

Odd Z $T_z = +7/2$

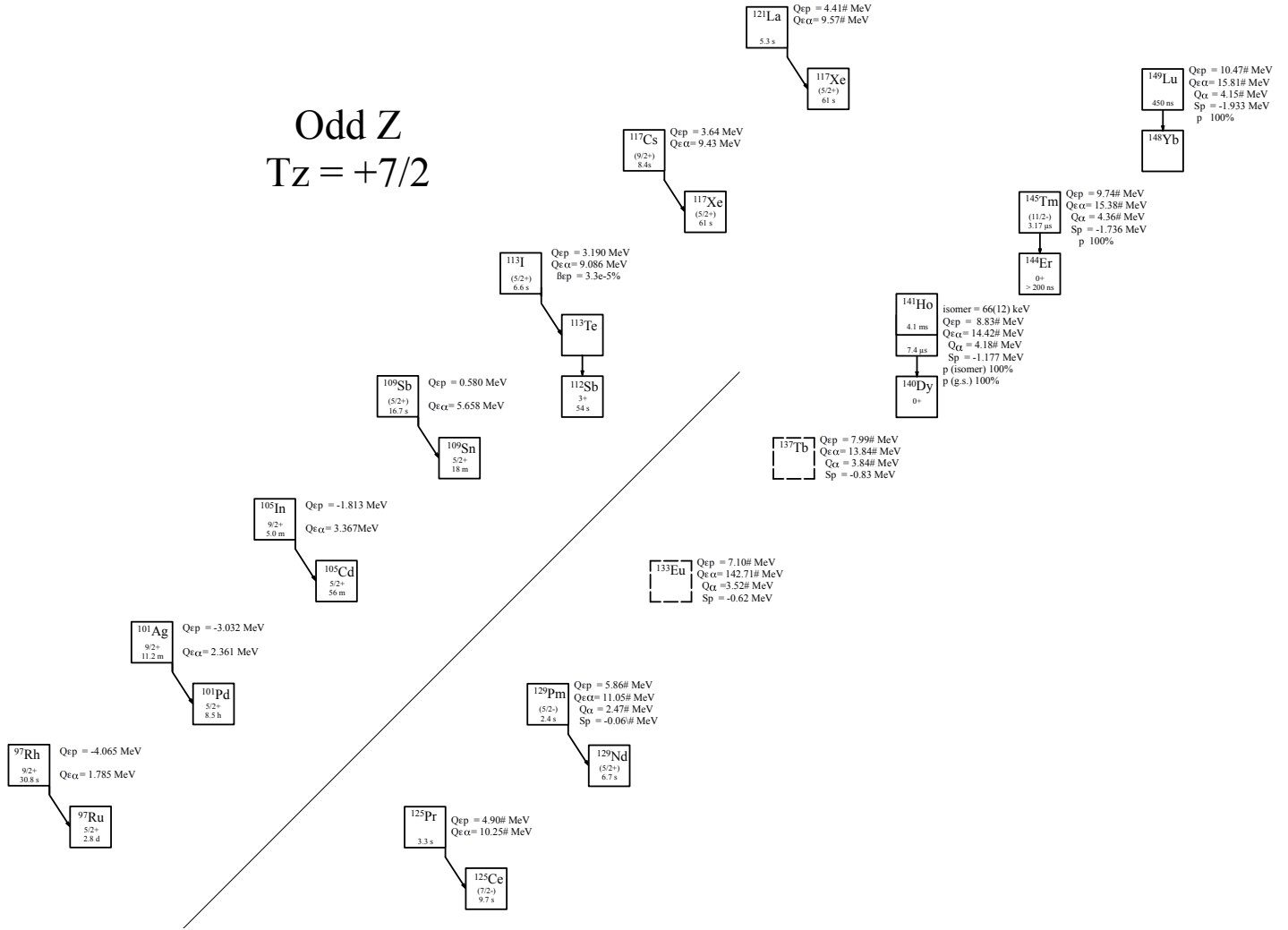


Fig. 1: Known experimental values for heavy particle emission of the odd-Z $T_z = +7/2$ nuclei.

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Table 1

Observed and predicted β -delayed particle emission from the odd- Z , $T_z = +7/2$ nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein. J^π values for ^{97}Rh , ^{101}Ag , ^{105}In , ^{109}Sb , ^{113}I , ^{117}Cs , ^{129}Pm are taken from ENSDF.

Nuclide	Ex	J^π	$T_{1/2}$	Q_ϵ	$Q_{\epsilon p}$	$BR_{\beta p}$	$Q_{\epsilon 2p}$	$Q_{\epsilon \alpha}$	Experimental
^{97}Rh		$9/2^+$	30.8(6) s*	3.52(40)	-4.065(36)	—	-9.464(35)	1.785(35)	[1975PI05, 1974Oh07]
^{101}Ag		$9/2^+$	11.2(1) m	4.098(7)	-3.032(19)	—	-8.287(5)	2.361(6)	[1966Pa14]
^{105}In		$9/2^+$	5.07(7) m	4.693(10)	-1.813(11)	—	-6.762(10)	3.367(11)	[1984Ve01]
^{109}Sb		$(5/2^+)$	16.67(15) s	6.379(9)	0.580(10)		-3.839(6)	5.658(5)	[1982Jo03]
^{113}I		$(5/2^+)$	6.6(2) s	7.228(29)	3.190(20)	$\approx 3.3\text{e-}5\%$	0.241(10)	9.086(11)	[1981Sc17, 1977Ki11]
^{117}Cs		$(9/2^+)$	8.4(6) s	7.690(60)	3.639(98)		0.992(68)	9.429(68)	[1986Ma41]
^{121}La			5.3(2) s	8.56(33)#	4.41(30)#		2.03(30)#	9.57(30)#	[1988Se08]
^{125}Pr			3.3(7) s	8.59(36)#	4.90(31)#		3.01(30)#	10.25(33)#	[1995Os03]
^{129}Pm		$(5/2^-)$	2.4(9) s	9.2(36)#	5.86(30)#		4.22(30)#	11.05(36)#	[2004Xu05]
^{133}Eu				10(42)#	7.10(33)#		5.95(30)#	12.71(36)#	
^{137}Tb				10.25(50)#	7.99(45)#		7.31(43)#	13.84(50)#	
^{141}Ho			4.1(1) ms	11.02(50)#	8.83(90)#		8.69(45)#	14.42(50)#	[2008Ka16]
^{141m}Ho	0.066(12)		7.4(3) μs	11.09(50)#	8.90(90)#		14.49(50)#	8.76(45)#	[2008Ka16]
^{145}Tm		$(11/2^-)$	3.17(20) μs	11.66(28)#	9.74(20)#		10.01(20)#	15.38(36)#	[2007Se06]
^{149}Lu			0.45 $^{+0.17}_{-0.10}$ μs	12.32(30)***	10.47(30)***		11.02(40)***	15.81***	[2022Au01]

* Weighted average of 30.3(9) m [1975PI05] and 31.1(8) m [1974Oh07].

** Deduced from proton energy and daughter values from [2021Wa16].

Table 2

Particle separation and β - α emission from the odd- Z , $T_z = +7/2$ 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_α	Experimental
^{97}Rh	3.806(35)		11.154(36)	-1.416(35)	
^{101}Ag	3.411(18)		10.328(20)	-1.162(36)	
^{105}In	2.961(10)		9.416(11)	-0.731(11)	
^{109}Sb	1.470(8)		7.262(11)	0.965(12)	
^{113}I	0.841(12)		4.861(12)	2.707(10)	
^{117}Cs	0.735(64)		4.733(69)	2.202(63)	
^{121}La	0.59(42)#		4.46(30)#	1.88(31)#	
^{125}Pr	0.44(42)#		4.00(36)#	1.70(42)#	
^{129}Pm	-0.06(36)#		3.22(39)#	2.47(42)#	
^{133}Eu	-0.62(42)#		2.04(36)#	3.52(42)#	
^{137}Tb	-0.83(50)#		1.40(45)#	3.84(60)#	
^{141}Ho	-1.177(7)	100%	0.81(50)#	4.18(57)#	[1998Da03, 1999Ry04, 2008Ka16, 2007KaZO, 2005Bi24, 2003BaZZ, 2002Kr04, 2001Se03, 2000SeZW, 1999BaZR, 1999RyZZ, 1999SeZY]
^{141m}Ho	-1.243(14)	100%	0.74(50)#	4.25(57)#	*
^{145}Tm	-1.736(7)	100%	0.11(36)#	4.36(45)#	[2007Se06, 2003Ka04, 2001Ry02, 1998Ba13, 2007SeZR, 2005Bi24, 2005RoZY, 2005Se26, 2004SeZW, 2003BaZZ, 2001Ry01, 2001Ry02, 1999BaZR]
^{149}Lu	-1.933(20)	100%	0.388(29)***	4.15(20)***	[2022Au01]

* References for ^{141m}Ho are the same as ^{141}Ho .

** Deduced from proton energy and daughter values from [2021Wa16].

Table 3

direct p emission from $^{141}\text{Ho}^*$, $J^\pi = T_{1/2} = 4.1(1)$ ms, $BR_p = 100\%$.

$E_p(\text{c.m.})$	$E_p(\text{lab})$	$I_p(\text{rel})$	$I_p(\text{absb})$	J_f^π	$E_{\text{daughter}}(^{140}\text{Dy})$	coincident γ -rays
0.975(10)	0.968(10)	0.9(2)%	0.9(2)%	(2^+)	0.202(2)	0.202(2)
1.177(8)	1.169(8)	100%	99.1(2)%	0^+	0.0	—

* All vaues from [2008Ka16].

Table 4
direct p emission from $^{141m}\text{Ho}^*$, $E_x = 66(12)$ keV, $J^\pi = T_{1/2} = 7.4(3)$ μs , $BR_p = 100\%$.

$E_p(\text{c.m.})$	$E_p(\text{lab})$	$I_p(\text{rel})$	$I_p(\text{absb})$	J_f^π	$E_{\text{daughter}}(^{140}\text{Dy})$	coincident γ -rays
1.037(10)	1.030(10)	$\approx 1\%$	$\approx 1\%$	(2 ⁺)	0.202(2)	0.202(2)
1.244(9)	1.235(9)	100%	$\approx 99\%$	0 ⁺	0.0	—

* All values from [2008Ka16].

Table 5
direct p emission from $^{145}\text{Tm}^*$, $J^\pi = (11/2^-)$, $T_{1/2} = 3.17(20)$ μs **, $BR_p = 100\%$.

$E_p(\text{c.m.})$	$E_p(\text{lab})$	$I_p(\text{rel})$	$I_p(\text{absb})$	J_f^π	$E_{\text{daughter}}(^{144}\text{Er})$	coincident γ -rays
1.410(10)	1.400(10)	10.6(15)%	9.6(15)%	2 ⁺	0.330	0.330
1.740(8)	1.728(10)	100%	90.4(15)%	0 ⁺	0.0	—

* Values from [2003Ka04] except where noted.

** [2007Se06]

Table 6
direct p emission from $^{149}\text{Lu}^*$, $J^\pi = T_{1/2} = 0.45^{+0.17}_{-0.10}$ μs , $BR_p = 100\%$.

$E_p(\text{c.m.})$	$E_p(\text{lab})$	$I_p(\text{rel})$	$I_p(\text{absb})$	J_f^π	$E_{\text{daughter}}(^{148}\text{Yb})$	coincident γ -rays
1.933(20)	1.920(20)	100%	100%	0 ⁺	0.0	—

* All values from [2022Au01].

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