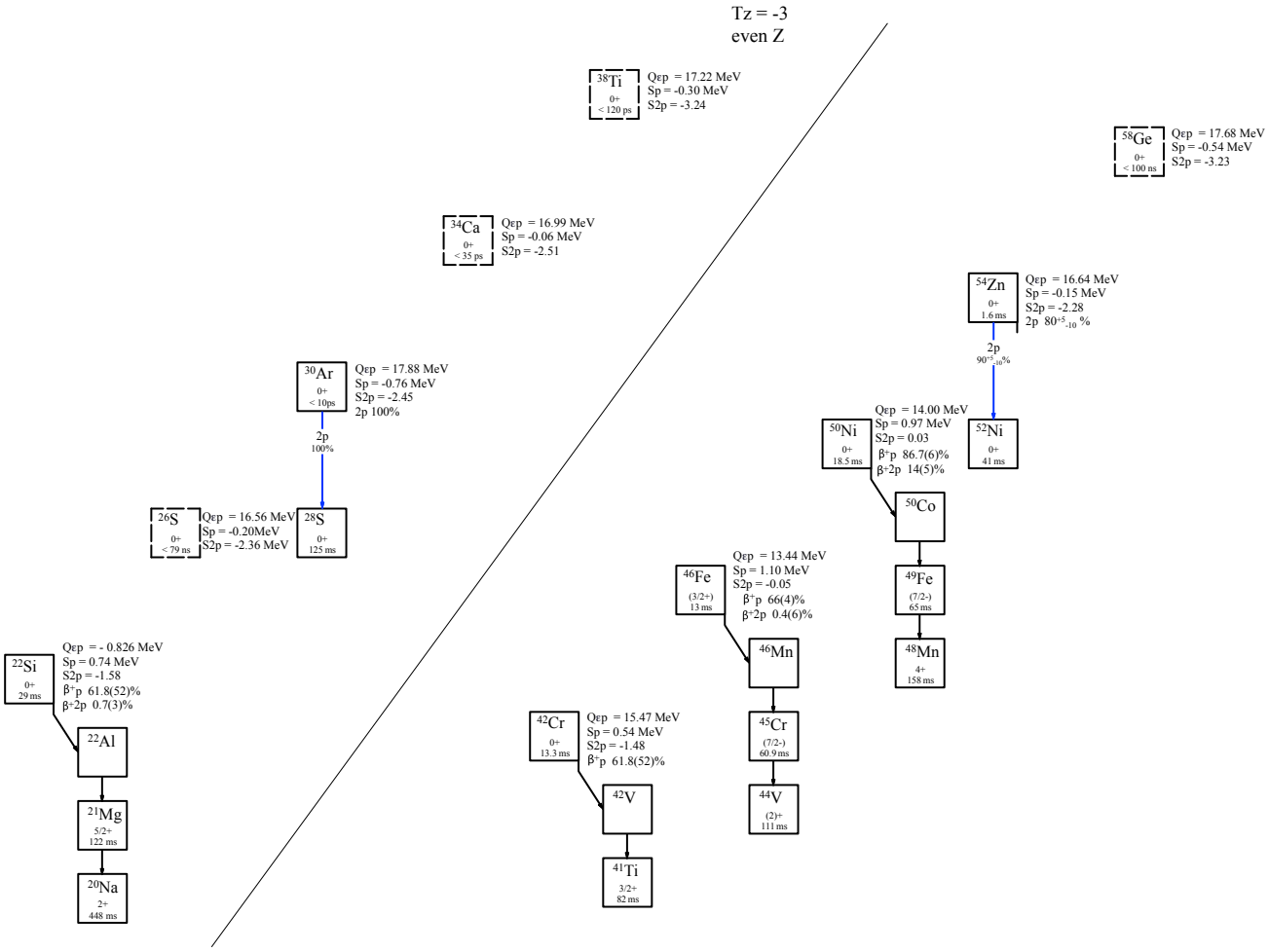

Fig. 1: Known experimental values for heavy particle emission of the even Z T_z= -3 nuclei.

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Table 1
Observed and predicted β-delayed particle emission from the even Z, T_z = -3 nuclei. Unless otherwise stated, all Q-values are taken from [2021Wa16] or deduced from values therein.

Nuclide	J^π	$T_{1/2}$	Q_ε	$Q_{\varepsilon p}$	$BR_{\beta p}$	$Q_{\varepsilon 2p}$	$BR_{\beta 2p}$	$Q_{\varepsilon 3p}$	$Q_{\varepsilon\alpha}$	Experimental
^{22}Si	0^+	28.6(14) ms*	15.44(64)#	15.45(50)#	61.8(52)%*	12.21(50)#	0.7(3)%**	10.02(50)#	6.18(51)#	[**2020Le16, 2017Xu01**, 2022Ci04, 1997Cz02, 1996Bl11]
^{26}S	0^+	$<$ 79 ns	16.71(63)#	16.56(60)#		13.15(60)#		11.29(60)#	7.06(72)#	[**2011Fo08**]
^{30}Ar	0^+	$<$ 10 ps	17.40(18)#	17.88(18)		14.64(18)		12.59(18)#	8.67(27)#	[**2019Ko18, 2016Xu08, 2015Mu13**]
^{34}Ca	0^+	$<$ 35 ns	16.11(36)#	16.99(30)#		13.64(30)#		12.07(30)#	7.79(30)#	
^{38}Ti	0^+	$<$ 120 ns	15.62(36)#	17.22(30)#		14.21(30)#		12.55(30)#	10.17(36)#	[**1996Bl21**]
^{42}Cr	0^+	13.3(10) ms***	14.68(36)#	15.47(30)#	94.4(50)%	13.01(30)#		12.48(30)#	8.89(36)#	[**2007Do17, 2001Gi01**]
^{46}Fe	0^+	13.0(20) ms***	13.63(31)#	13.44(30)#	66(4)%[@]	10.44(30)#	0.4(6)%[@]	8.66(30)#	6.41(36)#	[**2014Po05, 2007Do17**, 1992Bo37]
^{50}Ni	0^+	18.5(12) ms***	14.13(52)#	14.00(50)#	86.7(6)%[a]	11.26(50)#	14(5)%	9.24(50)#		[**2007Do17**, 2003Ma34]
^{54}Zn	0^+	$1.59^{+0.60}_{-0.35}$ ms	15.54(45)#	16.64(22)#	[b]	14.07(22)#		12.62(22)#	9.47(26)#	[**2011As08, 2005Bl15**]
^{58}Ge	0^+	$<$100 ns	15.96(58)#	17.68(54)#		16.47(50)#		15.89(50)#	11.24(64)#	[**2016Bl05**]

* [2020Le16]
** [2017Xu01].
*** [2007Do17]
[@] [2014Po05]
[a] Energies of individual proton peaks not reported in [2007Do17, 2003Ma34].
[b] Events were measured in [2011As08, 2005Bl15] consistent with β-delayed proton emission.

Table 2
Particle emission from even Z, T_z = -3 nuclei. Unless otherwise stated, all Q-values and separation energies are taken from [2021Wa16] or deduced from values therein.

Nuclide	S_p	BR_{1p}	S_{2p}	BR_{2p}	Q_α	Experimental
^{22}Si	0.74(78)#	——	-1.58(50)#			
^{26}S	-0.20(72)#		-2.36(60)#		-8.39(78)#	
^{30}Ar	-0.76(13)#		$-2.45^{+0.05}_{-0.10}$*	100%	-8.03(63)#	[**2019Ko18**, 2016Xu08, 2015Mu13]
^{34}Ca	-0.06(36)#		-2.51(30)#		-9.61(35)#	
^{38}Ti	-0.30(42)#		-3.24(30)#		-5.95(42)#	
^{42}Cr	0.54(36)#		-1.48(31)#		-6.74(42)#	
^{46}Fe	1.10(42)#		-0.05(30)#		-8.28(42)#	
^{50}Ni	0.97(71)#		0.03(51)#		-7.09(58)#	
^{54}Zn	-0.15(55)#		-2.28(20)	90^{+5}_{-10}%	-4.67(55)#	[**2011As08**]
^{58}Ge	-0.54(64)#		-3.23(64)		-4.30(55)#	[**2011As08**]

* [2019Ko18]

Table 3
β-p emission from ^{22}Si*, $T_{1/2}$= 28.6(14) ms, $BR_{\beta p}$ = 61.8(52)%

E_p(c.m.)	I_p(rel)	I_p(abs)	$E_{emitter}$ (^{22}Al)**	$E_{daughter}$(^{21}Mg)***	coincident γ-rays***
0.71(5)	12(3)	5.3(10)	0.902(403)	0.202(4)	0.202
1.95(5)	100(15)	43.0(46)	2.142(403)	0.202(4)	0.202
2.15(5)	31(6)	13.5(21)	2.142(403)	0	——

*All values taken from [2020Le16] except where noted. [1997Cz02, 1996Bl11] reported protons with energies of 1.63(5) and 2.10(5) meV which were nor observed in [2020Le16].
** Calculated from proton energies and S_p (^{22}Al) = -10(400) keV [2021Wa16]. For levels de-excited by more than one proton transition, E_{level} (emitter) is the weighted average.
*** Values from measured γ energy in [2020Le16].

Table 4
β-2p emission from ^{22}Si*, $T_{1/2}$= 28.6(14) ms, $BR_{\beta 2p}$ =0.7(3)%.

E_{2p}(c.m.)	I_p(abs)	$E_{emitter}$ (^{22}Al)	$E_{daughter}$(^{20}Na)	coincident γ-rays
5.600(70)	0.007(3)	8.83(41)	0	——

*All values taken from [2017Xu01] except where noted.
** Calculated from two proton energy and S_{2p} (^{22}Al) = 3230(400)# keV [2021Hu06].

Table 5
β-p emission from ^{42}Cr*, $T_{1/2}$= 13.3(10) ms**, $BR_{\beta p}$ = 94.4(50)%.

E_p(c.m.)	I_p(rel)	I_p(abs)	$E_{emitter}$ (^{42}V)	$E_{daughter}$(^{41}Ti)	coincident γ-rays
1.537(35)	31(25)	14(11)			
1.951(20)	100(34)	45(15)			
2.551(30)	31(25)	14(11)			
3.186(20)	26(14)	11.8(64)			
3.806(20)	21(14)	9.5(61)			

* Energies and relative intensities are taken from [2001Gi01]. Absolute intensities are calculated from the relative intensities modified by the total branching ratio from [2007Do17].
** [2007Do17].

Table 6
β-p emission from ^{46}Fe*, $T_{1/2}$= 13.0(20) ms, $BR_{\beta p}$ = 78.7(38)%

E_p(c.m.)	I_p(rel)	I_p(abs)	$E_{emitter}$ (^{46}Mn)**	$E_{daughter}$(^{45}Cr)	coincident γ-rays
≈0.75***	12(7)	1.2(7)			
≈1.05***	16(8)	1.6(8)			
1.457(28)	100(30)	10(3)			
1.692(23)	40(40)	4(4)			
3.272(23)	61(25)	6.1(25)			
4.239(33)	79(32)	7.9(32)	4.92(9)+x	0.494+x	0.494

*All values taken from [2007Do17] except where noted.
** Calculated from proton energies and S_p (^{46}Mn) = 190(90)# keV [2021Hu06].
*** Possible transitions from [2014Po05].

Table 7
β-2p emission from ^{50}Ni*, $T_{1/2}$= 18.5(12) ms, $BR_{\beta 2p}$ =24(5)%.

E_{2p}(c.m.)	I_p(abs)	$E_{emitter}$ (^{50}Co)**	$E_{daughter}$(^{48}Mn)	coincident γ-rays
1.972(13)	14(5)	4.82(13)	0	——

*All values taken from [2007Do17] except where noted.
** Calculated from two proton energy and S_{2p} (^{50}Co) = 2870(130)# keV [2021Hu06].

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