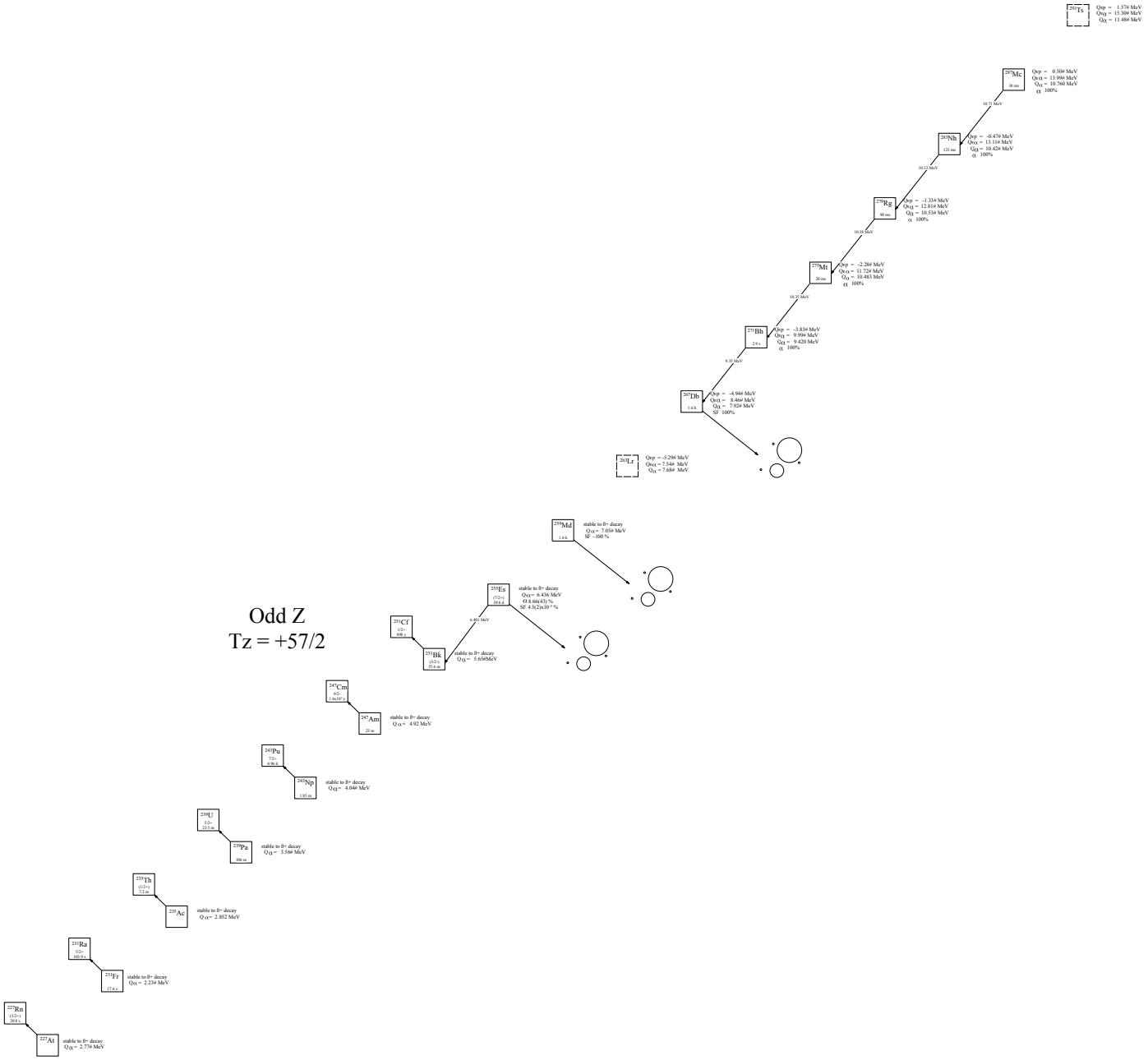

Fig. 1: Known experimental values for heavy particle emission of the odd-Z T_z= +59/2 nuclei.

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Table 1
Observed and predicted β-delayed particle emission from the odd-Z, T_z = +59/2 nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein. J^π values for ^{233}Fr is taken from ENSDF.

Nuclide	J^π	$T_{1/2}$	Q_ε	Q_{β^-}	$Q_{\beta^- \alpha}$	Experimental
^{233}Fr*	$(1/2^+)$	0.9(10) s		4.586(21)		[**2014Kr09**]
^{237}Ac				4.07(40)#		
^{241}Pa				3.54(36)#		
^{245}Np*		**		2.67(20)#		[**1960Di03**]
^{249}Am*		**		2.35(30)#		[**1960Di03**]
^{253}Bk*		$>$ 10 m		1.63(36)#		[**1992KrZK**]
^{257}Es		7.7(2) d		0.81(41)#		[**1987Po22**]
^{261}Md				0.12(55)#		
				$Q_{\varepsilon p}$	$Q_{\varepsilon \alpha}$	
^{265}Lr				—	—	
^{269}Db				—	—	
^{273}Bh			0.76(77)#			
^{277}Mt		5^{+9}_{-2} ms	1.63(80)#	-3.23(89)#	10.66(77)#	[**2013Og04**]
^{281}Rg		11^{+3}_{-1} s	2.06(92)#	-2.47(98)#	11.53(89)#	[**2022Og07, 2022Og08**]
^{285}Nh		$2.1^{+0.6}_{-0.3}$ ms	2.68(93)#	-1.49(92)#	12.07(92)#	[**2022Og07, 2022Og08**]
^{289}Mc		250^{+51}_{-35} ms	3.22(93)#	-0.6(10)#	13.17(93)#	[**2022Og07, 2022Og08**]
^{293}Ts		22^{+8}_{-4} ms	3.86(93)#	0.5(10)#	14.54(93)#	[**2013Og04**]

* 100% β^--emitter.
** Indirectly observed by the β^- daughter being present in bomb debris [1960Di03].

Table 2
Particle separation, Q-values, and measured values for direct particle emission of the odd-Z, T_z = +59/2 nuclei. Unless otherwise stated, all S and Q-values are taken from [2021Wa16] or deduced from values therein.

Nuclide	S_p	Q_α	BR_α	BR_{SF}	Experimental
^{233}Fr		1.61(40)#			
^{237}Ac		2.68(40)#			
^{241}Pa		3.33(30)#			
^{245}Np		3.69(36)#			
^{249}Am		4.83(36)#			
^{253}Bk	5.42(47)#	5.40(20)#			
^{257}Es	4.93(52)#	6.05(20)#			
^{261}Md	4.48(67)#	6.75(30)#			
^{265}Lr	4.07(81)#	7.23(20)#			
^{269}Db	3.62(91)#	8.49(30)#			
^{273}Bh	3.13(95)#	9.11(20)#			
^{277}Mt	2.47(98)#	9.90(10)#		100%	[**2013Og04**, 2022Og07, 2022Og08, 2017Ak02]
^{281}Rg	2.3(11)#	9.90(40)#	10%	90%	[**2022Og07, 2022Og08, 2013Og04**, 2023Ko22, 2019Kh04, 2017Ak02, 2013Og01, 2013Og04, 2012Og02, 2011Og04, 2011Og07, 2011OgZZ, 2010Og01]
^{285}Nh	1.9(11)#	10.010(40)	100%		[**2022Og07, 2022Og08, 2013Og04**, 2023Ko22, 2019Kh04, 2017Ak02, 2013Og01, 2013Og04, 2012Og02, 2011Og04, 2011Og07, 2011OgZZ, 2010Og01]
^{289}Mc	1.5(11)#	10.490(50)	100%		[**2022Og07, 2022Og08, 2013Og04**, 2023Ko22, 2019Kh04, 2017Ak02, 2013Og01, 2013Og04, 2012Og02, 2011Og04, 2011Og07, 2011OgZZ, 2010Og01]
^{293}Ts	0.9(11)#	11.320(50)	100%		[**2013Og04**, 2019Kh04, 2012Og02, 2011Og04, 2011Og07, 2011OgZZ, 2010Og01]

Table 3
direct α emission from ^{281}Rg*, $T_{1/2} = 11^{+3}_{-1}$ s**, BR_α = 10%.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{277}Mt)	coincident γ-rays (keV)	HF
9.52-9.69	9.38-9.55	10%				

* All values from [2013Og04], except where noted.
** [2022Og08].

Table 4
direct α emission from ^{285}Nh*, $T_{1/2} = 2.1^{+0.6}_{-0.3}$ ms**, $BR_\alpha = 100\%$.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{281}Rg	coincident γ-rays (keV)	HF
9.66-10.32	9.47-10.18	100%				

* All values from [2013Og04], except where noted.
** [2022Og08].

Table 5
direct α emission from ^{289}Mc*, $T_{1/2} = 250^{+51}_{-35}$ ms**, $BR_\alpha = 100\%$.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{285}Nh	coincident γ-rays (keV)	HF
10.29-10.49	10.15-10.34	100%				

* All values from [2013Og04], except where noted.
** [2022Og08].

Table 6
direct α emission from ^{293}Ts*, $T_{1/2} = 22^{+8}_{-4}$ ms, $BR_\alpha = 100\%$.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{277}Mt)	coincident γ-rays (keV)	HF
10.75-11.36	10.60-11.20	100%				

* All values from [2013Og04].

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