^{180}Hf(^{238}U,^{238}U′γ) 2001Ch10,1999Da09

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 126, 151 (2015)	1-Feb-2015

2001Ch10, 2014TaZY: E(^{238}U)=1.6 GeV, pulsed beam. Measured Eγ, Iγ, γγ, and γγΔt, using Gammasphere array consisting of 98 HPGe detectors and 3 LEPS detectors.

1999Da09, 1999Ch48: E(^{238}U)=1.6 GeV, pulsed beam. Measured Eγ, Iγ, γγ, $T_{1/2}$(1/2) for delayed γ-rays using an array of 12 Compton-suppressed HPGe detectors for (^{238}U,^{238}U′γ). Includes results of ^{180}Hf(^{208}Pb,^{208}Pb′γ) E=1.3 GeV using Gammasphere array. See also 2001Ch89.

^{180}Hf Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
0[a]	0+		
93.40[a] *10*	2+		
309.00[a] *15*	4+		
641.50[a] *18*	6+		
1084.83[a] *20*	8+		
1142.17[b] *20*	8−		K^{π}=8−. Configuration=π7/2[404]⊗π9/2[514].
1374.9[@] *17*	(4−)		
1385.6[b] *3*	9−		
1482.9[@] *19*	(5−)		
1612.9[@] *19*	(6−)		
1654.3[b] *3*	10−		
1703.3[&] *8*	(6+)		
1764.9[@] *20*	(7−)		
1895.3[&] *11*	(7+)		
1937.9[@] *20*	(8−)		
1947.2[b] *5*	11−		
2113.3[&] *11*	(8+)		
2133.9[@] *21*	(9−)		
2263.9[b] *5*	12−		
2349.9[@] *22*	(10−)		
2354.3[&] *12*	(9+)		
2426.5 *12*	(10+)	<2[d] ns	K^{π}=(10+). Configuration=ν9/2[624]⊗ν11/2[615].
2487.0[c] *5*	12+	0.94[d] μs *11*	K^{π}=12+. Configuration=π²8−⊗ν9/2[624]⊗ν1/2[510].
2538.9 *10*	(14+)	>10 μs	K^{π}=(14+). Configuration=π²8−⊗ν9/2[624]⊗ν3/2[512].
2587.9[@] *23*	(11−)		
2617.3[&] *13*	(10+)		
2625.0[c] *7*	(13+)		
2808.5[c] *6*	(14+)		
2847.9[@] *24*	(12−)		
2900.3[&] *14*	(11+)		
3102.3[c] *9*	(15+)		
3122.9[@] *25*	(13−)		
3194.3[&] *15*	(12+)		
3448.4[c] *9*	(16+)		
3530.4 *13*			
3599.0 *10*	(18−)	90 μs *10*	K^{π}=(18−). Configuration=π²8−⊗ν9/2[624]⊗ν11/2[615].

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^{180}Hf(^{238}U,^{238}U′γ) 2001Ch10,1999Da09 (continued)

^{180}Hf Levels (continued)

† From a least-squares fit to Eγ, by evaluator. ΔE=1 keV is assumed for transitions where no uncertainty is given.
‡ J^{π} for levels below 1.1 MeV are from the Adopted Levels. Others are as proposed by 1999Da09 and 2001Ch10 based on assumed band structure.
# From 2001Ch10, 1999Da09 using time spectra for the γ-rays triggered with the beam-sweeper, except where noted.
@ Band(A): 2 quasiparticle band based on 1374 keV (4^-).
& Band(B): 2 quasiparticle band based on 1703 keV (6^+).
a Band(C): g.s. band.
b Band(D): 2 quasiparticle 8^- band.
c Band(E): 4 quasiparticle 12^+ band.
d From 2014TaZY.

γ(^{180}Hf)

Eγ	Iγ	Ei(level)	J_i^{π}	E_f	J_f^{π}	Mult.	Comments
52	65 *3*	2538.9	(14^+)	2487.0	12^+		
57.2 *1*	22.5 *1*	1142.17	8^-	1084.83	8^+		
93.4 *1*	100	93.40	2^+	0	0^+		
108		1482.9	(5^-)	1374.9	(4^-)		
130		1612.9	(6^-)	1482.9	(5^-)		
137.9 *5*	2.1 *10*	2625.0	(13^+)	2487.0	12^+		
150.6 *5*	0.9 *5*	3599.0	(18^-)	3448.4	(16^+)	(M2)	α(exp)=9 *6* from intensity balance (1999Da09). Mult.: M2 or E3 from α(exp). M2 proposed by 1999Da09 assuming lowest multipole dominates.
152		1764.9	(7^-)	1612.9	(6^-)		
173		1937.9	(8^-)	1764.9	(7^-)		
183.4 *6*	2.5 *5*	2808.5	(14^+)	2625.0	(13^+)		
192		1895.3	(7^+)	1703.3	(6^+)		
196		2133.9	(9^-)	1937.9	(8^-)		
215.6 *1*	106 *8*	309.00	4^+	93.40	2^+		
216		2349.9	(10^-)	2133.9	(9^-)		
218		2113.3	(8^+)	1895.3	(7^+)		
223.3 *2*	1.1 *1*	2487.0	12^+	2263.9	12^-		
238		1612.9	(6^-)	1374.9	(4^-)		
241		2354.3	(9^+)	2113.3	(8^+)		
243.6 *2*	35.0 *15*	1385.6	9^-	1142.17	8^-		
263		2617.3	(10^+)	2354.3	(9^+)		
268.9 *2*	30.4 *13*	1654.3	10^-	1385.6	9^-		
270.0 *20*	1.8 *10*	2808.5	(14^+)	2538.9	(14^+)		
282		1764.9	(7^-)	1482.9	(5^-)		
283		2900.3	(11^+)	2617.3	(10^+)		
293.3 *5*	33.0 *12*	1947.2	11^-	1654.3	10^-		
293.9 *8*	3.8 *14*	3102.3	(15^+)	2808.5	(14^+)		
294		3194.3	(12^+)	2900.3	(11^+)		
317.3 *3*	0.8 *1*	2263.9	12^-	1947.2	11^-		
321.5 *3*	4.4 *7*	2808.5	(14^+)	2487.0	12^+		
325		1937.9	(8^-)	1612.9	(6^-)		
332.5 *1*	123 *6*	641.50	6^+	309.00	4^+		
346.1 *1*	4.0 *14*	3448.4	(16^+)	3102.3	(15^+)		
369		2133.9	(9^-)	1764.9	(7^-)		
410		2113.3	(8^+)	1703.3	(6^+)		
412		2349.9	(10^-)	1937.9	(8^-)		
427.9 *16*	<1	3530.4		3102.3	(15^+)		
443.2 *1*	100 *8*	1084.83	8^+	641.50	6^+		
454		2587.9	(11^-)	2133.9	(9^-)		

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^{180}Hf(^{238}U,^{238}U′γ) 2001Ch10,1999Da09 (continued)

γ(^{180}Hf) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π
459		2354.3	(9^+)	1895.3	(7^+)	609.1 *10*	0.3 *1*	2263.9	12^-	1654.3	10^-
481 *3*	0.1 *1*	2426.5	(10^+)	1947.2	11^-	639.4 *15*	3.1 *11*	3448.4	(16^+)	2808.5	(14^+)
498		2847.9	(12^-)	2349.9	(10^-)	722.0 *15*	<1	3530.4		2808.5	(14^+)
500.8 *1*	24.9 *17*	1142.17	8^-	641.50	6^+	771.7 *22*	1 *1*	2426.5	(10^+)	1654.3	10^-
504		2617.3	(10^+)	2113.3	(8^+)	832.4 *15*	0.5 *2*	2487.0	12^+	1654.3	10^-
511.7 *3*	2.4 *3*	1654.3	10^-	1142.17	8^-	1040.8 *15*	0.2 *1*	2426.5	(10^+)	1385.6	9^-
535		3122.9	(13^-)	2587.9	(11^-)	1062		1703.3	(6^+)	641.50	6^+
539.5 *3*	39.8 *18*	2487.0	12^+	1947.2	11^-	1065.9 *17*	0.6 *4*	1374.9	(4^-)	309.00	4^+
546		2900.3	(11^+)	2354.3	(9^+)	1101.1 *7*	14.7 *13*	2487.0	12^+	1385.6	9^-
561.3 *19*	8.4 *6*	1947.2	11^-	1385.6	9^-	1394		1703.3	(6^+)	309.00	4^+
577		3194.3	(12^+)	2617.3	(10^+)						

^{180}Hf(^{238}U,^{238}U′γ) 2001Ch10,1999Da09

Level Scheme

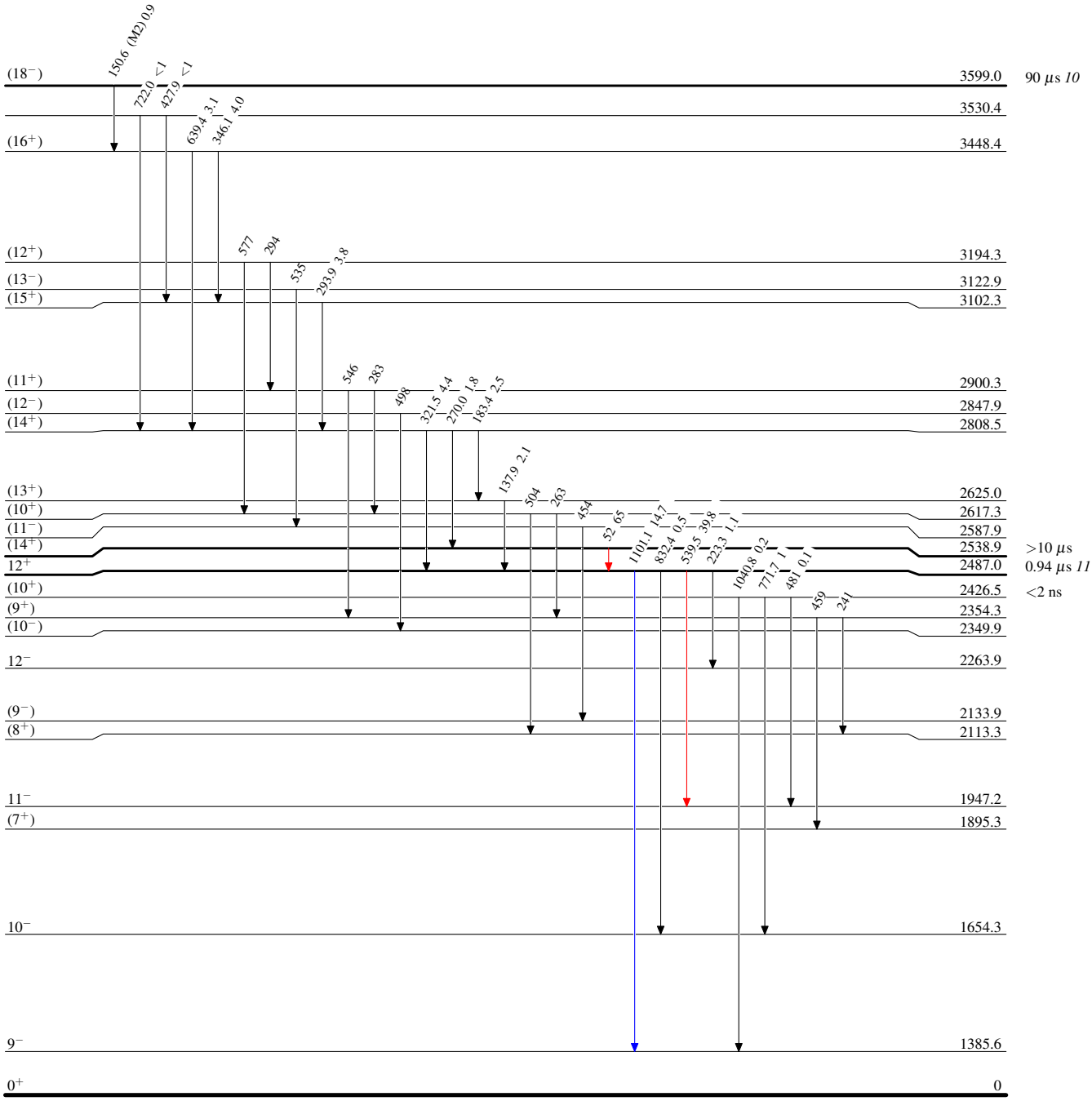
Intensities: Type not specified

Legend

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

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

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



$^{180}_{72}Hf_{108}$

^{180}Hf(^{238}U,^{238}U′γ) 2001Ch10,1999Da09

Level Scheme (continued)

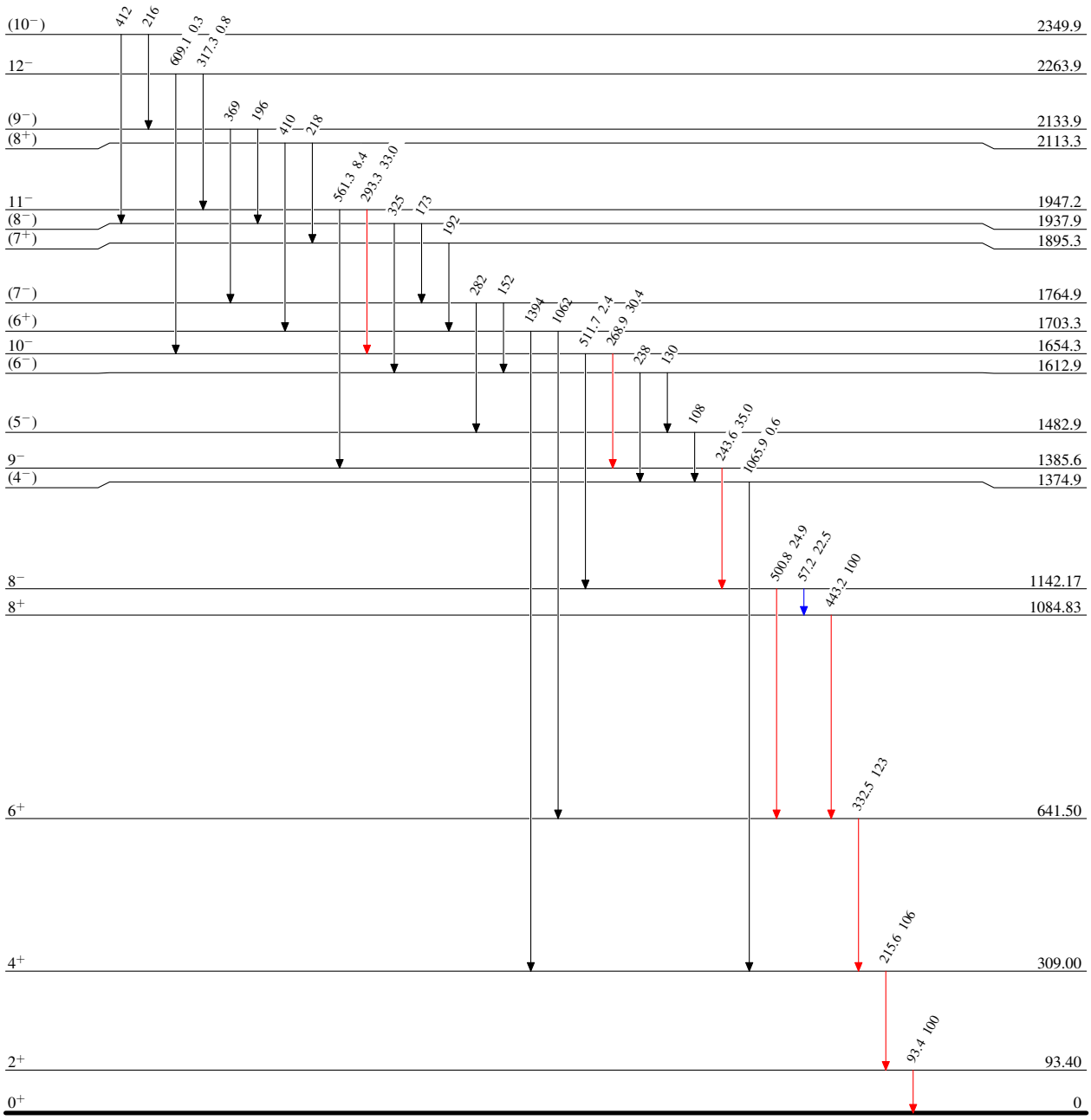
Intensities: Type not specified

Legend

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

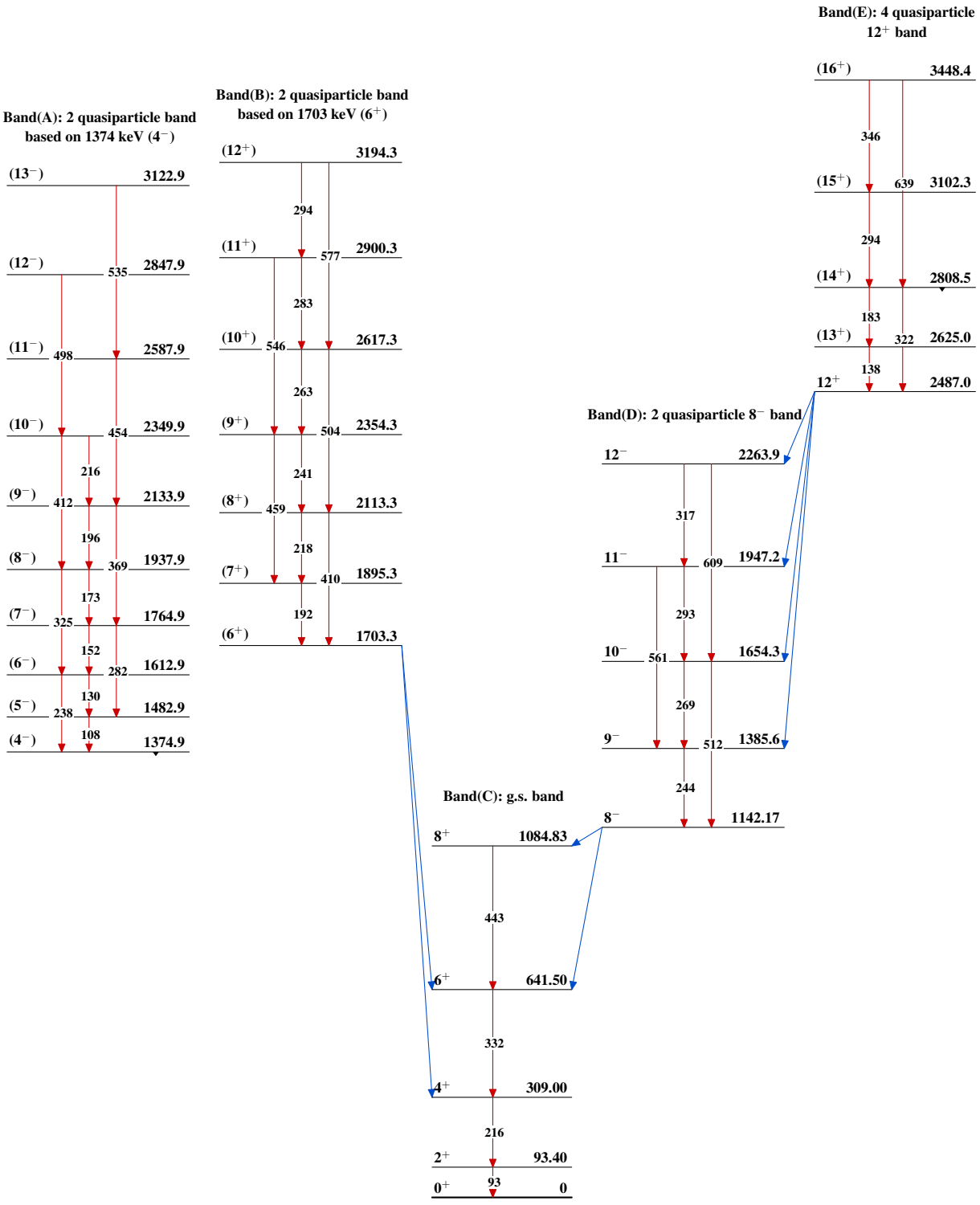
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{180}_{72}Hf_{108}$

^{180}Hf(^{238}U,^{238}U′γ) 2001Ch10,1999Da09



$^{180}_{72}Hf_{108}$