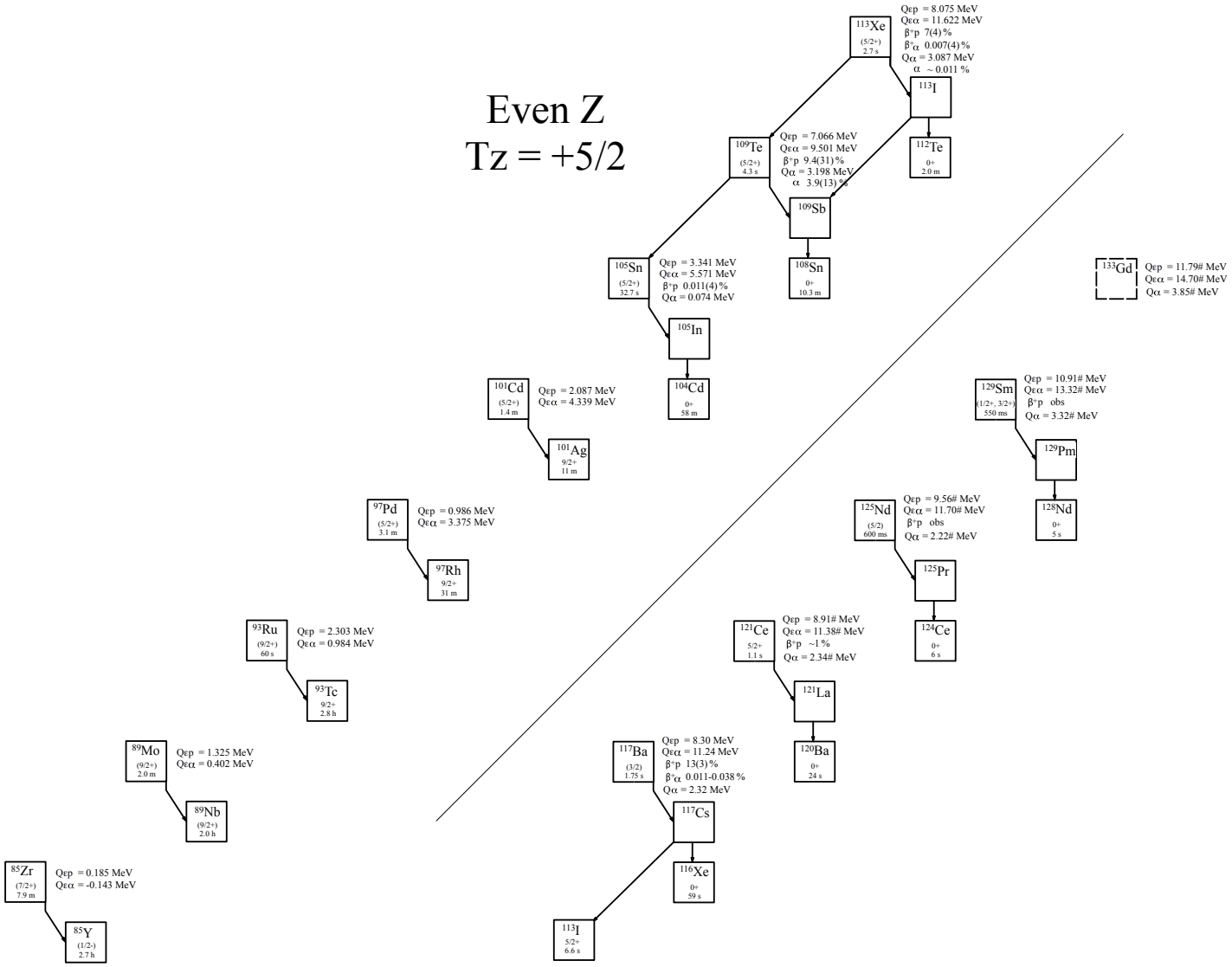

Fig. 1: Known experimental values for heavy particle emission of the even-Z, T_z = +5/2 nuclei.

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Table 1
Observed and predicted β-delayed particle emission from the even-Z, T_z = +5/2 nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein. J^π values for ^{85}Zr, ^{89}Mo, ^{93}Ru, ^{81}Y, ^{97}Pd, ^{101}Cd, ^{93}Rh, ^{125}Nd, ^{129}Sm are taken from ENSDF.

Nuclide	J^π	$T_{1/2}$	Q$_\varepsilon$	$Q_{\varepsilon p}$	BR$_{\beta p}$	Q$_{\varepsilon 2p}$	$Q_{\varepsilon\alpha}$	BR$_{\beta\alpha}$	Experimental
^{85}Zr	(7/2$^+$)	7.85(4) m	4.667(20)	0.185(7)		-8.682(6)	-0.143(8)		[**1972Tu07**]
^{89}Mo	(9/2$^+$)	1.98(14) m	5.611(24)	1.325(7)		-6.575(4)	0.402(19)		[**1985Be12**]
^{93}Ru	(9/2$^+$)	59.7(6) s	6.389(2)	2.303(2)		-5.157(4)	0.984(24)		[**1976De37**]
^{97}Pd	(5/2$^+$)	3.1(1) m	4.790(40)	0.986(5)		-6.363(7)	3.375(5)		[**1980Go11**]
^{101}Cd	(5/2$^+$)	1.37(5) m	5.498(5)	2.087(18)		-4.830(19)	4.339(40)		[**1980Ka05**]
^{105}Sn	(5/2$^+$)	32.7(5) s	6.303(11)	3.341(4)	0.011(4)%	-3.113(6)	5.571(6)		[**2006Ka44**]
^{109}Te	(5/2$^+$)	4.3(1) s	8.536(7)	7.066(7)	9.4(31)%	1.274(11)	9.501(11)	$<$ 0.00443%	[**1985Ti02, 2002Re28, 1973Bo15 1977Ki11, 1967Ka01**, 2019Xi06, 1981Sc17, 1979Sc22, 1977Ki11, 1973Bo20]
^{113}Xe	(5/2$^+$)	2.74(8) s	8.916(11)	8.075(11)	7(4)%	4.055(11)	11.622(9)	0.007(4)%	[**1985Ti02, 2005Ja10**, 2013Pr01, 1981Sc17, 1979Sc22, 1978Ro19]
^{117}Ba	(3/2)	1.75(7) s	9.04(26)	8.30(25)	13(3)%	4.30(25)	11.24(25)	0.011-0.038%	[**1997Ja12, 1985Ti02**, 1978Bo20]
^{121}Ce	5/2$^+$	1.1(1) s	9.50(50)#	8.91(50)#	$\approx$1%	5.04(40)#	11.38(40)#		[**2005Xu04, 1997Li19**, 2002XuZZ]
^{125}Nd	(5/2)	0.60(15) s	10.00(50)#	9.56(50)#	obs	6.00(45)#	11.70(50)#		[**1999Xu05**, 2005Xu04]
^{129}Sm	(1/2$^+$, 3/2$^+$)	0.55(10) s	10.85(58)#	10.91(54)#	obs	7.63(54)#	13.32(58)#		[**1999Xu05**, 2005Xu04]
^{133}Gd			11.18(58)#	11.79(58)#		9.13(54)#	14.70(58)#		

Table 2
Particle emission from the even-Z, T_z = +5/2 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$_\alpha$	BR$_\alpha$	Experimental
^{85}Zr	6.5780(5)	10.956(9)	-4.072(7)	——	
^{89}Mo	6.130(60)	10.246(6)	-4.265(8)	——	
^{93}Ru	5.580(4)	9.586(7)	-4.627(4)	——	
^{97}Pd	5.407(11)	8.926(11)	-3.014(5)	——	
^{101}Cd	4.987(5)	8.32(5)	-0.456(5)	——	
^{105}Sn	4.444(7)	7.264(4)	0.074(4)		
^{109}Te	2.559(7)	3.781(7)	3.198(6)	3.9(13)%	[**1985Ti02, 1981Sc17, 1979Sc22**]
^{113}Xe	2.429(12)	3.194(9)	3.087(8)	$\approx$0.011%	[**1985Ti02**]
^{117}Ba	2.70(27)	8.30(25)	2.32(25)		[**1997Ja12, 1985Ti02**]
^{121}Ce	2.41(50)#	8.91(50)#	2.34(47)#		
^{125}Nd	2.21(57)#	2.36(50)#	2.22(57)#		
^{129}Sm	1.40(58)#	1.00(58)#	3.32(64)#		
^{133}Gd	1.15(64)#	0.36(64)#	3.85(71)#		

Table 3
direct α emission from ^{109}Te, J^π = (5/2$^+$), T$_{1/2}$ = 4.3(1) s*, BR_α = 3.9(13)%.**

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	J^π_f	$E_{daughter}$(^{105}Sn)	coincident γ-rays	R$_0$ (fm)	HF
3.197(15)	3.080(15)***	100%	3.9(13)%	(5/2$^+$)	0.0	——	1.650(60)	$0.8^{+1.2}_{-0.5}$

* Weighted average of 4.2(2) s [1967Ka01], 4.9(4) s [1977Bo15] , 4.1(2) s [1977Ki11] , and 4.6(3) s [2002Re28].
** From 1981Sc17].
*** From [1979Sc22].

Table 4
direct α emission from ^{113}Xe*, J^π = (5/2$^+$), T$_{1/2}$ = 2.74(8) s, BR_α = $\approx$ 0.011%.

E_α(c.m.)	E_α(lab)	I_α(rel)	I_α(abs)	J^π_f	$E_{daughter}$(^{109}Te)	coincident γ-rays	R$_0$ (fm)	HF
3.095(16)	2.985(15)	100%	$\approx$0.011%	(5/2$^+$)	0.0	——	1.68(12)	3^{+11}_{-2}

* All values from [1985Ti02].

Table 5
β-p emission from ^{113}Xe*, $BR_{\beta p}$ = 7(4)%.

E_p(c.m.)	I_p(rel)	$E_{emitter}$ (^{113}I)	$E_{daughter}$(^{112}Te)	coincident γ-rays
	32(2)%		0.0	——
	60(3)%		0.689	0.689
	$\approx$ 4%		1.476	0.787, 0.689
	$\approx$ 4%		1.484	0.794, 0.689

* All values from [2005Ja10].

Table 6
β-p emission from ^{117}Ba*, $T_{1/2}$ = 1.75(7) s, $BR_{\beta p}$ = 13(3)%.

E_p(c.m.)	I_p(rel)	$E_{emitter}$ (^{117}I)	$E_{daughter}$(^{116}Xe)	coincident γ-rays
	51(4))%		0.0	——
	41(4)%		0.394	0.394
	8(2)%		1.016	0.622. 0.394

* All values from [1985Ti02].

Table 7
β-p emission from ^{121}Ce*, $T_{1/2}$ = 1.1(1) s**, $BR_{\beta p}$ = $\approx$ 1%.

E_p(c.m.)	I_p(rel)	$E_{emitter}$ (^{121}La)	$E_{daughter}$(^{120}Ba)	coincident γ-rays
2.5-6.0			0.0	——
2.5-6.0	80%		0.1858	0.1858
2.5-6.0			0.5438	0.3578, 0.1858

* All values from [2005Xu04] except where noted.
** [1997Li19]

Table 8
β-p emission from ^{125}Nd*, $T_{1/2}$ = 0.60(15) s, $BR_{\beta p}$ = obs.

E_p(c.m.)	I_p(rel)	$E_{emitter}$ (^{125}Pr)	$E_{daughter}$(^{124}Ce)	coincident γ-rays
2.5-6.5	100%		0.1419	0.1419
2.5-6.5	26(6)%		0.4478	0.3059, 0.1419
2.5-6.5	$<$3%		0.8919	0.4441, 0.3059, 0.1419

* All values from [1999Xu05].

Table 9
β-p emission from ^{129}Sm*, $T_{1/2}$ = 0.55(10) s, $BR_{\beta p}$ = obs.

E_p(c.m.)	I_p(rel)	$E_{emitter}$ (^{129}Pm)	$E_{daughter}$(^{128}Nd)	coincident γ-rays
2.0-6.0	100%		0.1337	0.1337
2.0-6.0	$<$10%		0.44245	0.2908, 0.1337

* All values from [1999Xu05].

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