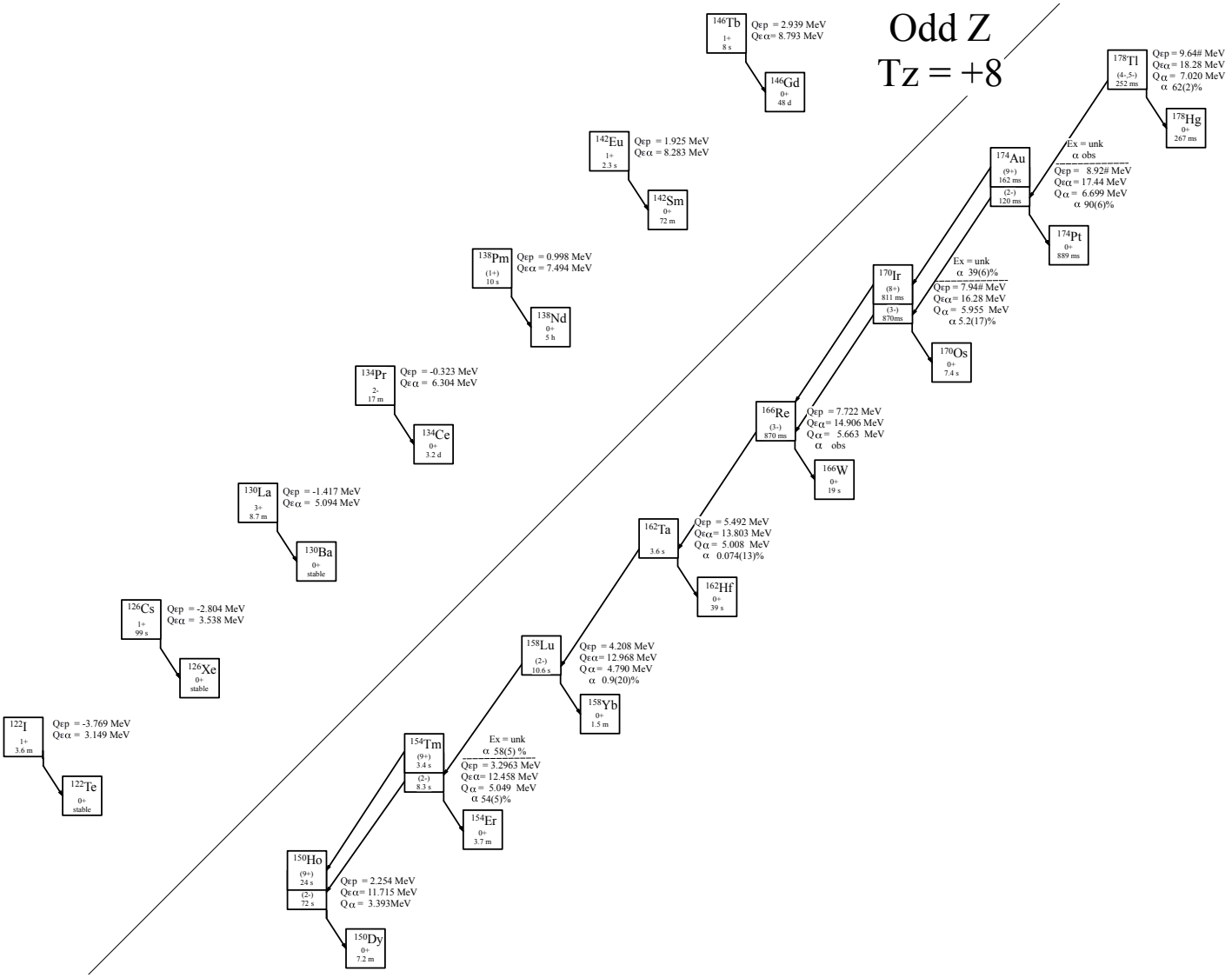

Fig. 1: Known experimental values for heavy particle emission of the odd-Z T_z= +8nuclei.

Last updated 12/12/22

Table 1
Observed and predicted β-delayed particle emission from the odd-Z, T_z = +8 nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein. $J^{|pi}$ values for ^{122}I, ^{126}Cs, ^{130}La, ^{134}Pr, ^{138}Pm, ^{142}Eu, ^{146}Tb, ^{150}Ho, are taken from ENSDF.

Nuclide	Ex	J^π	$T_{1/2}$	Q_ε	$Q_{\varepsilon p}$	$Q_{\varepsilon 2p}$	$Q_{\varepsilon\alpha}$	$BR_{\varepsilon F}$	Experimental
^{122}I		1^+	3.63(6) m	4.234(5)	-3.769(5)	-9.559(5)	3.149(5)		[**1970LaZX**]
^{126}Cs		1^+	98.6(10) s	4.796(10)	-2.804(10)	-8.404(10)	3.538(10)		[**1969Ch18**]
^{130}La		3^+	8.7(1) m	5.629(26)	-1.417(26)-	-6.345(26)	5.094(26)		[**1963Ya05**]
^{134}Pr		2^-	17(2) m	6.305(29)	-0.323(35)	-4.671(20)	6.304(20)		[**1967Cl02**]
^{138}Pm		(1^+)	10(2) s	7.103(16)	0.998(14)	-2.984(12)	7.494(23)		[**1983Al06**]
^{142}Eu		1^+	2.34(12) s	7.673(30)	1.925(33)	-1.630(30)	8.283(32)		[**1991Fi03**]
^{146}Tb		1^+	8(4) s	8.320(40)	2.939(45)	-0.376(45)	8.793(45)		[**1982No08**]
^{150}Ho		(2^-)	72(4) s	7.364(14)	2.254(15)	-0.254(14)	11.715(15)		[**1982No08**]
^{154}Tm		(2^-)	8.3(3) s	8.178(15)	3.296(15)	1.113(15)	12.458(15)		[**1982Bo04**]
^{154m}Tm	x	(9^+)	3.35(5) s	8.178(15)+x	3.296(15)+x	1.113(15)+x	12.458(15)+x		[**1982Bo04**]
^{158}Lu		(2^-)	10.6(3) s	8.797(17)	4.208(32)	2.422(29)	12.968(16)		[**1983Ge08**]
^{162}Ta			3.60(15) s	9.390(60)	5.492(69)	3.804(64)	13.803(64)		[**1992Ha10**]
^{166}Re		(3^-)*	2.4(2) s**	10.050(90)	6.722(89)	5.403(90)	14.906(89)		[**1992Me10, 1984Sc06, 1978Sc26**]
^{170}Ir		(3^-)	870^{+180}_{-120} ms	10.74(10)#	7.94(10)#	7.13(10)#	16.28(10)		[**2002Ro17**]
^{170m}Ir	x	(8^+)	811(18) ms	10.74(10)#+x	7.94(10)#+x	7.13(10)#+x	16.28(10)+x		[**2007Ha45**]
^{174}Au		(2^-)	120(20) ms	11.26(10)#	8.92(10)#	8.61(10)#	17.44(10)		[**1983Sc24**]
^{174m}Au	x	(9^+)	162(3) ms	11.26(10)#+x	8.92(10)#+x	8.61(10)#+x	17.44(10)+x		[**2004GoZZ**]
^{178}Tl		$(4^-, 5^-)$	252(20) ms	11.70(10)#	9.64(10)#	9.74(10)#	18.28(10)	0.15(6)%	[**2013Li49**]

* [2004GoZZ]
** Weighted average of 2.3(2) [1992Me10], 2.8(3) s [1984Sc06] and 2.2(4) s [1978Sc26].

Table 2
Particle separation and emission from the odd-Z, T_z = +8 nuclei. Unless otherwise stated, all Q-values and separation energies are taken from [2021Wa16] or deduced from values therein.

Nuclide	S_p	S_{2p}	Q_α	BR_α	Experimental
^{122}I	4.825(26)	12.240(9)	-0.508(6)	——	
^{126}Cs	4.440(10)	11.564(11)	-0.696(12)	——	
^{130}La	3.855(28)	10.274(26)	0.298(28)		
^{134}Pr	3.399(26)	9.382(42)	0.674(33)		
^{138}Pm	2.619(16)	8.152(16)	1.189(23)		
^{142}Eu	2.664(31)	7.675(39)	1.181(32)		
^{146}Tb	2.126(49)	6.722(46)	1.120(54)		
^{150}Ho	1.541(17)	5.987(19)	3.393(47)		
^{154}Tm	1.249(17)	5.400(19)	5.094(3)	54(5)%	[**1997To12, 1982Bo04, 1979Ho10**, 1995Wa32, 1995WaZN, 1995WaZR, 1993ToZX, 1992Po14, 1981De22, 1981HoZM, 1979Be52, 1973BoVZ, 1973BoXW, 1973BoXL, 1964Ma45, 1963Ma13]
^{154m}Tm*	1.249(17)-x	5.400(19)-x	5.094(3)+x	58(5)%	[**1997To12, 1982Bo04, 1982De11, 1979Ho10**, 1995Wa32, 1995WaZN, 1995WaZR, 1993ToZX, 1992Po14, 1991VaZZ, 1989KaYU, 1984ToZT, 1981De22, 1981HoZM, 1979Be52, 1973BoVZ, 1973BoXW, 1973BoXL, 1964Ma45, 1963Ma13]
^{158}Lu	1.081(19)	4.956(21)	4.790(5)	0.91(20)%	[**1992Ha10, 1983Ge08, 1983To01**, 1992Po14, 1982RaZZ, 1981RaZH, 1980Al14, 1980AlZN, 1979Al16, 1979AlZM, 1979Be52]
^{162}Ta	0.755(68)	4.089(85)	5.008(5)$^{@}$	0.074(13)%**	[**1992Ha10, 1986Ru05**, 2011Gh08, 1988MeZY, 1987HaZO, 1987ScZH, 1987ScZL]
^{166}Re	0.265(92)#	3.132(93)	5.663(4)$^{@@}$	obs	[**1996Pa01, 1992Me10, 1984Sc06, 1982De11, 1978Sc26**, 1992MeZW, 1984Gr14, 1981DeZA, 1981DeZL]
^{170}Ir	-0.25(11)	1.97(11)#	5.955(5)***	5.2(17)%	[**2004GZZ, 2002Ro17**, 1996Pa01]
^{170m}Ir*	-0.25(11)-x	1.97(11)#-x	5.955(5)+x	39(6)%	[**2004GoZZ**, 2002Ro17, 1996Pa01, 1984Gr14, 1982De11, 1978ReZZ, 1978Sc26, 1978Ca11, 1977Ca23, 1977ScYH
^{174}Au	-0.59(12)	1.26(11)#	6.699(7)	90(6)%	[**2002Ro17, 2004GoZZ**]
^{174m}Au	-0.59(12)-x	1.26(11)#-x	6.699(7)+x	obs	[**2004GoZZ**, 2002Ro17, 1996Pa01, 1992Ha10, 2000KoZN, 1984ScZQ, 1983Sc24]
^{178}Tl	-0.87(13)	0.67(11)#	7.020(10)	62(2)%	[**2013Li49**, 2002Ro17, 2001RoZW, 1997Ca13]

* Excitation is unknown.
** Weighted average of 0.081(13)% [1992Ha10] and 0.065(14)% [1986Ru05].
*** Deduced from α energy, 6.230(50)# in [2021Wa16].
$^{@}$ Deduced from α energy, 5.010(60) in [2021Wa16].
$^{@@}$ Deduced from α energy, 5.520(60) in [2021Wa16].

Table 3
direct α emission from ^{154}Tm*, $T_{1/2}$= 8.3(3) s**, BR_α = 54(5)%.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	$E_{daughter}$(^{150}Ho)	coincident γ-rays	R_0 (fm)	HF
4.975(15)	4.846(15)$^{@}$	0.45(20)%**	0.24(11)%**	0.131	0.131	1.5815(15)$^{@@}$	180^{+16}_{-6}
5.093(3)	4.961(3)***	100%**	58(5)%**	0.0	——	1.5815(15)$^{@@}$	3.4(4)

* All values from [1997To12], except where noted.
** [1982Bo04].
*** Weighted average of 4.959(5) MeV [1979Ho10] (adjusted to 4.964(5) MeV in [1999Ry01]) and 4.955(3) MeV [1982Bo04] (adjusted to 4.960(3) MeV in [1999Ry01])
$^{@}$ Reported as 4.825(15) MeV in [1997To12], which lists the 100% peak as 4.956(3) MeV based on data that was not adjusted in [1991Ry01]. The value adopted here is 5 keV higher, therefore the energy of the fine structure peak was adjusted accordingly.
$^{@@}$ Interpolated between 1.567(3) fm ^{152}Er and 1.596(15) fm ^{156}Yb.

Table 4
direct α emission from ^{154m}Tm*, Ex = unk, $T_{1/2}$= 3.35(5) s**, BR_α = 58(5)%.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	$E_{daughter}$(^{150}Ho)	coincident γ-rays	R_0 (fm)	HF
4.975(15)	4.846(15)$^{@}$	0.24(5)%**	0.14(3)%**	0.197 + x	0.197	1.5815(15)$^{@@}$	150^{+50}_{-30}
5.172(2)	5.037(2)***	100%**	58(5)%**	x	——	1.5815(15)$^{@@}$	2.98(28)

* All values from [1997To12], except where noted.
** [1982Bo04].
*** Weighted average of 5.035(5) MeV [1979Ho10] (adjusted to 5.040(5) MeV in [1999Ry01]), 5.037(2) MeV [1981De22] and 5.030(3) MeV [1982Bo04] (adjusted to 5.036(3) MeV in [1999Ry01]).
$^{@}$ Reported as 4.840(15) MeV in [1997To12], which lists the 100% peak as 5.031(3) MeV based on data that was not adjusted in [1991Ry01]. The value adopted here is 6 keV higher, therefore the energy of the fine structure peak was adjusted accordingly.
$^{@@}$ Interpolated between 1.567(3) fm ^{152}Er and 1.596(15) fm ^{156}Yb.

Table 5
direct α emission from ^{158}Lu, $T_{1/2}$= 10.6(3) s*, BR_α = 0.91(20)%**.

E_α(c.m.)	E_α(lab)	I_α(abs)	$E_{daughter}$(^{154}Tm)	coincident γ-rays	R_0 (fm)	HF
4.789(5)	4.668(5)***	0.91(20)%**	0.0	——	1.573(24)$^{@}$	$0.7^{+0.5}_{-0.3}$

* [1983Ge03].
** [1992Ha10].
*** Reported as 4.666(5) MeV [1983To01] (adjusted to 4.668(5) MeV in [1999Ry01]).
$^{@}$ Interpolated between 1.596(15) fm ^{156}Yb, and 1.549(19) fm ^{160}Hf.

Table 6
direct α emission from ^{162}Ta*, $T_{1/2}$= 3.60(15) s, BR_α = 0.074(13)%**.

E_α(c.m.)	E_α(lab)	I_α(abs)	$E_{daughter}$(^{158}Lu)	coincident γ-rays	R_0 (fm)	HF
5.008(5)	4.884(5)	0.074(13)%**	0.0	——	1.563(24)***	$3.8^{+2.4}_{-1.6}$

* All values from [1992Ha10], unless otherwise noted.
** Weighted average of 0.081(13)% [1992Ha10] and 0.065(14)% [1986Ru05].
*** Interpolated between 1.549(19) fm ^{160}Hf and 1.576(15) fm ^{164}W,

Table 7
direct α emission from ^{166}Re, $T_{1/2}$= 2.4(2) s*, BR_α =obs.

E_α(c.m.)	E_α(lab)	I_α(abs)	$E_{daughter}$(^{162}Ta)	coincident γ-rays	R_0 (fm)	HF
5.663(4)	5.527(4)**	obs	0.0	——	1.569(16)	5^{+5}_{-3}

* Weighted average of 2.3(2) [1992Me10], 2.8(3) s [1984Sc06] and 2.2(4) s [1978Sc26].
** [1982De11].
*** Interpolated between 1.576(15) fm ^{164}W and 1.5627(48) fm ^{168}Os.

Table 8
direct α emission from ^{170}Ir, $T_{1/2}$= 870^{+180}_{-120} ms*, BR_α = 5.2(17)%*.

E_α(c.m.)	E_α(lab)	I_α(abs)	$E_{daughter}$(^{166}Re)	coincident γ-rays	R_0 (fm)	HF
5.955(5)	5.815(5)**	5.2(17)%*	0.0	——	1.5605(62)	$4.5^{+3.1}_{-1.7}$

* [2002Ro17].
** [2004GoZZ].
*** Interpolated between 1.5627(48) fm ^{168}Os and1.5583(40) fm ^{172}Pt.

Table 9
direct α emission from ^{170m}Ir*, Ex. = unk., $T_{1/2}$= 811(18) ms, BR_α = 39(6)%**.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	$E_{daughter}$(^{166}Re)	coincident γ-rays	R_0 (fm)	HF
6.094(10)	5.951(10)	≈30***	≈5***	0.175+x	0.175, 0.122, 0.110, 0.075, 0.069, 0.053		
6.152(10)	6.007(10)	≈80***	≈14***	0.122+x	0.122, 0.069, 0.053		
6.199(10)	6.053(10)	100***	≈17***	0.075+x	0.075		
6.268(10)	6.121(10)	≈25***	≈4***	x			

* All values from [2007Ha45], except where noted.
** [2004GoZZ].
*** Relative intensities not given in [2007Ha45], estimated by evaluator from Fig 5b.

Table 10
direct α emission from ^{174}Au, $T_{1/2}$= 120(20) ms*, BR_α = 90(6)%**.

E_α(c.m.)	E_α(lab)	I_α(abs)	$E_{daughter}$(^{170}Ir)	coincident γ-rays	R_0 (fm)	HF
6.701(5)	6.547(5)***	90(6)%**	0.0	——	1.5525(50)$^{@}$	3.3(7)

* [1983Sc24].
** [2002Ro17].
** [2004GoZZ].
$^{@}$ Interpolated between 1.5583(40) fm ^{172}Pt and 1.5466(30) fm ^{176}Hg.

Table 11
direct α emission from ^{174m}Au, $T_{1/2}$= 162(3) ms, BR_α = obs.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	$E_{daughter}$(^{170}Ir)	coincident γ-rays	R_0 (fm)	HF
6.584(5)	6.433(5)			0.191+x	0.191		
6.623(5)	6.471(5)			0.153+x	0.153		
6.773(15)	6.618(15)			x			

* All values from [2004GoZZ].

Table 12
direct α emission from ^{178}Tl*, $T_{1/2}$= 252(20) ms, BR_α = 62(2)%.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	$E_{daughter}$(^{174}Au)	coincident γ-rays	R_0 (fm)	HF
6.747(10)	6.595(10)	34(7)	15(3)	0.273	0.273, 0.163	1.533(55)**	$2.6^{+1.0}_{-0.7}$
8.847(10)	6.693(10)	100	43(3)	0.173	0.173, 0.163	1.533(55)**	2.09(12)
7.010(10)	6.852(10)	9(5)	4(2)	0.0	——	1.533(55)**	100^{+120}_{-40}

* All values from [2013Li49].
** Interpolated between 1.5466(30) fm ^{176}Hg and 1.5194(46) fm ^{180}Pb.

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