



**Fig. 1:** Known experimental values for heavy particle emission of the even- $Z$   $T_z = +59/2$  nuclei.

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**Table 1**

Observed and predicted  $\beta$ -delayed particle emission from the even- $Z$ ,  $T_z = +59/2$  nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein.

Nuclide	$J^\pi$	$T_{1/2}$	$Q_\varepsilon$	$Q_{\beta^-}$	$Q_{\beta^- \alpha}$	Experimental
$^{231}\text{Rn}$		obs		4.47(30)##		[2010Al24]
$^{235}\text{Ra}$				3.77(30)##		
$^{239}\text{Th}$				3.16(45)##		
$^{243}\text{U}$				2.67(30)##		
$^{247}\text{Pu}^*$		2.27(23) d		2.06(22)##		[1983Po14]
$^{251}\text{Cm}^*$		16.8(2) m		1.420(20)		[1978Lo13]
$^{255}\text{Cf}^*$		85(18) m		0.72(20)##		[1981Lo15]
$^{259}\text{Fm}$		1.57(9) s**		0.14(30)##		[1985So03, 1981Ho32, 1980Hu03]
			$Q_{\varepsilon p}$	$Q_{\varepsilon \alpha}$		
$^{263}\text{No}$						
$^{267}\text{Rf}$		$1.3^{+2.3}_{-0.5}$ h				[2011Og07]
$^{271}\text{Sg}$		$1.9^{+2.4}_{-0.6}$ m				[2011Og07]
$^{275}\text{Hs}$		$190^{+220}_{-70}$ s	0.71(84)##			[2011Og07]
$^{279}\text{Ds}$		$200^{+50}_{-40}$ ms	1.44(90)##	-1.49(68)##	10.82(85)##	[2011Og07]
$^{283}\text{Cn}$		$3.8^{+1.2}_{-0.7}$ s	1.96(92)##	-0.74(68)##	11.33(91)##	[2011Og07]
$^{287}\text{Fl}$		$480^{+160}_{-90}$ ms	2.47(84)##	0.19(93)##	12.12(92)##	[2011Og07]
$^{291}\text{Lv}$		$18^{+22}_{-6}$ ms	3.06(96)##	1.22(94)##	13.36(94)##	[2011Og07]
$^{295}\text{Og}$			—	—	—	—

\* 100%  $\beta^-$ -emitter.

\*\* Weighted average of 1.6(1) s [1985So03], 1.5(2) s [1981Ho32] and 1.5(3) s [1980Hu03].

**Table 2**

Particle separation, Q-values, and measured values for direct particle emission of the even- $Z$ ,  $T_z = +59/2$  nuclei. Unless otherwise stated, all S and Q-values are taken from [2021Wa16] or deduced from values therein.

Nuclide	$S_p$	$Q_\alpha$	$\text{BR}_\alpha$	$\text{BR}_{SF}$	Experimental
$^{235}\text{Ra}$		2.16(42)##			
$^{239}\text{Th}$		2.95(50)##			
$^{243}\text{U}$		3.56(50)##			
$^{247}\text{Pu}$		4.31(36)##			
$^{251}\text{Cm}$		5.01(20)##			
$^{255}\text{Cf}$	6.87(36)##	5.74(20)##			
$^{259}\text{Fm}$	6.29(49)##	6.47(20)##	100%		[1985So03, 1981Ho32, 1980Hu03, 1982GhZZ, 1976HoYT, 1976HoZP, 1976HoZS]
$^{263}\text{No}$	5.83(66)##	7.00(40)##			
$^{267}\text{Rf}$	5.51(79)##	7.89(30)##		100%	[2016Ho09, 2011Og07]
$^{271}\text{Sg}$	5.07(82)##	8.75(14)##		70%	[2016Ho09, 2011Og07, 2006Og05, 2005Og03, 2005OgZZ, 2004OgZZ]
$^{275}\text{Hs}$	4.56(83)##	9.450(54)##		100%	[2016Ho09, 2011Og07, 2006Og05, 2005Og03, 2005OgZZ, 2004OgZZ]
$^{279}\text{Ds}$	4.03(84)##	10.11(12)##		10%	[2016Ho09, 2011Og07, 2006Og05, 2005Og03, 2005OgZZ, 2004Og12, 2004OgZZ]
$^{283}\text{Cn}$	3.69(85)##	9.89(11)##		100%	[2016Ho09, 2011Og07, 2006Og05, 2005Og03, 2005OgZZ, 2004Og12, 2004OgZZ]
$^{287}\text{Fl}$	3.32(85)##	10.170(50)		100%	[2016Ho09, 2011Og07, 2006Og05, 2005Og03, 2005OgZZ, 2004Og12, 2004OgZZ]
$^{291}\text{Lv}$	2.84(86)##	10.791(12)		100%	[2016Ho09, 2011Og07, 2006Og05, 2004Og12]
$^{295}\text{Og}$	2.32(88)##	11.70(20)##			

**Table 3**direct  $\alpha$  emission from  $^{271}\text{Sg}^*$ ,  $T_{1/2} = 1.9^{+2.4}_{-0.6}$  m,  $BR_\alpha = 70\%$ .

$E_\alpha$ (c.m.)	$E_\alpha$ (lab)	$I_\alpha$ (abs)	$J_f^\pi$	$E_{daughter}(^{267}\text{Rf})$	coincident $\gamma$ -rays (keV)	HF
8.67(8)	8.54(8)	70%				

\* All values from [2011Og07], which contains all measured data.

**Table 4**direct  $\alpha$  emission from  $^{275}\text{Hs}^*$ ,  $T_{1/2} = 190^{+220}_{-70}$  s,  $BR_\alpha = 100\%$ .

$E_\alpha$ (c.m.)	$E_\alpha$ (lab)	$I_\alpha$ (abs)	$J_f^\pi$	$E_{daughter}(^{271}\text{Sg})$	coincident $\gamma$ -rays (keV)	HF
9.44(6)	9.30(6)	100%				

\* All values from [2011Og07], which contains all measured data.

**Table 5**direct  $\alpha$  emission from  $^{279}\text{Ds}^*$ ,  $T_{1/2} = 200^{+50}_{-40}$  ms,  $BR_\alpha = 10\%$ .

$E_\alpha$ (c.m.)	$E_\alpha$ (lab)	$I_\alpha$ (abs)	$J_f^\pi$	$E_{daughter}(^{275}\text{Hs})$	coincident $\gamma$ -rays (keV)	HF
9.84(6)	9.70(6)	10%				

\* All values from [2011Og07], which contains all measured data.

**Table 6**direct  $\alpha$  emission from  $^{283}\text{Cn}^*$ ,  $T_{1/2} = 3.8^{+1.2}_{-0.7}$  s,  $BR_\alpha = 100\%$ .

$E_\alpha$ (c.m.)	$E_\alpha$ (lab)	$I_\alpha$ (abs)	$J_f^\pi$	$E_{daughter}(^{275}\text{Hs})$	coincident $\gamma$ -rays (keV)	HF
9.67(6)	9.54(6)	100%				

\* All values from [2011Og07], which contains all measured data.

**Table 7**direct  $\alpha$  emission from  $^{287}\text{Fl}^*$ ,  $T_{1/2} = 480^{+160}_{-90}$  ms,  $BR_\alpha = 100\%$ .

$E_\alpha$ (c.m.)	$E_\alpha$ (lab)	$I_\alpha$ (abs)	$J_f^\pi$	$E_{daughter}(^{283}\text{Cn})$	coincident $\gamma$ -rays (keV)	HF
10.16(6)	10.02(6)	100%				

\* All values from [2011Og07], which contains all measured data.

**Table 8**direct  $\alpha$  emission from  $^{291}\text{Lv}^*$ ,  $T_{1/2} = 18^{+22}_{-6}$  ms,  $BR_\alpha = 100\%$ .

$E_\alpha$ (c.m.)	$E_\alpha$ (lab)	$I_\alpha$ (abs)	$J_f^\pi$	$E_{daughter}(^{287}\text{Fl})$	coincident $\gamma$ -rays (keV)	HF
10.89(6)	10.74(6)	100%				

\* All values from [2011Og07], which contains all measured data.

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