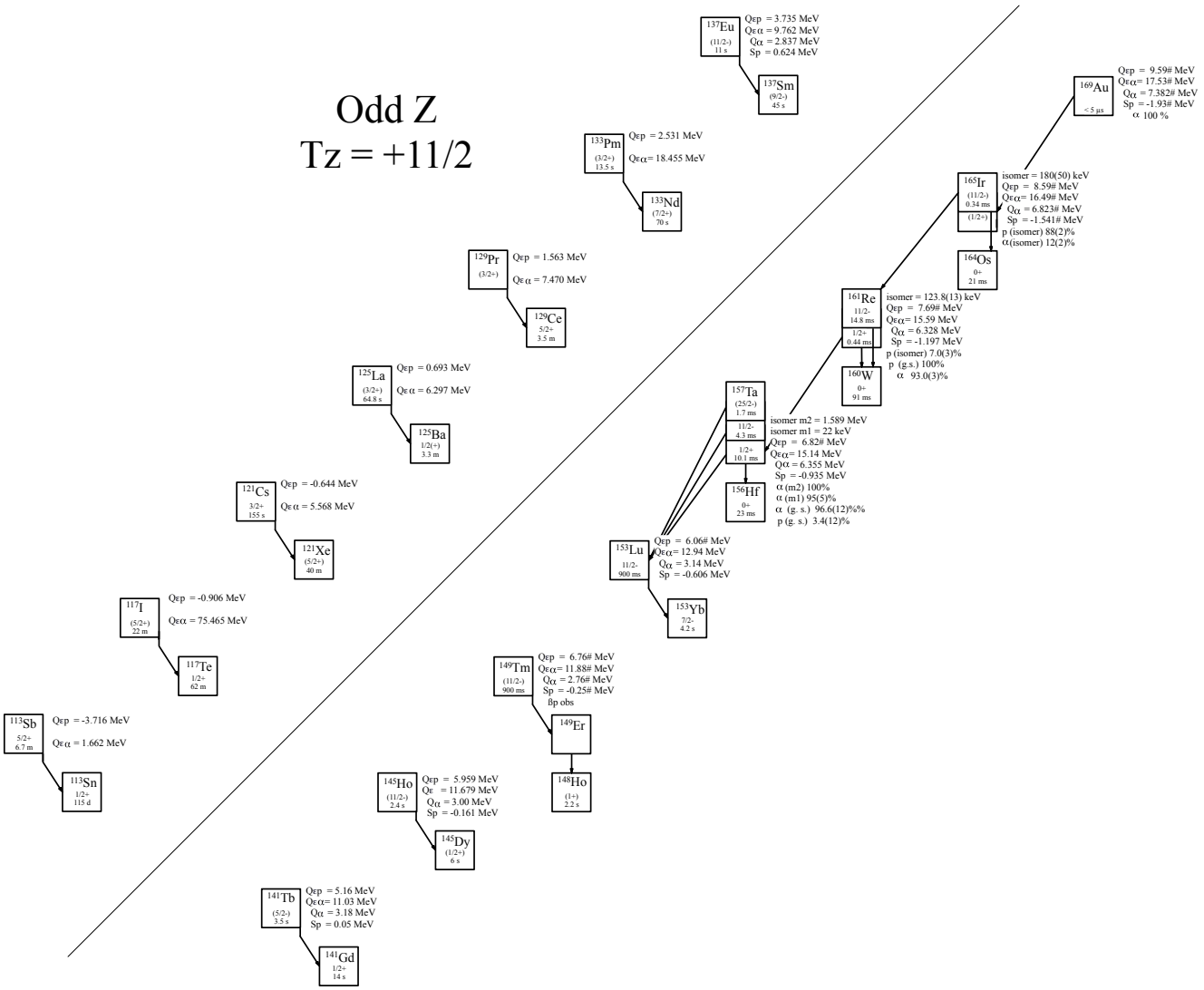

Fig. 1: Known experimental values for heavy particle emission of the odd-Z T_z= +1/2 nuclei.

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Table 1
Observed and predicted β-delayed particle emission from the odd-Z, T_z = +11/2 nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein. J^π values for ^{113}Sb, ^{117}I ^{121}Cs, ^{125}La, ^{119}Pr, ^{133}Pm, ^{137}Eu, ^{141}Tb, ^{145}Ho, ^{149}Tm are taken from ENSDF.

Nuclide	Ex	J^π	$T_{1/2}$	Q$_\varepsilon$	$Q_{\varepsilon p}$	$BR_{\beta p}$	$Q_{\varepsilon 2p}$	$Q_{\varepsilon\alpha}$	Experimental
^{113}Sb		$5/2^+$	6.67(7) m	3.911(17)	-3.716(18)		-9.743(17)	1.662(17)	[**1976Wi10**]
^{117}I		$(5/2^+)$	22.2(4) m	4.657(28)	-0.906(26)		-4.983(26)	5.465(26)	[**1985Le10**]
^{121}Cs		$3/2^+$	155(4) s	5.379(14)	-0.644(21)		-4.498(16)	5.568(20)	[**1991Ge02**]
^{125}La		$(3/2^+)$	64.8(12) s	5.909(28)	0.693(28)		-3.089(28)	6.297(28)	[**1992Ic02**]
^{129}Pr		$(3/2^+)$		6.510(40)	1.563(62)		-1.534(32)	7.470(32)	
^{133}Pm		$(3/2^+)$	13.5(3) s*	6.920(70)	2.531(58)		-0.277(60)	8.455(58)	[**1995Br21, 1977Bo02**]
^{137}Eu		$(11/2^-)$	11(2) s	7.846(29)	3.735(69)		1.490(20)	9.762(47)	[**1982No15**]
^{141}Tb		$(5/2^-)$	3.5(2) s	8.68(11)	5.16(12)		3.26(11)	11.03(11)	[**1989Gi06**]
^{145}Ho		$(11/2^-)$	2.4(1) s	9.122(10)	5.959(29)		4.53(20)	11.679(21)	[**1989Vi02**]
^{149}Tm		$(11/2^-)$	0.9(2) s	9.80(20)#	6.76(22)#	obs	5.68(20)#	11.88(20)#	[**1987To12**]
^{153}Lu		$11/2^-$	0.9(2) s	8.78(25)#	6.06(14)#		5.31(15)#	12.94(15)#	[**1989Ni04**]
^{157}Ta		$1/2^+$	10.1(4) ms	9.26(25)#	6.82(14)#		6.33(15)#	15.14(25)#	[**1997Ir01**]
^{157m1}Ta	0.022(5)	$11/2^-$	4.3(1) ms	9.28(25)#	6.84(14)#		6.35(15)#	15.16(25)#	[**1996Pa01, 1997Ir01**]
^{157m2}Ta	1.589(10)	$(25/2^-)$	1.7(1) ms	10.85(25)#	8.41(14)#		7.92(15)#	16.73(25)#	[**1996Pa01**]
^{161}Re		$1/2^+$	0.44(1) ms	9.66(25)#	7.69(14)#		7.43(15)#	15.59(25)#	[**1997Ir01**]
^{161m}Re	0.1238(13)	$11/2^-$	14.8(3) ms	9.78(25)#	7.81(14)#		7.55(15)#	15.71(28)#	[**2006La16**]
^{165}Ir		$(1/2^+)$		10.15(26)#	8.59(15)#		8.74(17)#	16.49(26)#	
^{165m}Ir	0.18(5)	$(11/2^-)$	340(40) μs	10.33(26)#	8.77(15)#		8.92(17)#	16.67(26)#	[**2014Dr02**]
^{169}Au			<5 μs	10.68(36)#	9.59(30)#		10.13(31)#	17.53(36)#	[**2019Uu01**]

* Weighted average of 15(3) s [1995Br21] and 12(3) s [1977Bo02].

Table 2
Particle emission from the odd-Z, T_z = +11/2 nuclei. Unless otherwise stated, all Q-values and separation energies are taken from [2021Wa16] or deduced from values therein.

Nuclide	S$_p$	BR$_p$	S$_{2p}$	Q$_\alpha$	BR$_\alpha$	Experimental
^{113}Sb	3.051(17)	——	10.603(18)	-0.352(18)	——	
^{117}I	2.464(35)	——	8.013(30)	1.553(31)		
^{121}Cs	2.219(19)	——	7.903(26)	0.911(29)		
^{125}La	1.959(29)	——	7.294(29)	0.918(30)		
^{129}Pr	1.529(41)	——	6.455(40)	1.561(40)		
^{133}Pm	1.271(56)	——	5.685(69)	1.941(58)		
^{137}Eu	0.624(13)	——	4.662(83)	2.837(50)		
^{141}Tb	0.05(11)		3.72(11)	3.18(11)		
^{145}Ho	-0.161(10)		3.279(52)	3.00(11)		
^{149}Tm	-0.25(20)#		2.76(20)#	2.76(20)#		
^{153}Lu	-0.606(10)		2.18(15)	3.14(25)#		
^{157}Ta	-0.935(10)	3.4(12) %	1.63(15)	6.355(6)	96.6(12)%	[**1997Ir01**, 1996Pa01]
^{157m1}Ta	-0.957(11)		1.41(16)	6.377(8)	95^{+5}_{-12}%	[**1997Ir01, 1996Pa01**, 1981HoZM, 1979Ho10]
^{157m2}Ta	-2.524(140)		0.04(18)	7.944(12)	100%	[**1996Pa01**]
^{161}Re	-1.197(5)	100%	0.98(15)	6.328(7)		**1997Ir01**, 2006La16, 1996Pa01, 2011Sa59, 2001Ke05, 1979Ho10]
^{161m}Re	-1.300(14)	7.0(3) %	0.86(15)	6.162(15)	93.0(3)%	**2006La16, 1997Ir01, 1996Pa01**, 2011Sa59, 2001Ke05, 1995DeZY, 1981HoZM, 1979Ho10]
^{165}Ir	-1.541(50)#		0.17(16)#	6.823(50)#		
^{165m}Ir	-1.721(71)#	88(2)%	-0.10(17)#	7.003(71)#	12(2)%	[**2014Dr02, 1997Da07**]
^{169}Au	-1.93(33)#	$\approx$ 100%	-0.71(30)#	7.382(34)#		[**2019Uu01**]

Table 3
direct p emission from ^{157}Ta*, $J^\pi = 1/2^+$, $T_{1/2}$ = 10.1(4) ms, BR_p = 3.4(12) %.

E_p(c.m.)	E_p(lab)	I_p(absb)	J^π_f	$E_{daughter}$(^{156}Hf)	coincident γ-rays
0.933(7)	0.927(7)	3.4(12)%	0^+	0.0	——

* All values from [1997Ir01], except where noted.

Table 4
direct α emission from ^{157}Ta*, $J^\pi = 1/2^+$, $T_{1/2}$ = 10.1(4) ms, BR_α = 96.6(12) %.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{153}Lu)	coincident γ-rays	R_0 (fm)	HF
6.277(4)	6.117(4)	96.6(12)%	$1/2^+$	80(5)	?	1.5551(66)	$0.73^{+0.11}_{-0.10}$

* All values from [1997Ir01].

Table 5
direct α emission from ^{157m1}Ta*, Ex = 22(5) keV**, $J^\pi = (11/2^-)$, $T_{1/2}$ = 4.3(1) ms, $BR_\alpha = 95^{+5}_{-12}$%.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{153}Lu)	coincident γ-rays	R_0 (fm)	HF
6.375(4)	6.213(4)	95^{+5}_{-12}%	$11/2^-$	0.0	——	1.5551(66)	$1.56^{+0.23}_{-0.20}$

* All other values from [1996Pa01], except where noted.
** [1997Ir01]

Table 6
direct α emission from ^{157m2}Ta*, Ex = 1.589(10) MeV, $J^\pi = (25/2^-)$, $T_{1/2}$ = 1.7(1) ms, BR_α = 100%.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{153}Lu)	coincident γ-rays	R_0 (fm)	HF
7.946(8)	7.744(8)	100%	$11/2^-$	0.0	——	1.5551(66)	$2.07(29)\times10^4$

* All values from [1996Pa01].

Table 7
direct p emission from ^{161}Re*, $J^\pi = 1/2^+$, $T_{1/2}$ = 0.44(1) ms, BR_p = 100 %.

E_p(c.m.)	E_α(lab)	I_p(abs)	J^π_f	$E_{daughter}$(^{160}W)	coincident γ-rays
1.199(6)	1.192(6)	100%	0^+	0.0	——

* All values from [1997Ir01].

Table 8
direct p emission from ^{161m}Re*, Ex = 123.8(13) keV**, $J^\pi = 1/2^+$, $T_{1/2}$ = 14.8(3) ms, BR_p = 7.0(3) %.

E_p(c.m.)	E_p(lab)	I_p(abs)	J^π_f	$E_{daughter}$(^{160}W)	coincident γ-rays
1.199(2)	1.192(2)**	7.0(3)%	0^+	0.0	——

* All values from [2006La16], except where noted.
** [1997Ir01].

Table 9
direct α emission from ^{161m}Re*, Ex = 123.8(13) keV**,$J^\pi = 11/2^-$, $T_{1/2}$ = 14.8(3) ms, BR_α = 93.0(3) %.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^π_f	$E_{daughter}$(^{157}Ta)	coincident γ-rays	R_0 (fm)	HF
6.429(6)	6.269(6)***	93.0(3)%	$11/2^-$	0.022	——	1.5580(46)	1.30(13)

* All values from [2006La16], except where noted.
** [1997Ir01].
*** Weighted average of 6.265(6) MeV [1996Pa01], and 6.272(6) MeV [2006Pa01].

Table 10
direct p emission from ^{165m}Ir, Ex = 180(50) keV*, J^{π} = $11/2^{-}$, $T_{1/2}$ = 340(40) μs*, BR_p = 88(2)%*.

E_p(c.m.)	E_p(lab)	I_p(abs)	J^{π}_f	$E_{daughter}$(^{164}Os)	coincident γ-rays
1.733(7)	1.707(7)**	88(2)%*	0^+	0.0	——

* [2014Dr02]
** [1997Da07]

Table 11
direct α emission from ^{165m}Ir, Ex = 180(50) keV*, J^{π} = $(11/2^{-})$, $T_{1/2}$ = 340(40) μs*, BR_α = 12(2)%*.

E_α(c.m.)	E_α(lab)	I_α(abs)	J^{π}_f	$E_{daughter}$(^{161}Re)	coincident γ-rays	R_0 (fm)	HF
6.882(7)	6.715(7)**	12(2)%*	$11/2^{-}$	0.1238	——	1.551(11)	$1.2^{+0.5}_{-0.4}$

* [2014Dr02]
** [1997Da07]

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