



Fig. 1: Known experimental values for heavy particle emission of the even-Z $T_z = +17/2$ nuclei.

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Table 1

Observed and predicted β -delayed particle emission from the even- Z , $T_z = +17/2$ nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein. J^{π} values for ^{129}Ba , ^{133}Ce , ^{137}Nd , ^{141}Sm , ^{145}Gd , ^{149}Dy , are taken from ENSDF

Nuclide	J^π	$T_{1/2}$	Q_ϵ	$Q_{\epsilon p}$	$\text{BR}_{\beta p}$	$Q_{\epsilon 2p}$	$Q_{\epsilon \alpha}$	Experimental
^{129}Ba	$1/2^+$	2.23(11) h	2.438(11)	-2.489(11)	—	-10.656(11)	1.350(11)	[1972Ta02]
^{133}Ce	$1/2^+$	97(4) m	3.080(30)	-1.272(16)	—	-8.941(16)	2.656(17)	[1967Ge08]
^{137}Nd	$1/2^+$	38.5(15) m	3.618(14)	-0.364(12)	—	-7.518(15)	3.486(30)	[1973Bu18]
^{141}Sm	$1/2^+$	10.2(2) m	4.589(16)	1.034(9)	—	-5.683(9)	4.843(12)	[1977Ke03]
^{145}Gd	$1/2^+$	23.0(4) m	5.065(20)	1.750(20)	—	-4.544(20)	5.171(24)	[1982Fi01]
^{149}Dy	$7/2^-$	4.2(2) m	3.795(9)	1.286(9)	—	-4.727(10)	7.873(10)	[1993Al03]
^{153}Er	$(7/2^-)$	37.1(2) s	4.545(10)	2.362(10)	—	-3.421(10)	8.597(10)	[1982Bo04]
^{157}Yb	$7/2^-$	37.9(9) s*	5.289(30)	3.503(27)	—	-1.958(21)	9.167(12)	[1978AfZZ, 1977Ha48, 1970To16]
^{161}Hf	$(7/2^-)$	18.7(5) s	6.250(40)	4.558(24)	—	-0.323(36)	9.969(36)	[1995Hi12]
^{165}W	$(5/2^-)$	5.1(5) s	6.987(29)	5.668(30)	—	1.352(38)	11.276(38)	[1975To05]
^{169}Os	$(5/2^-)$	3.3(3) s	7.686(28)	6.881(29)	—	3.050(38)	12.700(29)	[1995Hi02]
^{173}Pt	$(5/2^-)$	382(2) ms	8.330(60)	8.018(65)	—	4.736(69)	14.048(64)	[2004GoZZ]
^{177}Hg	$(7/2^-)$	127(2) ms	8.770(90)	8.869(86)	—	6.041(86)	15.068(85)	[2002Ro17]
^{181}Pb	$(9/2^-)$	39.0(9) ms**	9.690(90)	9.851(86)	—	7.300(86)	16.010(86)	2009An20, 2005CaZV]

* Weighted average of 37(2) s [1978AfZZ], 38.6(10) s [1977Ha48], 34(3) s [1970To16].

** Weighted average of 36(2) ms [2009An20] and 39.6(9) ms [2005CaZV].

Table 2

Particle separation and emission from the even- Z , $T_z = +17/2$ nuclei

Nuclide	S_p	S_{2p}	Q_α	BR_α	Experimental
^{129}Ba	6.418(12)	11.318(11)	-0.286(11)	—	
^{133}Ce	5.984(40)	10.317(16)	0.218(19)		
^{137}Nd	5.533(16)	9.546(16)	0.409(20)		
^{141}Sm	5.011(26)	8.495(29)	1.225(15)		
^{145}Gd	4.596(22)	7.987(20)	0.582(21)		
^{149}Dy	4.446(15)	6.915(9)	2.808(22)		
^{153}Er	4.151(15)	6.292(10)	4.802(1)	53(3)%	1996Pa01, 1982Bo04, 1981De22, 1978Ho10, 1977AfZZ, 1988KaZK, 1988ScZO, 1981HoZM, 1980Da09, 1977Ha48, 1975ToZT, 1974Sc35, 1974To07, 1974ToZN, 1973BoXL, 1970To16, 1970Ma18
^{157}Yb	3.874(18)	5.789(12)	4.622(6)	obs	[1983Al09, 1979Ho10, 1978AfZZ, 1977Ha48, 1970To16, 1981HoZM, 1970ToZS, 1970ToZU, 1970ToZY]
^{161}Hf	3.335(61)	5.060(29)	4.718(7)*	0.30(5)%	[1995Hi12, 1992Ha10, 1973To12, 1996HiZX, 1973ToZU]
^{165}W	2.867(38)	4.170(36)	5.031(5)	< 1.5%	[1979Ho10, 1975To05, 1981HoZM, 1976ToZP]
^{169}Os	2.217(40)	3.208(32)	5.713(3)	13(2)%	[1995Hi02, 2004GoZZ, 1996Pa01, 1984Sc06, 1982En03, 1982De11, 1981DeZO, 1981DeZL, 1978Sc26, 1972To19]
^{173}Pt	1.846(71)	2.217(66)	6.380(5)***	86(6)%	[2004GoZZ, 2014ThZZ, 2009An20, 2002Ro19, 1996Pa01, 1993ToZY, 1993ToZX, 1982En03, 1981De22, 1981DeZB, 1979Ha10, 1975Ca39, 1973Ga08, 1966Si08]
^{177}Hg	1.544(91)	1.645(87)	6.731(5)@	100%	[2009An20, 2004GoZZ, 1996Pa01, 2003Me20, 2002Ro17, 1991Se01, 1990SeZW, 1976HaYQ, 1976HoZD, 1975Ca39]
^{181}Pb	1.01(11)	0.756(90)	7.240(7)	\approx 100%	2009An20, 2005CaZV, 2005CaZY, 2004CaZW, 1996To01, 1995ToZU, 1989To01, 1986Ke03]

* Deduced from α energy, 4.679(25) in [2021Wa16].

** Deduced from α energy, 5.030(32) in [2021Wa16].

*** Deduced from α energy, 6.361(58) in [2021Wa16].

@ Deduced from α energy, 6.736(56) in [2021Wa16].

Table 3

direct α emission from ^{153}Er , $J^\pi = (7/2^-)$, $T_{1/2} = 37.1(2)$ s*, $\text{BR}_\alpha = 53(3)\%**$.

$E_\alpha(\text{c.m.})$	$E_\alpha(\text{lab})$	$I_\alpha(\text{abs})$	J_f^π	$E_{\text{daughter}}(^{149}\text{Dy})$	coincident γ -rays	R_0 (fm)	HF
4.799(2)	4.674(2)***	53(3)**	$7/2^-$	0.0	—	1.5584(94)	$1.21^{+0.23}_{-0.20}$

* [1982Bo04].

** [1979Ho10].

*** Weighted average of 4.674(4) [1996Pa01], 4.676(2) [1981De22], and 4.671(3) [1978AfZZ].

Table 4
direct α emission from ^{157}Yb , $J^\pi = 7/2^-$, $T_{1/2} = 37.9(9)$ s*, $BR_\alpha = \text{obs.}$

$E_\alpha(\text{c.m.})$	$E_\alpha(\text{lab})$	$I_\alpha(\text{abs})$	J_f^π	$E_{\text{daughter}}(^{153}\text{Er})$	coincident γ -rays	R_0 (fm)	HF
4.622(10)	4.504(10)**		(7/2 ⁻)	0.0	—	1.563(27)	

* Weighted average of 37(2) s [1978AfZZ], 38.6(10) s [1977Ha48], 34(3) s [1970To16].

** Weighted average of 4.504(10) MeV [1983Al09], 4.505(10) MeV [1979Ho10], 4.504(10) MeV [1978AfZZ], 4.507(10) MeV [1977Ha48], and 4.500(10) MeV [1970To16].

Table 5
direct α emission from ^{161}Hf , $J^\pi = (7/2^-)$, $T_{1/2} = 18.7(5)$ s*, $BR_\alpha = 0.30(5)\%$ *

$E_\alpha(\text{c.m.})$	$E_\alpha(\text{lab})$	$I_\alpha(\text{abs})$	J_f^π	$E_{\text{daughter}}(^{157}\text{Yb})$	coincident γ -rays	R_0 (fm)	HF
4.718(7)	4.600(7)**	0.30(5)%*	7/2 ⁻	0.0	—	1.567(12)	0.49 ^{+0.17} _{-0.14} ***

* [1995Hi12].

** Weighted average of 4.604(10) MeV [1995Hi12], 4.599(7) MeV [1992Ha10], and 4.600(10) MeV [1973To12].

*** This low value for HF may indicate that the BR for α -decay is slightly higher than reported in [1995Hi12].

Table 6
direct α emission from ^{165}W , $J^\pi = (5/2^-)$, $T_{1/2} = 5.1(5)$ s*, $BR_\alpha = <1.5\%$ **.

$E_\alpha(\text{c.m.})$	$E_\alpha(\text{lab})$	$I_\alpha(\text{abs})$	J_f^π	$E_{\text{daughter}}(^{161}\text{Hf})$	coincident γ -rays	R_0 (fm)	HF
5.031(5)	4.909(5)*	<1.5%**	(7/2 ⁻)	0.0	—	1.541(20)	>0.08***

* [1975To05].

** [1979Ho10].

*** This unphysical HF value indicates that the α branching ratio is much lower. A value of $BR_\alpha = 0.12\%$ gives a value of 1.0.

Table 7
direct α emission from ^{169}Os *, $J^\pi = (5/2^-)$, $T_{1/2} = 3.3(3)$ s*, $BR_\alpha = 13(2)\%$.

$E_\alpha(\text{c.m.})$	$E_\alpha(\text{lab})$	$I_\alpha(\text{rel})$	$I_\alpha(\text{abs})$	J_f^π	$E_{\text{daughter}}(^{165}\text{W})$	coincident γ -rays	R_0 (fm)	HF
5.642(8)	5.508(8)	15%	2.0(3)%	(7/2 ⁻)	0.072	0.028?, 0.043, 0.072	1.5627(60)	8
5.670(10)	5.536(10)	10%	1.3(2)%	(3/2 ⁻)	0.043	0.043	1.5627(60)	15
5.713(8)	5.578(8)	100%	10(2)%	(5/2 ⁻)	0.0	—	1.5627(60)	2.4

* All values from [1995Hi02].

Table 8
direct α emission from ^{173}Pt *, $J^\pi = (5/2^-)$, $T_{1/2} = 382(2)$ ms, $BR_\alpha = 86(6)\%$.

$E_\alpha(\text{c.m.})$	$E_\alpha(\text{lab})$	$I_\alpha(\text{rel})$	$I_\alpha(\text{abs})$	J_f^π	$E_{\text{daughter}}(^{169}\text{Os})$	coincident γ -rays	R_0 (fm)	HF
6.211(5)	6.067(5)	$\approx 1\%$	$\approx 1\%$		0.171(7)	0.171	1.5565(36)	50 ⁺⁵ ₋₂
6.244(5)	6.100(5)	$\approx 1\%$	$\approx 1\%$		0.136(7)	0.136	1.5565(36)	60 ⁺⁷ ₋₂
6.278(5)	6.133(5)	$\approx 2\%$	$\approx 2\%$		0.102(7)		1.5565(36)	40 ⁺⁵ ₋₂
6.380(5)	6.232(5)	100%	82(6)%	(5/2 ⁻)	0.0	—	1.5565(36)	2.22(24)

* All values from [2004GoZZ].

Table 9direct α emission from ^{177}Hg , $J^\pi = (7/2^-)$, $T_{1/2} = 127(2)$ ms*, $BR_\alpha = 100\%^{**}$.

E_α (c.m.)	E_α (lab)	I_α (abs)	J_f^π	$E_{daughter}(^{173}\text{Pt})$	coincident γ -rays	R_0 (fm)	HF
6.731(5)	6.579(5)***	100%	(5/2 ⁻)	0.0	—	1.55433(52)	1.48 ^{+0.17} _{-0.16}

* [2002Ro17].

** [2009An20]

*** Weighted average of 6.580(5) MeV [2004GoZZ] and 6.577(9) MeV [1996Pa01].

Table 10direct α emission from ^{181}Pb , $J^\pi = (9/2^-)$, $T_{1/2} = 39.0(9)$ ms*, $BR_\alpha = \approx 100\%$.

E_α (c.m.)	E_α (lab)	I_α (abs)	J_f^π	$E_{daughter}(^{177}\text{Hg})$	coincident γ -rays	R_0 (fm)	HF
7.174(10)	7.015(10)**	100%	9/2 ⁻	0.077	0.077	1.5139(54)	1.47 ^{+0.17} _{-0.16}

** Weighted average of 36(2) ms [2009An20] and 39.6(9) ms [2005CaZV].

** Weighted average of 7.016(15) MeV [2009An10] and 7.015(10) MeV [2005CaZV].

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