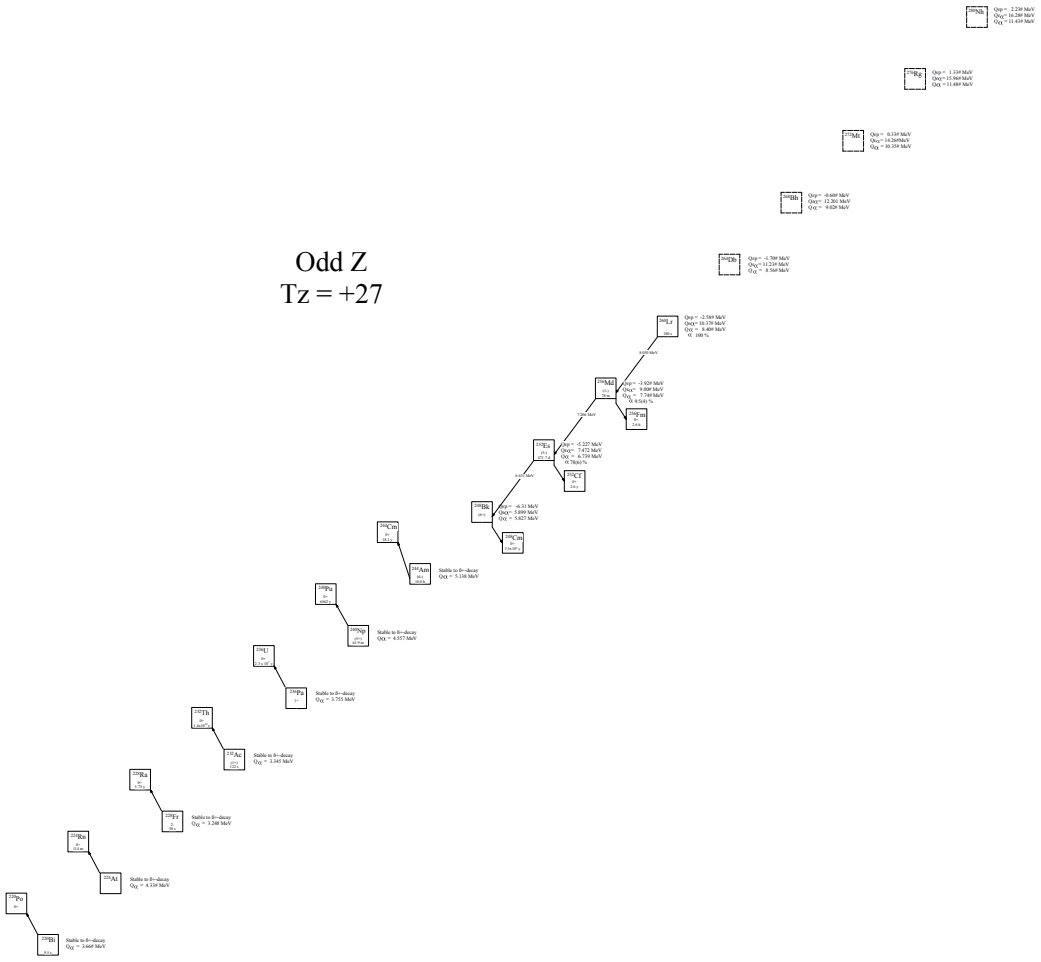

Fig. 1: Known experimental values for heavy particle emission of the odd-Z T_z= +27 nuclei.

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Table 1
Observed and predicted β-delayed particle emission from the odd-Z, T_z = +27 nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein. J^π values are taken from ENSDF.

Nuclide	J^π	$T_{1/2}$	Q_ε	Q_{β^-}	$Q_{\beta^- \alpha}$	Experimental
^{220}Bi*		9.5(57) s	-3.17(50)#	5.70(30)#	16.93(30)#	[**2010Al24**]
^{224}At*		obs	-2.20(20)#	5.266(24)	10.203(28)	[**2012Ch19**]
^{228}Fr*	2^-	38*1) s	-1.859(19)	4.444(7)	8.694(12)	[**1982Ru04**]
^{232}Ac*	(1^+)	119(5) s	-1.343(16)	3.708(13)	7.969(13)	[**1986Gi08**]
^{236}Pa*	1^+		-0.921(20)	2.889(14)	7.642(14)	[**1984Mi02**]
^{240}Np*	(5^+)	61.9(2) m	-0.399(17)	2.191(17)	7.626(17)	[**1982Pa23**]
				$Q_{\varepsilon p}$	$Q_{\varepsilon\alpha}$	
^{244}Am*	(6^-)	10.01(3) h	0.073(3)	-7.220(30)#	4.739(3)	[**2019Tr05**]
^{248}Bk*	(6^+)		0.740(50)	-6.31(11)#	5.899(50)	[**1973Fi06**]
^{252}Es	(5^-)	471.7(17) d	1.260(50)	-5.227(51)	7.472(50)	[**1977Ah03**]
^{256}Md	(1^-)	78.1(18) m	1.97(12)#	-3.92(12)#	9.00(12)#	[**1993Mo18**]
^{260}Lr		180(30) s	2.67(24)#	-2.58(16)#	10.37(13)#	[**1971Es01**]
^{264}Db			3.19(43)#	-1.70(33)#	11.23(31)#	
^{268}Bh			3.91(61)#	-0.60(54)#	12.201(53)#	
^{272}Mt			4.48(70)#	0.33(62)#	14.26(68)#	
^{276}Rg			4.85(83)#	1.33(74)#	15.96(81)#	
^{280}Nh			5.59(71)#	2.23(58)#	16.28(68)#	

* 100% β^- emitter.
** Taken from α decay of ^{252}Es [1973Fi06], might not be the ground state.

Table 2
Particle separation, Q-values, and measured values for direct particle emission of the odd-Z, T_z = +27 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
^{220}Bi	6.95(50)#	3.66(42)#			
^{224}At	6.66(20)#	4.33(30)#			
^{228}Fr	6.791(16)	3.248(23)			
^{232}Ac	6.351(17)	3.345(15)			
^{236}Pa	5.973(19)	3.755(19)			
^{240}Np	5.545(17)	4.557(22)			
^{244}Am	5.164(3)	5.138(17)			
^{248}Bk	4.691(50)	5.827(50)			
^{252}Es	4.129(50)	6.739(1)	78(6)%		[**1973Fi06**, 1977Ah03, 1973AhZQ, 1965Mc11, 1956Ha80]
^{256}Md	3.63(12)#	7.74(11)#	9.5(4)%*		[**2000Ah02, 1993Mo18, 1971Ho16, 1970Fi12**, 2019Ah04, 1965Si14, 1955Gh02]
^{260}Lr	3.09(13)#	8.40(14)#	100%		[**1971Es01**]
^{264}Db	2.78(28)#	8.56(20)#			
^{268}Bh	2.39(46)#	9.02(30)#			
^{272}Mt	1.50(56)#	10.35(30)#			
^{276}Rg	1.57(72)#	11.48(40)#			
^{280}Nh	1.07(56)#	11.43(75)#			

* Weighted average of 9.9(5)% [1971Ho16] and 8.5(8)% [1970Fi12].

Table 3
direct α emission from ^{252}Es*, $J^{\pi} = (5^{-})$, $T_{1/2}$ = 471.7(19) d**, BR_{α} = 78(6)%.

E_{α}(c.m.)	E_{α}(lab)	I_{α}(rel)	I_{α}(abs)	J^{π}_{f}	$E_{daughter}$(^{248}Bk)	coincident γ-rays (keV)	R_0 (fm)***	HF
6.038(4)	5.942(4)	0.050(19)%	0.031(12)%	8^{+}	0.700(5)		1.48566(81)	35^{+22}_{-10}
6.081(4)	5.984(4)	0.062(19)%	0.039(12)%	6^{-}	0.657(5)		1.48566(81)	47^{+22}_{-12}
6.113(4)	6.016(4)	0.15(4)%	0.09(2)%	7^{+}	0.625(5)		1.48566(81)	29^{+11}_{-6}
6.148(3)	6.050(3)	1.27(11)%	0.80(9)%	5^{-}	0.590(4)	377.4, 418.5, 590.0	1.48566(81)	$5.1^{+0.8}_{-0.6}$
6.207(5)	6.108(5)	0.15(4)%	0.09(2)%		0.531(6)	529.1	1.48566(81)	87^{+32}_{-20}
6.254(5)	6.155(5)	≈0.05%	≈0.03%		0.483(6)		1.48566(81)	≈500
6.280(5)	6.180(5)	0.10(4)%	0.06(2)%		0.458(6)		1.48566(81)	300^{+190}_{-90}
6.314(5)	6.214(5)	0.12(4)%	0.08(2)%		0.424(6)		1.48566(81)	360^{+170}_{-90}
6.339(3)	6.238(3)	0.71(6)%	0.44(5)%		0.399(4)	399.7	1.48566(81)	83^{+13}_{-10}
6.365(3)	6.264(3)	0.94(9)%	0.59 (7)%		0.373(4)	193.5, 228.0	1.48566(81)	85^{+13}_{-11}
6.399(5)	6.297(5)	≈0.05%	≈0.03%		0.339(6)		1.48566(81)	$\approx 2\times10^{3}$
6.476(5)	6.373(5)	0.09(4)%	0.05(2)%		0.262(6)		1.48566(81)	$3.1^{+2.4}_{-1.0}\times10^{3}$
6.527(5)	6.423(5)	0.56(6)%	0.35(5)%	(5^{-})	0.211(6)		1.48566(81)	840^{+150}_{-120}
6.564(3)	6.460(3)	0.31(5)%	0.20(3)%	(4^{-})	0.174(4)		1.48566(81)	$1.6^{+0.3}_{-0.2}\times10^{3}$
6.586(3)	6.481(3)	2.73(12)%	1.71(15)%	8^{+}	0.152(4)	70.7, 80.7, 151.3	1.48566(81)	326(34)
6.602(5)	6.497(5)	0.39(5)%	0.24(4)%		0.136(6)	64.4, 70.7	1.48566(81)	$2.7(5)\times10^{3}$
6.667(3)	6.561(3)	17.0(4)%	10.6(9)%	7^{+}	0.071(4)	70.7	1.48566(81)	123(12)
6.738(3)	6.631(3)	100%	62.6(7)%	(6^{+})	0.0	——	1.48566(81)	44(4)

* All values from [1973Fi06], except where noted.
** [1977Ah03].
*** Interpolated between 1.48260(30) fm (^{250}Cf) and 1.48871(75) fm (^{254}Fm).

Table 4
direct α emission from ^{256}Md*, $J^{\pi} = (1^{-})$, $T_{1/2}$ = 78.1(18) m**, BR_{α} = 9.5(4)%***.

E_{α}(c.m.)	E_{α}(lab)	I_{α}(rel)	I_{α}(abs)	J^{π}_{f}	$E_{daughter}$(^{252}Es)	coincident γ-rays (keV)	R_0 (fm)$^{@}$	HF
7.255(5)	7.142(5)	31(2)%	2.1(1)%		0.542(9)		1.483(24)	$3.6^{+3.0}_{-1.7}$
7.320(4)	7.206(4)	100(3)%	6.8(3)%		0.477(9)		1.483(24)	$2.1^{+1.7}_{-1.0}$
7.362(5)	7.247(5)	3.5(7)%	0.24(5)%		0.436(9)		1.483(24)	90^{+70}_{-40}
7.763(8)	7.642(8)	3.0(7)%	0.20(5)%		0.035(11)		1.483(24)	$3.4^{+3.0}_{-1.7}\times10^{3}$
7.798(8)	7.676(8)	3.5(7)%	0.24(5)%	(5^{-})	0.0	——	1.483(24)	$3.8^{+3.3}_{-1.9}\times10^{3}$

* All values from [2000Ah02], except where noted.
** [1993Mo18].
*** Weighted average of 9.9(5)% [1971Ho16] and 8.5(8)% [1970Fi12].
$^{@}$ Interpolated between 1.48871(75) fm (^{254}Fm) and 1.477(24) fm (^{258}No).

Table 5
direct α emission from ^{260}Lr*, $T_{1/2}$ = 180(30) s, BR_{α} = 100%.

E_{α}(c.m.)	E_{α}(lab)	I_{α}(abs)	J^{π}_{f}	$E_{daughter}$(^{256}Md)	coincident γ-rays (keV)	R_0 (fm)**	HF
8.155(20)	8.030(20)	100%	(1^{-})	0.0	——	1.479(28)	$1.1\ ^{1.2}_{-0.6}$

* All values from [1971Es01].
** Interpolated between 1.477(24) fm (^{258}No) and 1.480(14) fm (^{262}Rf).

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