Last updated 1/24/2024

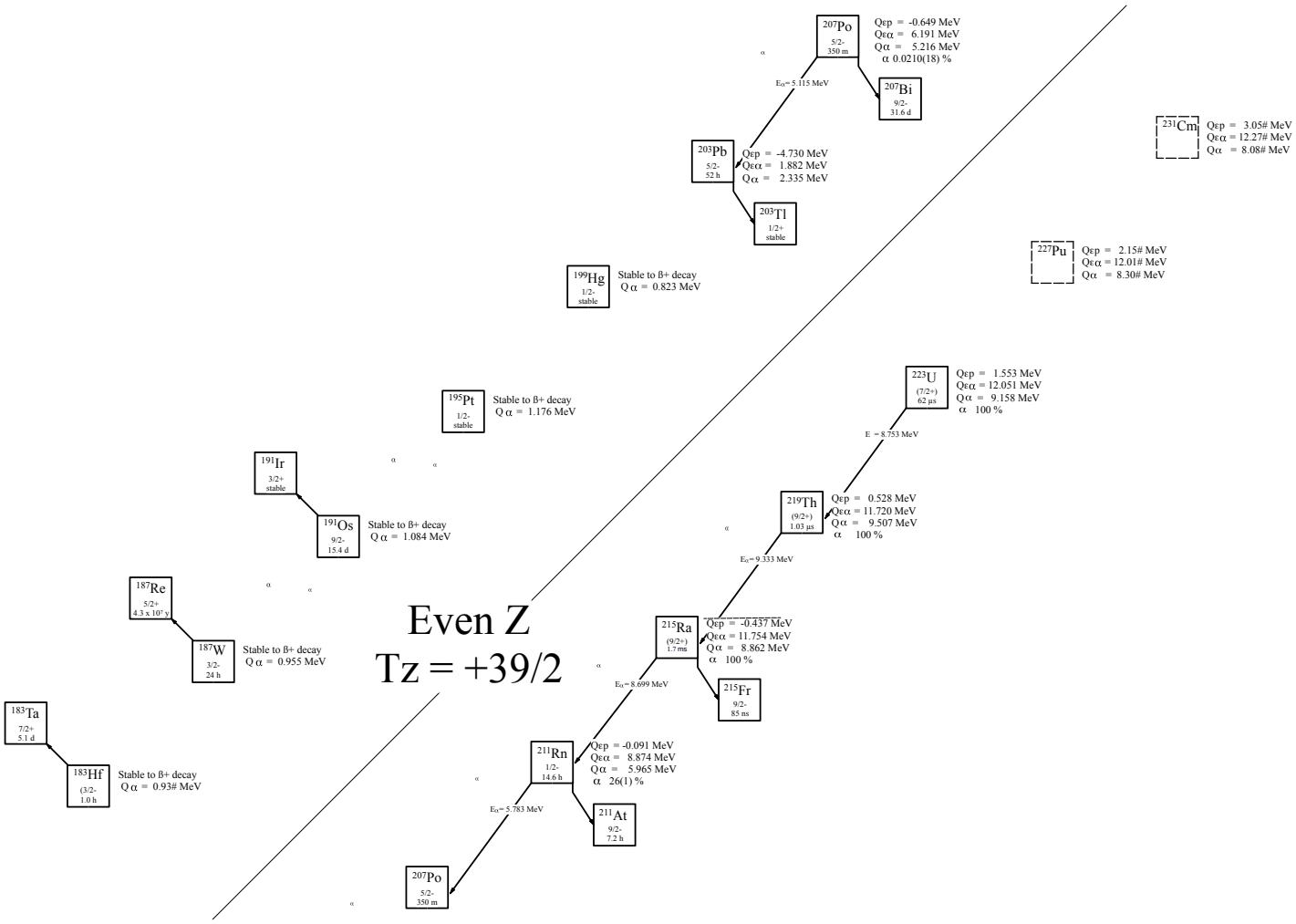

Fig. 1: Known experimental values for heavy particle emission of the even-Z T_z= +39/2 nuclei.

Table 1
Observed and predicted β-delayed particle emission from the even-Z, T_z = +39/2 nuclei. J^π values for ^{183}Hf, ^{187}W, ^{191}Os, ^{195}Pt, ^{199}Hg, and ^{203}Pb are taken from ENSDF. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein.

Nuclide	J^π	$T_{1/2}$	Q_ε	$Q_{\varepsilon p}$	$Q_{\varepsilon\alpha}$	Experimental
^{183}Hf*	$(3/2^-)$	1.018(2) h	-3.570(90)	——	——	[**2006Vo12**]
^{187}W*	$3/2^-$	23.80(3) h	-3.010(60)	——	——	[**2019Kr02**]
^{191}Os*	$9/2^-$	15.4(1) d	-2.045(10)	——	——	[**1967Ag07**]
^{195}Pt	$1/2^-$	stable	-1.102(1)	——	——	
^{199}Hg	$1/2^-$	stable	-0.452(1)	——	——	
^{203}Pb	$5/2^-$	51.95(1) h	0.975(6)	-4.730(7)	1.882(7)	[**2001Li17**]
^{207}Po	$5/2^-$	350.3(41) m	2.909(7)	-0.649(7)	6.191(7)	[**1974Pa05**]
^{211}Rn	$1/2^-$	14.6(2) h	2.892(7)	-0.091(7)	8.874(7)	[**1972As11**]
^{215}Ra	$(9/2^+)$	1.67(1) ms	2.214(10)	-0.437(12)	11.754(8)	[**2000He17**]
^{219}Th	$(9/2^+)$	1.03(3) μs**	2.890(80)	0.528(57)	11.720(57)	[**2017Su18, 2015Kh09, 1973Ha32**]
^{223}U	$(7/2^+)$	62^{+14}_{-10} μs	3.71(10)	1.553(60)	12.051(78)	[**2020Su02**]
^{227}Pu			4.19(13)#	2.15(10)#	12.01(13)#	
^{231}Cm			4.86(42)#	3.05(30)#	12.27(31)#	

* 100% β^- emitter.
** Weighted average of 1.09(8) μs [2017Su18], 0.97(4) μs [2015Kh09] and 1.05(3) μs [1973Ha32].

Table 2
Particle separation, Q-values, and measured values for direct particle emission of the even-Z, T_z = +39/2 nuclei. Unless otherwise stated, all S and Q-values are taken from [2021Wa16] or deduced from values therein.

Nuclide	S_p	S_{2p}	Q_α	BR_α	Experimental
^{183}Hf	8.80(20)	16.77(30)	0.93(20)#		
^{187}W	8.585(60)	16.162(64)	0.955(30)		
^{191}Os	8.101(5)	15.16(20)	1.084(1)		
^{195}Pt	7.551(1)	13.977(2)	1.176(1)		
^{199}Hg	7.254(1)	13.704(1)	0.823(1)		
^{203}Pb	6.095(7)	11.702(7)	2.335(7)		
^{207}Po	4.406(10)	7.953(7)	5.216(3)	0.0210(18)%	[**1974Pa05, 1970AfZZ**, 1971Go35, 1967Ti04, 1955Mo68, 1951Ka37, 1947Ho06, 1947Te01]
^{211}Rn	4.072(10)	6.967(7)	5.965(1)	26(1)%	[**1971Go35**, 1970AfZZ, 1955Mo68, 1955Mo69, 1952Mo23]
^{215}Ra	3.799(11)	6.350(8)	8.862(2)	100%	[**1970To18, 1968Va18**, 2020Su02, 2015Kh09, 2005Li17, 2000He17, 1970TaZS, 1969MaZT, 1961Gr43]
^{219}Th	3.677(81)	6.005(57)	9.507(11)*	100%	[**2020Ma27, 2017Su18, 1973Ha32**, 2020Su02, 2020Wa16, 2015Kh09, 1973HaVQ, 1973HaWU]
^{223}U	3.308(105)	5.473(60)	9.158(17)	100%	[**2020Su02**, 1994AnZY, 1993AnZS, 1991An10, 1991An13]
^{227}Pu	3.34(14)#	5.18(10)#	8.30(12)#		
^{231}Cm	2.89(33)#	4.70(31)#	8.08(31)#		

* Deduced from α energy, 9.506(56) in [2021Wa16].

Table 3
direct α emission from ^{207}Po, J^π = 5/2$^-$, $T_{1/2}$ = 350.3(41) m*, BR_α = 0.0210(18)%*.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{203}Pb)	coincident γ-rays	R_0 (fm)	HF
5.2158(25)	5.1150(25)**	0.0210(18)%*	5/2$^-$	0.0	——	1.44219(87)	1.41(13)

* [1974Pa05].
** [1970AfZZ].

Table 4
direct α emission from ^{211}Rn, $J^\pi = 1/2^-$, $T_{1/2}$ = 14.6(2) h**, BR_α = 26(1)%.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	J_f^π***	$E_{daughter}$(^{207}Po)***	coincident γ-rays***	R_0 (fm)	HF
5.153(4)	5.055(4)	$1.0(3) \times 10^{-3}$%	$1.6(5) \times 10^{-4}$%	$9/2^-$	0.8144	0.8144	1.4456(24)	22^{+12}_{-6}
5.279(3)	5.179(3)	$4.1(3) \times 10^{-3}$%	$6.7(6) \times 10^{-4}$%	$5/2^-$	0.6858	0.0686, 0.0973, 0.1679, 0.2365, 0.2928, 0.3244, 0.3929, 0.4491,0.6172	1.4456(24)	27.6(28)
5.378(3)	5.276(3)	0.024(2)%	$0.39(3)\times 10^{-3}$%	$7/2^-$	0.5883	0.5883	1.4456(24)	16.7(16)
5.572(3)	5.466(3)	0.022(2)%	$0.36(3)\times 10^{-3}$%	$3/2^-$	0.3930	0.0686, 0.1565, 0.1679, 0.2365, 0.3244, 0.3929	1.4456(24)	196(19)
5.725(3)	5.616(3)	4.3(3)%	0.70(6)%	$3/2^-$	0.2365	0.0686, 0.1679, 0.2365	1.4456(24)	6.3(6)
5.895(2)	5.783(2)	100(2)%	16.4(7)%	$1/2^-$	0.0686	0.0686	1.4456(24)	1.78(12)
5.963(2)	5.850(2)	54(2)2%	8.8(4)%	$5/2^-$	0.0	——	1.4456(24)	6.9(5)

* All values from [1971Go35], except where noted.
** [1972As11].
*** [2011Ko].

Table 5
direct α emission from ^{215}Ra, $J^\pi = (9/2^+)$, $T_{1/2}$ = 1.67(1) ms*, BR_α = 100%.

E_α(c.m.)	E_α(lab)**	I_α(rel)***	I_α(abs)***	J_f^π@	$E_{daughter}$(^{211}Rn)@	coincident γ-rays@	R_0 (fm)	HF
8.031(6)	7.882(6)	3.1(5)%	3.0(5)%	$(3/2^-)$	0.8335(2)	0.8335(2)	1.4995(24)	17^{+4}_{-3}
8.326(6)	8.171(6)	1.4(5)%	1.3(5)%	$5/2^-$	0.5399(2)	0.5399(2)	1.4995(24)	280^{+180}_{-80}
8.864(4)	8.699(4)	100(1)%	95.7(10)%	$1/2^-$	0.0	——	1.4995(24)	105(6)

* [2000He17].
** Weighted average of values from [1970To18] and [1968Va18], adjusted as recommended by [1991Ry01].
*** [1968Va18].
@ [2013Si17].

Table 6
direct α emission from ^{219}Th, $J^\pi = (9/2^+)$, $T_{1/2}$ = 1.03(3) μs*, BR_α = 100%.

E_α(c.m.)	E_α(lab)**	I_α(abs)***	J_f^π	$E_{daughter}$(^{215}Ra)	coincident γ-rays	R_0 (fm)	HF
9.507(11)	9.333(11)	100%	$(9/2^+)$	0.0	——	1.5769(37)	2.7(3)

* Weighted average of 1.09(8) μs [2017Su18], 0.97(4) μs [2015Kh09] and 1.05(3) μs [1973Ha32].
** Weighted average of 9.338(24) MeV [2020Ma27], 9.327(15) MeV [2017Su189] and 9.340(20) MeV [1973Ha32].

Table 7
direct α emission from ^{223}U*, $J^\pi = (7/2^+)$, $T_{1/2} = 62^{+14}_{-10}$ μs, BR_α = 100%.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	J_f^π	$E_{daughter}$(^{219}Th)	coincident γ-rays	R_0 (fm)	HF
8.913(16)	8.753(16)	100(31)%	65(20)%	$(7/2^+)$	0.244(23)		1.5402(90)	$1.0^{+0.9}_{-0.5}$
9.157(17)	8.993(17)	54(26)%	35(13)%	$(9/2^+)$	0.0	——	1.5402(90)	8^{+8}_{-4}

* All values from [2020Su02].

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