha=1$ (π 1/2[541])-(ν 5/2[642]) band. See comment on signature partner of this band. $\alpha=1$ sequence is reported in this reaction alone.

^e Band(E): $K^\pi=5^+, \alpha=0$ (π 5/2[402])+(ν 5/2[642]) band. Configuration assignment supported by similarity of band structure to that for a ^{162}Tm band with the same configuration assignment. Very weakly populated, strongly coupled band reported in this reaction alone.

^f Band(e): $K^\pi=5^+, \alpha=1$ (π 5/2[402])+(ν 5/2[642]) band. See comment on signature partner of this band.

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$^{152}\text{Sm}(^{19}\text{F}, 5\text{n}\gamma)$ **2000Zh51 (continued)** ^{166}Lu Levels (continued)^g Not adopted; tentative deexciting 719 γ differs from adopted 736.2 γ deexciting the J=22 band member.^h Not adopted; tentative deexciting 718.8 γ differs from adopted 749.1 γ deexciting the J=24 band member.ⁱ From Adopted Levels, u=358.2.^j From Adopted Levels, z=196.0.^k From Adopted Levels, Y=287.2.^l From Adopted Levels, x=189.8. $\gamma(^{166}\text{Lu})$

E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π
53.6	53.8+y	9 ⁻	0.0+y	(8 ⁻)	319.2	548.8+u	12 ⁻	229.7+u	10 ⁻
84.7	138.4+y	10 ⁻	53.8+y	9 ⁻	327.1	3204.9+y	22 ⁻	2877.9+y	21 ⁻
100.1	100.2+x	8 ⁺	0.0+x	(7) ⁺	328.0	578.1+y	13 ⁻	250.0+y	11 ⁻
111.7	250.0+y	11 ⁻	138.4+y	10 ⁻	328.0 [#]	2114.0+v	17 ⁺	1785.7+v	16 ⁺
130.3 [#]	130.3+v	9 ⁺	0.0+v?	(8 ⁺)	330.1	2189.6+y	19 ⁻	1859.4+y	18 ⁻
134.8	235.0+x	9 ⁺	100.2+x	8 ⁺	339.8	470.4+v	11 ⁺	130.3+v	9 ⁺
138.5	138.4+y	10 ⁻	0.0+y	(8 ⁻)	359.1	787.5+u	13 ⁻	428.3+u	11 ⁻
139.3	139.3+z	8 ⁺	0.0+z	(6 ⁺)	360.5	595.4+x	11 ⁺	235.0+x	9 ⁺
148.0 [#]	147.6+u	9 ⁻	0.0+u	(8) ⁻	369.4	764.1+z	12 ⁺	394.7+z	10 ⁺
154.7	405.2+y	12 ⁻	250.0+y	11 ⁻	371.4	2877.9+y	21 ⁻	2506.6+y	20 ⁻
156.3	286.7+v	10 ⁺	130.3+v	9 ⁺	388.0	793.1+y	14 ⁻	405.2+y	12 ⁻
165.3	400.4+x	10 ⁺	235.0+x	9 ⁺	403.8	690.4+v	12 ⁺	286.7+v	10 ⁺
172.8	578.1+y	13 ⁻	405.2+y	12 ⁻	412.7	813.1+x	12 ⁺	400.4+x	10 ⁺
183.2	470.4+v	11 ⁺	286.7+v	10 ⁺	416.1	964.7+u	14 ⁻	548.8+u	12 ⁻
194.8	595.4+x	11 ⁺	400.4+x	10 ⁺	442.4	1230.0+u	15 ⁻	787.5+u	13 ⁻
196.4	250.0+y	11 ⁻	53.8+y	9 ⁻	444.0	1022.0+y	15 ⁻	578.1+y	13 ⁻
198.2	428.3+u	11 ⁻	229.7+u	10 ⁻	458.6	928.6+v	13 ⁺	470.4+v	11 ⁺
214.7	793.1+y	14 ⁻	578.1+y	13 ⁻	463.0	1058.4+x	13 ⁺	595.4+x	11 ⁺
217.6	813.1+x	12 ⁺	595.4+x	11 ⁺	471.0	1235.1+z	14 ⁺	764.1+z	12 ⁺
220.2	690.4+v	12 ⁺	470.4+v	11 ⁺	490.1	1283.3+y	16 ⁻	793.1+y	14 ⁻
228.8	1022.0+y	15 ⁻	793.1+y	14 ⁻	506.6	1319.6+x	14 ⁺	813.1+x	12 ⁺
229.3	229.7+u	10 ⁻	0.0+u	(8) ⁻	507.6	1197.8+v	14 ⁺	690.4+v	12 ⁺
235.1	235.0+x	9 ⁺	0.0+x	(7) ⁺	510.2	1474.9+u	16 ⁻	964.7+u	14 ⁻
238.1	928.6+v	13 ⁺	690.4+v	12 ⁺	522.4	1752.4+u	17 ⁻	1230.0+u	15 ⁻
238.6	787.5+u	13 ⁻	548.8+u	12 ⁻	543.0	1564.9+y	17 ⁻	1022.0+y	15 ⁻
245.2	1058.4+x	13 ⁺	813.1+x	12 ⁺	548.1	1606.4+x	15 ⁺	1058.4+x	13 ⁺
255.4	394.7+z	10 ⁺	139.3+z	8 ⁺	557.1	1792.2+z	16 ⁺	1235.1+z	14 ⁺
261.1	1319.6+x	14 ⁺	1058.4+x	13 ⁺	557.4	1486.0+v	15 ⁺	928.6+v	13 ⁺
261.3	1283.3+y	16 ⁻	1022.0+y	15 ⁻	576.0	1859.4+y	18 ⁻	1283.3+y	16 ⁻
265.4	1230.0+u	15 ⁻	964.7+u	14 ⁻	583.2	1902.7+x	16 ⁺	1319.6+x	14 ⁺
267.0	405.2+y	12 ⁻	138.4+y	10 ⁻	588.1	1785.7+v	16 ⁺	1197.8+v	14 ⁺
269.1	1197.8+v	14 ⁺	928.6+v	13 ⁺	595.2	2070.1+u	18 ⁻	1474.9+u	16 ⁻
277.5	1752.4+u	17 ⁻	1474.9+u	16 ⁻	597.7	2350.2+u	19 ⁻	1752.4+u	17 ⁻
280.1	2350.2+u	19 ⁻	2070.1+u	18 ⁻	615.8	2222.2+x	17 ⁺	1606.4+x	15 ⁺
281.0	428.3+u	11 ⁻	147.6+u	9 ⁻	623.4	2415.6+z	18 ⁺	1792.2+z	16 ⁺
281.4	1564.9+y	17 ⁻	1283.3+y	16 ⁻	625.0	2189.6+y	19 ⁻	1564.9+y	17 ⁻
286.7	1606.4+x	15 ⁺	1319.6+x	14 ⁺	628.0	2114.0+v	17 ⁺	1486.0+v	15 ⁺
287.0 [#]	286.7+v	10 ⁺	0.0+v?	(8 ⁺)	642.0	2544.7+x	18 ⁺	1902.7+x	16 ⁺
288.0	1486.0+v	15 ⁺	1197.8+v	14 ⁺	647.1	2506.6+y	20 ⁻	1859.4+y	18 ⁻
294.5	1859.4+y	18 ⁻	1564.9+y	17 ⁻	651.4	2873.6+x	19 ⁺	2222.2+x	17 ⁺
296.2	1902.7+x	16 ⁺	1606.4+x	15 ⁺	665.7	3015.9+u	21 ⁻	2350.2+u	19 ⁻
299.5	1785.7+v	16 ⁺	1486.0+v	15 ⁺	667.6	2737.7+u	20 ⁻	2070.1+u	18 ⁻
300.2	400.4+x	10 ⁺	100.2+x	8 ⁺	670.0	3085.6+z	20 ⁺	2415.6+z	18 ⁺
317.1	2506.6+y	20 ⁻	2189.6+y	19 ⁻	688.3	2877.9+y	21 ⁻	2189.6+y	19 ⁻

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$^{152}\text{Sm}(^{19}\text{F}, 5\text{n}\gamma)$ **2000Zh51 (continued)** $\gamma(^{166}\text{Lu})$ (continued)

E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π
689 [#]	3774.6+z?	22 ⁺	3085.6+z	20 ⁺	719 ^{‡#}	3953.4+x?	22 ⁺	3234.4+x	20 ⁺
689.7	3234.4+x	20 ⁺	2544.7+x	18 ⁺	720.5	3458.2+u	22 ⁻	2737.7+u	20 ⁻
698.1	3204.9+y	22 ⁻	2506.6+y	20 ⁻	728.5	3744.4+u	23 ⁻	3015.9+u	21 ⁻
703.0 [#]	3576.6+x?	21 ⁺	2873.6+x	19 ⁺	747 [#]	4323.6+x?	23 ⁺	3576.6+x?	21 ⁺
718.8 ^{†#}	3923.7+y?	24 ⁻	3204.9+y	22 ⁻	772.5	4230.7+u	24 ⁻	3458.2+u	22 ⁻

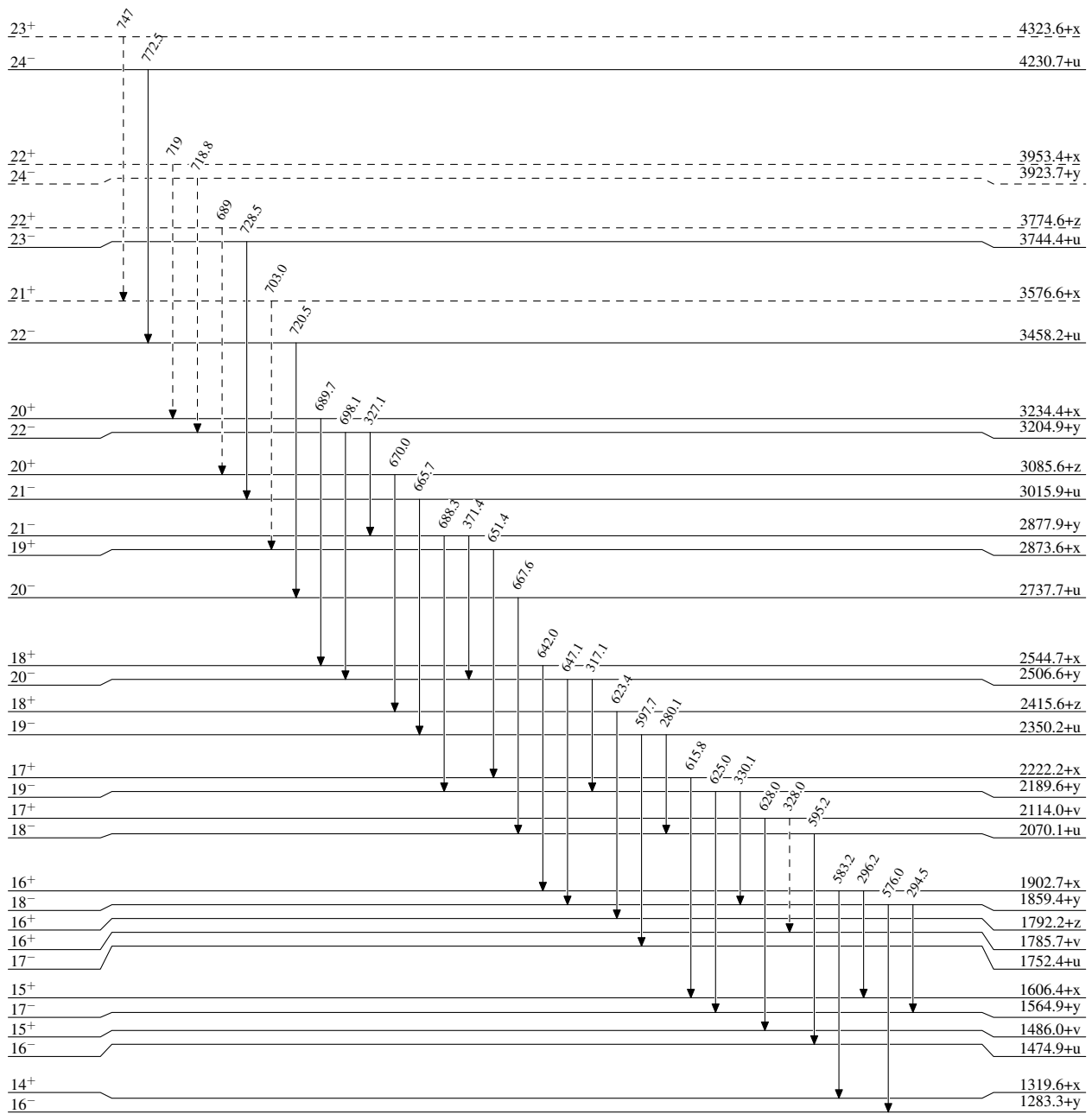
[†] Not adopted; see comment on 3924+Y level.

[‡] Not adopted; see comment on 3953+x level.

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

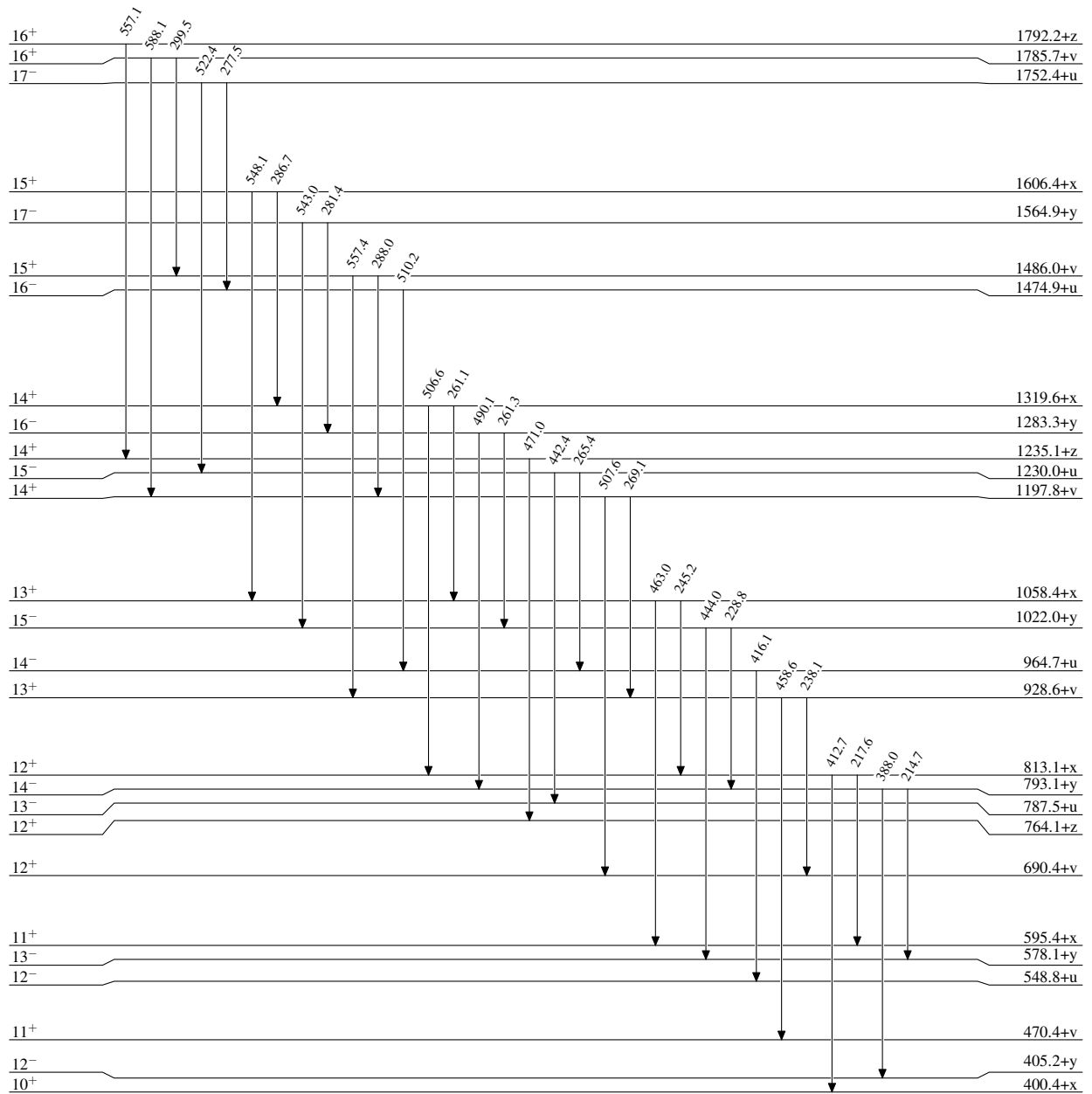
$^{152}\text{Sm}(^{19}\text{F},5\text{n}\gamma) \quad 2000\text{Zh51}$

Legend

Level Scheme-----► γ Decay (Uncertain) $^{166}_{71}\text{Lu}_{95}$

$^{152}\text{Sm}(^{19}\text{F},5\text{n}\gamma)$ 2000Zh51

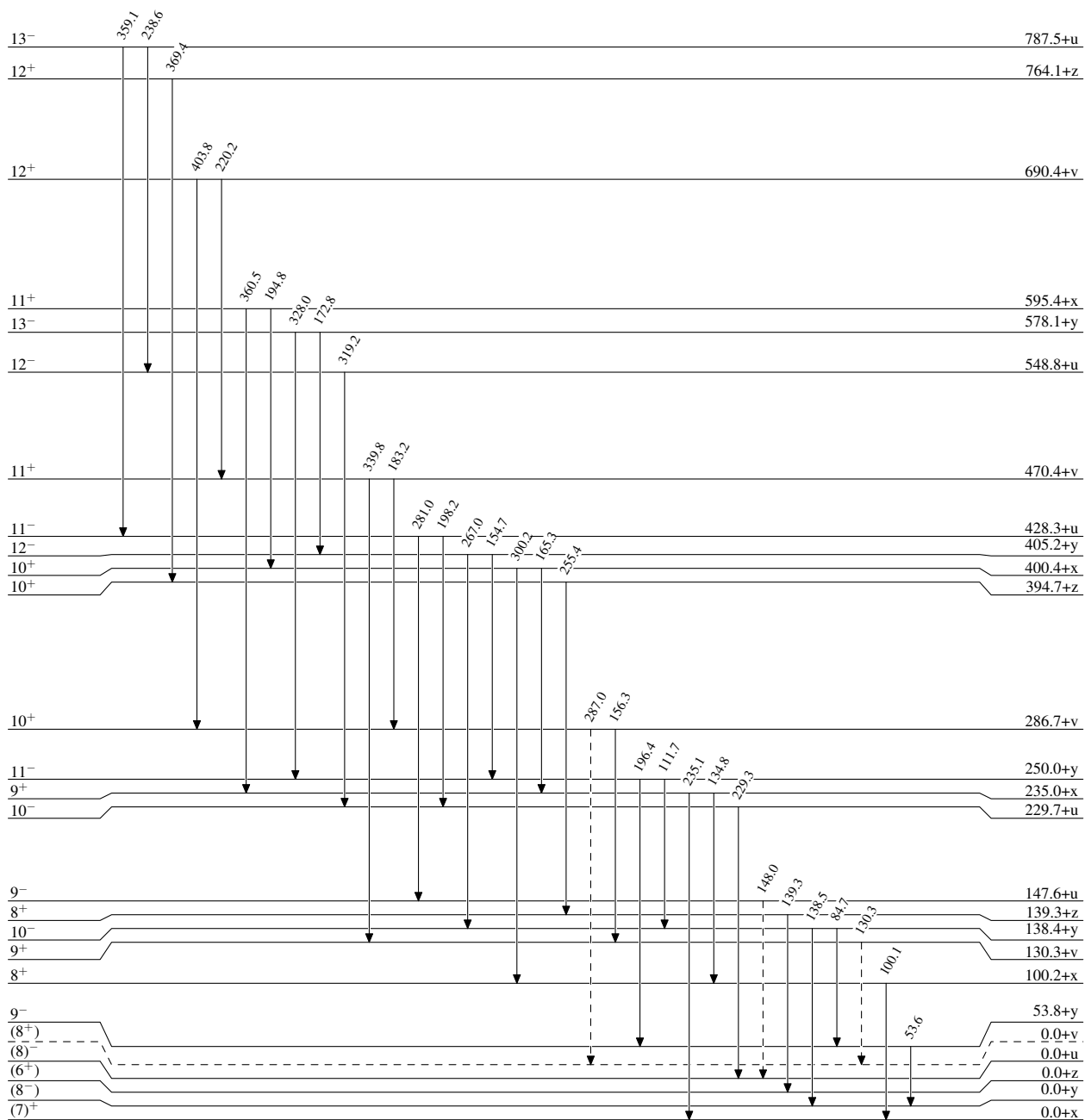
Level Scheme (continued)

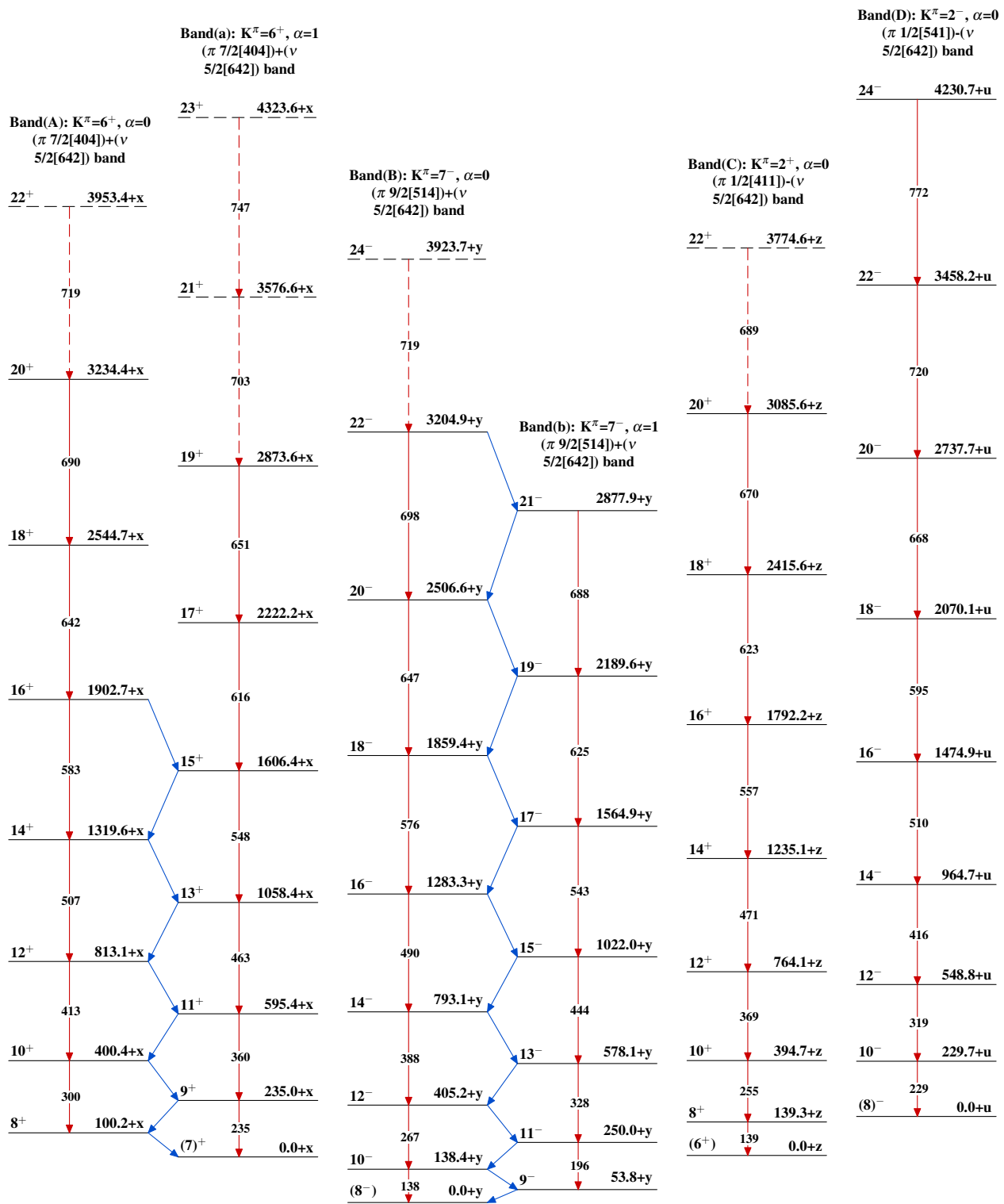
 $^{166}_{71}\text{Lu}_{95}$

$^{152}\text{Sm}(^{19}\text{F},5\text{n}\gamma)$ 2000Zh51

Legend

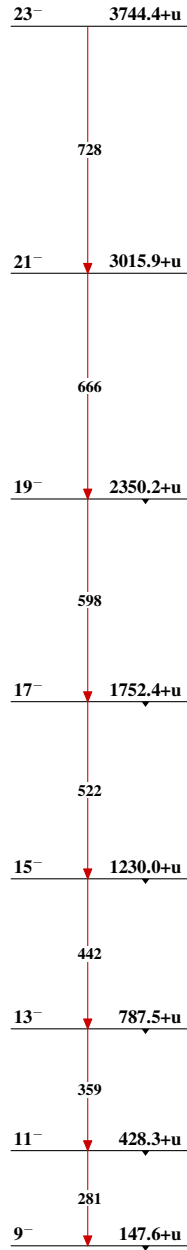
Level Scheme (continued)

-----► γ Decay (Uncertain) $^{166}_{71}\text{Lu}_{95}$

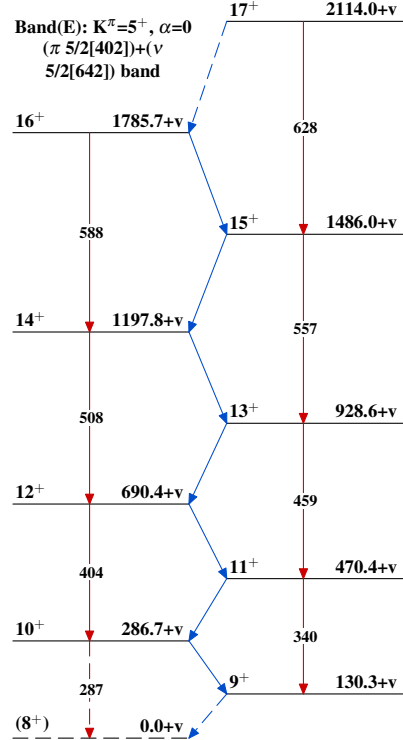
$^{152}\text{Sm}(^{19}\text{F}, 5\text{n}\gamma) \quad 2000\text{Zh51}$ 

$^{152}\text{Sm}(^{19}\text{F},5\text{n}\gamma)$ 2000Zh51 (continued)

Band(d): $K^\pi=2^-, \alpha=1$
 (π 1/2[541])-(ν
 5/2[642]) band



Band(e): $K^\pi=5^+, \alpha=1$
 (π 5/2[402])-(ν
 5/2[642]) band

 $^{166}_{71}\text{Lu}_{95}$