^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 172,1 (2021)	31-Jan-2021

Parent: ^{100}Nb: E=0.0; J$^\pi$=1$^+$; $T_{1/2}$=1.4 s *2*; Q(β^-)=6396 *8*; %β^- decay=100
^{100}Nb-J$^\pi$,$T_{1/2}$: From ^{100}Nb Adopted Levels.
^{100}Nb-Q(β^-): From 2017Wa10.

2019Gu20 (also 2019Gu03,2020Gu06,priv. comm.): ^{100}Nb isotope from U(p,F),E=25 MeV at the IGISOL facility and JYFLTRAP double Penning trap system at the university of Jyvaskyla. Measured Eγ, Iγ, Eβ, $\beta\gamma$-coin, total absorption γ spectrum (TAGS) using Decay Total Absorption γ-ray Spectrometer (DTAS) with 18 NaI(Tl) crystals, a plastic β detector and an HPGe detector. Deduced β feedings, absolute cumulative γ-intensities deexciting the main levels in ^{100}Mo, average γ and β energies. Discussed impact on antineutrino spectrum summation calculations. Comparison with evaluated data in ENSDF, ENDF/B-VII.1 and JEFF-3.1.1.

2012Ro01: ^{100}Nb produced at IGISOL facility, via proton-induced fission of uranium, and mass separated using JYFLTRAP Penning trap system and Ramsey laser technique to separate the ground state and isomeric activities at Jyvaskyla accelerator facility. The detector array consisted of a plastic β scintillator, two Ge clovers, and one Ge LOAX detector. Complete isolation of the two activities could not be achieved in this study.

1987Me06: source of ^{100}Nb from mass separation of fission fragments using JOSEF separator at Julich. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$ for a mixed activity of ground state and isomer.

1976Ah06: ^{100}Nb source from mass separation of fragments using TRIGA reactor at Mainz. Measured energies of 11 γ rays, placed among nine excited states up to 2468 keV. Source had mixed g.s. and isomeric activity. The γ-ray intensities and energy uncertainties were not provided.

1982VoZP: source of ^{100}Nb from ^{100}Zr β^- decay, the latter obtained in two ways: chemical separation of fragments produced in neutron-induced fission of ^{235}U using TRIGA reactor at Mainz, and mass separation of fission fragments from neutron-induced fission of ^{235}U using JOSEF separator at Julich. Measured Eγ, Iγ, $\gamma\gamma$-coin, and $\beta\gamma$-coin. Deduced levels, Iβ feedings and log *ft* values.

1972He37: ^{100}Nb source from ^{100}Mo(n,p),E=14.8 MeV. Measured Eγ, Iγ, $\gamma\gamma$-coin, Eβ, $\beta\gamma$-coin. Deduced levels, Iβ feedings, log *ft*. A total 27 γ rays were reported and 20 placed among ten levels up to 2563 keV. The ^{100}Nb source used was a mixture of the two activities. Only the composite intensities were provided. Energy uncertainties were not given.

Others:

1990Ma01, 1989OhZY: measured half-life of 695-keV level by $\beta\gamma$(t) fast-timing method.

1984Pa19, 1983Ke09: ^{100}Nb from mass separation of fission fragments using OSTIS separator at ILL-Grenoble. Measured $\beta\gamma$-coin using mixed activity. Deduced Q(β) value.

1984BuZS: measured $\gamma\gamma$-coin for nine γ rays. No other details given.

1979Bo26: measurement of precise energies of 535.6- and 528.3-keV γ rays using curved-crystal spectrometer.

1978St02: ^{100}Nb from mass separation of fission fragments using LOHENGRIN separator at ILL-Grenoble. Measured $\beta\gamma$-coin using mixed activity. Deduced Q(β) value.

1975Kh05: ^{100}Nb source from mass separation of fission fragments using JOSEF separator at Julich. Measured conversion electron spectrum. Deduced E0 transition from 695-keV level.

1972Tr08: a 7.1-s activity in ^{100}Nb reported from observation of three γ rays. This half-life is actually for ^{100}Zr decay.

1970Ei02: ^{100}Nb from mass separation of fission fragments using gas-filled Online mass separator at the FRJ-2 reactor in Julich. Measured energies of three main gamma rays placed from three excited states, $\gamma\gamma$-coin and $\beta\gamma$-coin. Deduced Q(β) value. Half-life of 6.6 s *2* actually is for ^{100}Zr decay.

1969WiZX: ^{100}Nb from fission fragments of ^{252}Cf SF decay. Measured Eγ, deduced first excited state of ^{100}Mo.

1967Hu09: measured Eγ.

Additional information 1.

Total decay energy deposit of 6387 keV *340* calculated by RADLIST code is in agreement with expected value of 6396 keV *8*.

^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20 (continued)

^{100}Mo Levels

E(level)†	Jπ@	$T_{1/2}$	Comments
0.0	0^+		
535.663 *14*	2^+		
695.21 *8*	0^+	1.58 ns *3*	$T_{1/2}$: weighted average of 1.58 ns *4* ($\beta\gamma$(t), 1990Ma01) and 1.57 ns *5* ($\beta\gamma$(t), 1989OhZY).
1063.918 *22*	2^+		
1136.17 *10*	4^+		
1463.95 *8*	2^+		
1504.79 *8*	0^+&		
1607.30 *14*	(3^+)		
(1766.52‡ *11*)	(2^+)		
(1908.19‡ *6*)	3^-		
1977.15 *14*	$(1,2^+)$		
2037.55 *10*	0^+&		
2042.78‡ *7*	$(2)^+$		
2086.38 *15*	0^+&		
2189.65 *15*	$(0^+,1,2)$		
(2286.47‡ *17*)	2^+		
2320.4 *3*	$(0^+,1,2)$		
2420# *20*			
2460# *20*			
2500# *20*			
2540# *20*			
2580# *20*			
2620# *20*			
2660# *20*			
2700# *20*			
2740# *20*			
2780# *20*			
2820# *20*			
2860# *20*			
2900# *20*			
2934.9 *10*	(4^+)		
2970.3 *4*	4^+		
3004.3 *10*			
3020# *20*			
3039.3 *10*	(4^+)		
3062.64 *25*	$(0^+,1,2)$		
3070.3 *4*	$(0^+,1,2)$		
3129.7 *4*	$(0^+,1,2)$		
3180# *20*			
3220# *20*			
3260# *20*			
3300# *20*			
3340# *20*			
3380# *20*			
3420# *20*			

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^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20 (continued)

^{100}Mo Levels (continued)

E(level)†	E(level)†	E(level)†	E(level)†
3460# *20*	3940# *20*	4420# *20*	4900# *20*
3500# *20*	3980# *20*	4460# *20*	4940# *20*
3540# *20*	4020# *20*	4500# *20*	4980# *20*
3580# *20*	4060# *20*	4540# *20*	5020# *20*
3620# *20*	4100# *20*	4580# *20*	5060# *20*
3660# *20*	4140# *20*	4620# *20*	5100# *20*
3700# *20*	4180# *20*	4660# *20*	5140# *20*
3740# *20*	4220# *20*	4700# *20*	5180# *20*
3780# *20*	4260# *20*	4740# *20*	5220# *20*
3820# *20*	4300# *20*	4780# *20*	5260# *20*
3860# *20*	4340# *20*	4820# *20*	
3900# *20*	4380# *20*	4860# *20*	

† From least-squares fit to Eγ data, unless otherwise stated.
‡ Level population suggested by 2019Gu20 (and priv. comm.) from TAGS data. Energy is taken from the Adopted Levels.
# Pseudo-level from 40-keV binned TAGS data 2019Gu20 (and priv. comm.). Uncertainty of 20 keV is assigned by evaluators based on 40-keV binned experimental data. This level is not included in the Adopted Levels.
@ From the Adopted Levels, unless otherwise stated.
& From $\gamma\gamma(\theta)$ (1987Me06).

β^- radiations

E(decay)	E(level)	Iβ^-†@	Log *ft*	Comments
(1136 22)	5260	0.004# *3*	6.1 *4*	av Eβ=410.1 *92* Iβ^-: 0.004 +*3*−*2*.
(1176 22)	5220	0.005# *3*	6.0 *3*	av Eβ=427.2 *93* Iβ^-: 0.005 *3*.
(1216 22)	5180	0.007# *4*	5.9 *3*	av Eβ=444.4 *93* Iβ^-: 0.007 +*4*−*3*.
(1256 22)	5140	0.007# *3*	6.0 *2*	av Eβ=461.6 *94* Iβ^-: 0.007 *3*.
(1296 22)	5100	0.005# *2*	6.2 *2*	av Eβ=479.0 *94* Iβ^-: 0.005 *2*.
(1336 22)	5060	0.006# *3*	6.2 *2*	av Eβ=496.4 *95* Iβ^-: 0.006 +*2*−*3*.
(1376 22)	5020	0.009# *5*	6.0 *3*	av Eβ=513.9 *95* Iβ^-: 0.009 +*7*−*3*.
(1416 22)	4980	0.018# *10*	5.8 *3*	av Eβ=531.5 *95* Iβ^-: 0.018 +*11*−*9*.
(1456 22)	4940	0.025# *10*	5.7 *2*	av Eβ=549.2 *96* Iβ^-: 0.025 +*9*−*11*.
(1496 22)	4900	0.025# *8*	5.7 *2*	av Eβ=566.9 *96* Iβ^-: 0.025 +*10*−*5*.
(1536 22)	4860	0.025# *8*	5.8 *2*	av Eβ=584.7 *96* Iβ^-: 0.025 +*10*−*6*.
(1576 22)	4820	0.029# *8*	5.8 *2*	av Eβ=602.5 *97*

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^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^- † @	Log *ft*	Comments
				Iβ^-: 0.029 +*11*−*4*.
(1616 *22*)	4780	0.036# *9*	5.7 *1*	av Eβ=620.4 *97* Iβ^-: 0.036 +*13*−*5*.
(1656 *22*)	4740	0.037# *10*	5.7 *2*	av Eβ=638.3 *97* Iβ^-: 0.037 +*14*−*5*.
(1696 *22*)	4700	0.036# *11*	5.8 *2*	av Eβ=656.3 *98* Iβ^-: 0.036 +*14*−*8*.
(1736 *22*)	4660	0.038# *12*	5.8 *2*	av Eβ=674.4 *98* Iβ^-: 0.038 +*15*−*9*.
(1776 *22*)	4620	0.047# *12*	5.8 *1*	av Eβ=692.5 *98* Iβ^-: 0.047 +*17*−*6*.
(1816 *22*)	4580	0.053# *13*	5.7 *1*	av Eβ=710.6 *98* Iβ^-: 0.053 +*19*−*7*.
(1856 *22*)	4540	0.049# *16*	5.8 *2*	av Eβ=728.8 *98* Iβ^-: 0.049 +*18*−*13*.
(1896 *22*)	4500	0.039# *12*	5.9 *2*	av Eβ=747.0 *99* Iβ^-: 0.039 +*15*−*8*.
(1936 *22*)	4460	0.034# *9*	6.0 *2*	av Eβ=765.3 *99* Iβ^-: 0.034 +*13*−*5*.
(1976 *22*)	4420	0.040# *12*	6.0 *2*	av Eβ=783.6 *99* Iβ^-: 0.040 +*19*−*5*.
(2016 *22*)	4380	0.053# *13*	5.9 *1*	av Eβ=801.9 *99* Iβ^-: 0.053 +*19*−*7*.
(2056 *22*)	4340	0.068# *18*	5.9 *2*	av Eβ=820.3 *99* Iβ^-: 0.068 +*25*−*10*.
(2096 *22*)	4300	0.073# *22*	5.9 *2*	av Eβ=839 *10* Iβ^-: 0.073 +*28*−*15*.
(2136 *22*)	4260	0.069# *20*	5.9 *2*	av Eβ=857 *10* Iβ^-: 0.069 +*27*−*12*.
(2176 *22*)	4220	0.061# *16*	6.0 *1*	av Eβ=876 *10* Iβ^-: 0.061 +*23*−*8*.
(2216 *22*)	4180	0.056# *15*	6.1 *2*	av Eβ=894 *10* Iβ^-: 0.056 +*21*−*8*.
(2256 *22*)	4140	0.17# *5*	5.6 *2*	av Eβ=913 *10* Iβ^-: 0.173 +*68*−*41*.
(2296 *22*)	4100	0.11# *3*	5.8 *2*	av Eβ=931 *10* Iβ^-: 0.111 +*39*−*22*.
(2336 *22*)	4060	0.18# *5*	5.7 *2*	av Eβ=950 *10* Iβ^-: 0.180 +*65*−*41*.
(2376 *22*)	4020	0.17# *5*	5.7 *2*	av Eβ=968 *10* Iβ^-: 0.173 +*68*−*41*.
(2416 *22*)	3980	0.09# *3*	6.0 *2*	av Eβ=987 *10* Iβ^-: 0.090 +*42*−*25*.
(2456 *22*)	3940	0.044# *17*	6.4 *2*	av Eβ=1006 *10* Iβ^-: 0.044 +*21*−*13*.
(2496 *22*)	3900	0.039# *15*	6.4 *2*	av Eβ=1024 *10* Iβ^-: 0.039 +*14*−*15*.
(2536 *22*)	3860	0.08# *4*	6.2 *2*	av Eβ=1043 *10* Iβ^-: 0.079 +*54*−*24*.
(2576 *22*)	3820	0.21# *10*	5.8 *2*	av Eβ=1062 *10*

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^{100}Nb β$^-$ decay (1.4 s) 1982VoZP,1987Me06,2019Gu20 (continued)

β$^-$ radiations (continued)

E(decay)	E(level)	Iβ$^-$[†@]	Log *ft*	Comments
				Iβ$^-$: 0.21 +*11*−*8*.
(2616 *22*)	3780	0.38[#] *10*	5.5 *1*	av Eβ=1080 *10* Iβ$^-$: 0.38 +*14*−*6*.
(2656 *22*)	3740	0.31[#] *13*	5.7 *2*	av Eβ=1099 *11* Iβ$^-$: 0.31 +*14*−*11*.
(2696 *22*)	3700	0.14[#] *6*	6.0 *2*	av Eβ=1118 *11* Iβ$^-$: 0.143 +*60*−*53*.
(2736 *22*)	3660	0.072[#] *24*	6.3 *2*	av Eβ=1137 *11* Iβ$^-$: 0.072 +*24*−*23*.
(2776 *22*)	3620	0.067[#] *17*	6.4 *1*	av Eβ=1156 *11* Iβ$^-$: 0.067 +*18*−*15*.
(2816 *22*)	3580	0.091[#] *24*	6.3 *2*	av Eβ=1174 *11* Iβ$^-$: 0.091 +*26*−*22*.
(2856 *22*)	3540	0.11[#] *3*	6.2 *2*	av Eβ=1193 *11* Iβ$^-$: 0.114 +*31*−*25*.
(2896 *22*)	3500	0.11[#] *3*	6.3 *2*	av Eβ=1212 *11* Iβ$^-$: 0.114 +*40*−*17*.
(2936 *22*)	3460	0.12[#] *4*	6.2 *2*	av Eβ=1231 *11* Iβ$^-$: 0.116 +*46*−*23*.
(2976 *22*)	3420	0.14[#] *4*	6.2 *2*	av Eβ=1250 *11* Iβ$^-$: 0.140 +*53*−*19*.
(3016 *22*)	3380	0.17[#] *4*	6.1 *1*	av Eβ=1269 *11* Iβ$^-$: 0.173 +*59*−*26*.
(3056 *22*)	3340	0.18[#] *5*	6.1 *2*	av Eβ=1288 *11* Iβ$^-$: 0.183 +*61*−*30*.
(3096 *22*)	3300	0.15[#] *4*	6.3 *2*	av Eβ=1306 *11* Iβ$^-$: 0.149 +*50*−*25*.
(3136 *22*)	3260	0.11[#] *3*	6.4 *2*	av Eβ=1325 *11* Iβ$^-$: 0.111 +*36*−*20*.
(3176 *22*)	3220	0.11[#] *3*	6.4 *2*	av Eβ=1344 *11* Iβ$^-$: 0.111 +*33*−*27*.
(3216 *22*)	3180	0.19[#] *6*	6.2 *2*	av Eβ=1363 *11* Iβ$^-$: 0.191 +*68*−*45*.
(3266[&] *8*)	3129.7	0.28 *7*	6.1 *1*	av Eβ=1387.1 *38* Iβ$^-$: 0.42 +*13*−*11* (2019Gu20 and priv. comm.) for 2380.
(3326[&] *8*)	3070.3	0.8 *2*	5.7 *1*	av Eβ=1415.3 *38* Iβ$^-$: 0.74 +*24*−*12* (2019Gu20 and priv. comm.) for 3100.
(3333[&] *8*)	3062.64	0.6 *1*	5.8 *1*	av Eβ=1418.9 *38* Iβ$^-$: 0.97 +*33*−*14* (2019Gu20 and priv. comm.) for 3060.
(3357[&] *8*)	3039.3	[‡]		av Eβ=1430.0 *39* Iβ$^-$: Iβ=0.06 *5*, nearly zero, as expected for a ΔJ=(3) β transition.
(3376 *22*)	3020	1.1[#] *3*	5.5 *2*	av Eβ=1439 *11* Iβ$^-$: 1.13 +*43*−*16*.
(3392[&] *8*)	3004.3	0.10 *8*	6.6 *4*	av Eβ=1446.6 *39*
(3426[&] *8*)	2970.3	1.9[‡] *4*	5.3 *1*	av Eβ=1462.7 *38* Iβ$^-$: 0.97 +*35*−*22* (2019Gu20 and priv. comm.) for 2980. Expected β feeding is zero from ΔJ=3 β transition.
(3461[&] *8*)	2934.9	0.33[‡] *8*	6.1 *1*	av Eβ=1479.6 *39* Iβ$^-$: 0.43 +*20*−*13* (2019Gu20 and priv. comm.) for 2940. Expected β feeding is zero from ΔJ=(3) β transition.

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^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^- [†@]	Log *ft*	Comments
(3496 *22*)	2900	0.14[#] *6*	6.5 *2*	av Eβ=1496 *11* Iβ^-: 0.144 *+79−39* (2019Gu20 and priv. comm.).
(3536 *22*)	2860	0.077[#] *24*	6.8 *2*	av Eβ=1515 *11* Iβ^-: 0.077 *+22−25* (2019Gu20 and priv. comm.).
(3576 *22*)	2820	0.09[#] *3*	6.7 *2*	av Eβ=1534 *11* Iβ^-: 0.090 *+25−29* (2019Gu20 and priv. comm.).
(3616 *22*)	2780	0.14[#] *4*	6.6 *2*	av Eβ=1553 *11* Iβ^-: 0.142 *+39−36* (2019Gu20 and priv. comm.).
(3656 *22*)	2740	0.20[#] *5*	6.4 *1*	av Eβ=1572 *11* Iβ^-: 0.204 *+68−36* (2019Gu20 and priv. comm.).
(3696 *22*)	2700	0.23[#] *6*	6.4 *1*	av Eβ=1591 *11* Iβ^-: 0.225 *+88−33* (2019Gu20 and priv. comm.).
(3736 *22*)	2660	0.20[#] *5*	6.5 *1*	av Eβ=1610 *11* Iβ^-: 0.196 *+73−29* (2019Gu20 and priv. comm.).
(3776 *22*)	2620	0.14[#] *3*	6.7 *1*	av Eβ=1629 *11* Iβ^-: 0.141 *+45−26* (2019Gu20 and priv. comm.).
(3816 *22*)	2580	0.10[#] *3*	6.8 *2*	av Eβ=1649 *11* Iβ^-: 0.103 *+32−23* (2019Gu20 and priv. comm.).
(3856 *22*)	2540	0.095[#] *26*	6.9 *2*	av Eβ=1668 *11* Iβ^-: 0.095 *+30−21* (2019Gu20 and priv. comm.).
(3896 *22*)	2500	0.10[#] *3*	6.9 *2*	av Eβ=1687 *11* Iβ^-: 0.100 *+35−21* (2019Gu20 and priv. comm.).
(3936 *22*)	2460	0.13[#] *4*	6.8 *2*	av Eβ=1706 *11* Iβ^-: 0.127 *+41−29* (2019Gu20 and priv. comm.).
(3976 *22*)	2420	0.30[#] *8*	6.4 *2*	av Eβ=1725 *11* Iβ^-: 0.30 *+9−7* (2019Gu20 and priv. comm.).
(4076 *8*)	2320.4	1.3 *3*	5.8 *1*	av Eβ=1772.4 *39* Iβ^-: 0.94 *11* (2019Gu20 and priv. comm.) for 2380.
(4110 *8*)	(2286.47)	0.84[#] *27*	6.0 *2*	av Eβ=1788.7 *39* Iβ^-: 0.84 *+33−20* (2019Gu20 and priv. comm.).
(4206 *8*)	2189.65	1.5 *3*	5.8 *1*	av Eβ=1834.9 *39* Iβ^-: 1.5 *+5−15* (2019Gu20 and priv. comm.).
(4310 *8*)	2086.38	7.0 *12*	5.2 *1*	av Eβ=1884.3 *39* Iβ^-: 8.1 *+29−14* (2019Gu20 and priv. comm.). E(decay): 4266 *50* from 1982VoZP. Others: 1983Ke09, 1984Pa19.
(4353 *8*)	2042.78	1.8[#] *9*	5.8 *2*	av Eβ=1905.2 *39* Iβ^-: 1.8 *9* (2019Gu20 and priv. comm.).
(4359 *8*)	2037.55	4.7 *7*	5.4 *1*	av Eβ=1907.7 *39* Iβ^-: 3.5 *11* (2019Gu20 and priv. comm.). E(decay): 4304 *71* from 1982VoZP. Others: 1983Ke09, 1984Pa19.
(4419 *8*)	1977.15	0.80 *17*	6.2 *1*	av Eβ=1936.6 *39* Iβ^-: 0.25 *+17−19* (2019Gu20 and priv. comm.).
(4488 *8*)	(1908.19)	0.69[#] *22*	8.0[1u] *2*	av Eβ=1969.6 *39* Iβ^-: 0.69 *+22−21* (2019Gu20 and priv. comm.).
(4630 *8*)	(1766.52)	0.68[#] *23*	6.4 *2*	av Eβ=2037.4 *39* Iβ^-: 0.68 *+34−11* (2019Gu20 and priv. comm.).
(4789[&] *8*)	1607.30	0.7[‡] *2*	6.4 *2*	av Eβ=2113.7 *39* Iβ^-: 0.61 *+22−18* (2019Gu20 and priv. comm.). Expected β feeding is zero from ΔJ=(2), $\Delta\pi$=(yes) β transition.
(4891 *8*)	1504.79	3.7 *6*	5.7 *1*	av Eβ=2162.9 *39* Iβ^-: 2.9 *+26−8* (2019Gu20 and priv. comm.). E(decay): 4740 *120* from 1982VoZP. Others: 1983Ke09, 1984Pa19.

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^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20 (continued)

β^- radiations (continued)

E(decay)	E(level)	I$\beta^{-\dagger @}$	Log *ft*	Comments
(4932 *8*)	1463.95	3.4 *9*	5.8 *1*	av Eβ=2182.5 *39* Iβ^-: 4.0 +*13*−*28* (2019Gu20 and priv. comm.). E(decay): 4770 *130* from 1983Ke09. Other: 1984Pa19.
(5332 *8*)	1063.918	1.6 *6*	6.3 *2*	av Eβ=2374.4 *39* Iβ^-: from TAGS data (2019Gu20 and priv. comm.) where value is 1.6 +*5*−*6*. Transition intensity balance gives Iβ=3.9% *9*, implying that about 2.3% β feeding to this level is likely from the gamma rays from unobserved levels in gamma-ray spectroscopy. E(decay): 5160 *70* from 1983Ke09. Other: 1984Pa19.
(5701 *8*)	695.21	8.5 *14*	5.7 *1*	av Eβ=2551.3 *39* Iβ^-: 10.5 +*33*−*17* (2019Gu20 and priv. comm.). E(decay): 5520 *120* from 1983Ke09. Other: 1984Pa19.
(5860 *8*)	535.663	5.0 *17*	5.9 *2*	av Eβ=2627.9 *39* Iβ^-: from TAGS data (2019Gu20 and priv. comm.) where value is 5.0 +*17*−*16*. Transition intensity balance gives Iβ=10.6% *19*, implying that about 5.5% β feeding to this level is likely from the gamma rays from unobserved levels in gamma-ray spectroscopy. E(decay): 5650 *90* from 1983Ke09. Others: 1984Pa19, 1972He37.
(6396 *8*)	0.0	50 *7*	5.1 *1*	av Eβ=2885.2 *39* Iβ^-: value deduced by the evaluators from the decay scheme, based on the adopted γ normalization factor. This value agrees with 46% +*16*−*15* from TAGS data, and 40% *6* obtained from $4\pi\gamma$-β coin counting method for TAGS data (2020Gu06, corresponding values were 46% +*8*−*15* and 41% *16* in their 2019Gu20 publication).

† For discrete levels, β feedings are from transition-intensity balances, unless otherwise stated. All the values for pseudolevels between 2420 and 2900, and above 3150 are from TAGS data (2019Gu20 and priv. comm.). Total β feeding of 11.6% *11* from the TAGS data between the 1760 and 5260 levels is not revealed by the high-resolution gamma-ray data, and apparent β feeding of 10.5% *41* to four low-lying levels is in excess, as compared to values from the TAGS data. This suggests that while the total β feeding to levels based on the γ-ray data has not changed significantly, the distribution of β feeding is much different, and according to TAGS data, about 7.5% β feeding populates a large number of levels in ^{100}Mo up to 5260 keV.

‡ Apparent β feeding, probably due to missing transitions from higher levels, as from ΔJ^π, no β feeding is expected.

From TAGS data (2019Gu20 and priv. comm.). The uncertainties are systematic which dominate the statistical uncertainties. The latter were also provided by the authors of 2019Gu20, but as all these were negligible as compared to the systematic uncertainties listed here.

@ Absolute intensity per 100 decays.

& Existence of this branch is questionable.

γ(^{100}Mo)

Iγ normalization: From measured %Iγ(504γ from ^{100}Zr β^-)=30 *4* (2007Ri01), 31 *4* (1981DeYV). Other: 19 *2* in 1989WaZV seems discrepant.

E_γ[†]	I_γ[‡c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	α[d]	Comments
159.5 *1*	8.9 *5*	695.21	0+	535.663	2+	E2		0.223	α(K)=0.188 *3*; α(L)=0.0287 *4*; α(M)=0.00517 *8*; α(N+..)=0.000776 *11* α(N)=0.000748 *11*; α(O)=2.87×10^{-5} *4* E_γ: same value in 1987Me06 and 1982VoZP. I_γ: 8.2 *12* in 1982VoZP from I(γ+ce)=10.8 *6* and α=0.22. Iγ(159.5)/Iγ(535.7)=28.7 *16*/100 *8* (2012Ro01).
327[a] *1*	0.12[&] *52*	1463.95	2+	1136.17	4+				
368.6 *5*	0.13[&] *3*	1063.918	2+	695.21	0+				
400[a] *1*	0.16[&] *10*	1463.95	2+	1063.918	2+				
440.9 *1*	1.07 *5*	1504.79	0+	1063.918	2+				E_γ: 440.9 *1* (1982VoZP), 440.7 *2* (1987Me06). Iγ(440.9)/Iγ(535.7)=1.9 *2*/100 *8* (2012Ro01).
471 *1*	0.10[&] *6*	1607.30	(3+)	1136.17	4+				
513.2[a] *2*	0.20[&] *5*	1977.15	(1,2+)	1463.95	2+				
528.263[@] *18*	9.1 *2*	1063.918	2+	535.663	2+	E2+M1	+4.4 *+15−9*	0.00400	α(K)=0.00350 *6*; α(L)=0.000416 *7*; α(M)=7.45×10^{-5} *12*; α(N+..)=1.180×10^{-5} *18* α(N)=1.121×10^{-5} *17*; α(O)=5.91×10^{-7} *9* E_γ: 528.2 *1* (1982VoZP), 528.3 *1* (1987Me06). Iγ(528.2)/Iγ(535.7)=21.2 *15*/100 *8* (2012Ro01). Mult.: from $T_{1/2}$(1064 level), δ(528γ) and RUL. δ: from A_2=−0.22 *3*, A_4=+0.31 *3* for (528γ)(536γ)(θ) (1987Me06).
535.666[@] *14*	45.7 *10*	535.663	2+	0.0	0+	E2		0.00388	α(K)=0.00339 *5*; α(L)=0.000403 *6*; α(M)=7.21×10^{-5} *10*; α(N+..)=1.143×10^{-5} *16* α(N)=1.085×10^{-5} *16*; α(O)=5.72×10^{-7} *8* I_γ: statistical uncertainty is 0.1 in 1982VoZP. Evaluators assign ≈2% to include a crude estimate of systematic uncertainty. Relative Iγ=100 *8* (2012Ro01). E_γ: others: 535.7 *1* (1987Me06), 535.5 *1* (1982VoZP), 535.4 *5* (1976Ah06).
543.4 *2*	0.42[&] *3*	1607.30	(3+)	1063.918	2+				E_γ: 543.5 *1* (1982VoZP), 543.0 *2* (1987Me06). No relative intensity given in 2012Ro01 from ^{100}Nb g.s. decay.
573.5 *2*	0.29 *4*	2037.55	0+	1463.95	2+				E_γ: 573.6 *2*(1982VoZP), 573.3 *4* (1987Me06). Iγ(573.5)/Iγ(535.7)=0.9 *1*/100 *8* (2012Ro01).
600.5 *1*	0.55 *5*	1136.17	4+	535.663	2+	(E2)		0.00280	α(K)=0.00245 *4*; α(L)=0.000289 *4*; α(M)=5.16×10^{-5} *8*;

From ENSDF

γ(^{100}Mo) (continued)

E_γ[†]	I_γ[‡c]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	α[d]	$I_{(\gamma+ce)}$[c]	Comments
										α(N+..)=8.20×10^{-6} *12* α(N)=7.78×10^{-6} *11*; α(O)=4.16×10^{-7} *6* E_γ: same value in 1982VoZP and 1987Me06. Iγ(600.5)/Iγ(535.7)=0.8 *1*/100 *8* (2012Ro01).
622.5 *2*	1.45[&] *30*	2086.38	0$^+$	1463.95	2$^+$	(E2)[b]		0.00254		α(K)=0.00222 *4*; α(L)=0.000261 *4*; α(M)=4.66×10^{-5} *7*; α(N+..)=7.41×10^{-6} *11* α(N)=7.03×10^{-6} *10*; α(O)=3.77×10^{-7} *6* E_γ: 622.4 *2* (1982VoZP), 622.6 *2* (1987Me06). Iγ(622.5)/Iγ(535.7)=3.7 *4*/100 *8* (2012Ro01). (622γ)(769γ)(θ): A_2=+0.31 *9*, A_4=+1.26 *19* (1987Me06) is typical of 0-2-0 cascade.
695.0		695.21	0$^+$	0.0	0$^+$	E0			1.32 *18*	E_γ,Mult.: transition seen in ce measurements (1975Kh05). K/L=11.7 *38* (1975Kh05). $I_{(\gamma+ce)}$: using branching of 695 transition from the Adopted Gammas.
768.7 *1*	3.4[&] *3*	1463.95	2$^+$	695.21	0$^+$	E2[b]		1.45×10^{-3}		α(K)=0.001277 *18*; α(L)=0.0001473 *21*; α(M)=2.63×10^{-5} *4*; α(N+..)=4.20×10^{-6} *6* α(N)=3.98×10^{-6} *6*; α(O)=2.18×10^{-7} *3* E_γ: 768.6 *1* (1982VoZP), 768.9 *2* (1987Me06). Iγ(768.7)/Iγ(535.7)=8.1 *6*/100 *8* (2012Ro01).
856.3 *3*	0.40[&] *16*	2320.4	(0$^+$,1,2)	1463.95	2$^+$					
913.2 *5*	0.19[&] *9*	1977.15	(1,2$^+$)	1063.918	2$^+$					
928.3 *1*	2.5 *1*	1463.95	2$^+$	535.663	2$^+$	M1+E2	−0.27 *2*	9.42×10^{-4}		α(K)=0.000830 *12*; α(L)=9.27×10^{-5} *13*; α(M)=1.655×10^{-5} *24*; α(N+..)=2.67×10^{-6} *4* α(N)=2.52×10^{-6} *4*; α(O)=1.446×10^{-7} *21* E_γ: 928.2 *1* (1982VoZP), 928.5 *2* (1987Me06). Iγ(928.3)/Iγ(535.7)=7.3 *6*/100 *8* (2012Ro01). δ: from A_2=+0.38 *7*, A_4=0.00 *12* for (928γ)(536γ)(θ) (1987Me06). Mult.: from $T_{1/2}$(1464 level), δ(928γ) and RUL.
969.1 *1*	2.6[&] *3*	1504.79	0$^+$	535.663	2$^+$	(E2)[b]		8.30×10^{-4}		α(K)=0.000730 *11*; α(L)=8.29×10^{-5} *12*; α(M)=1.480×10^{-5} *21*; α(N+..)=2.37×10^{-6} *4* α(N)=2.25×10^{-6} *4*; α(O)=1.252×10^{-7} *18* E_γ: 969.1 *1* (1982VoZP), 969.1 *4* (1987Me06). Iγ(969.1)/Iγ(535.7)=5.6 *5*/100 *8* (2012Ro01). (969γ)(536γ)(θ): A_2=+0.30 *12*, A_4=+1.43 *24* (1987Me06) is typical of 0-2-0 cascade.
1022.5 *3*	4.9[&] *6*	2086.38	0$^+$	1063.918	2$^+$	(E2)[b]		7.34×10^{-4}		α(K)=0.000646 *9*; α(L)=7.31×10^{-5} *11*;

γ(^{100}Mo) (continued)

E_γ[†]	I_γ[‡c]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	α[d]	Comments
								α(M)=1.305×10^{-5} *19*; α(N+..)=2.09×10^{-6} *3* α(N)=1.98×10^{-6} *3*; α(O)=1.108×10^{-7} *16* E_γ: 1022.2 *2* (1982VoZP), 1022.8 *2* (1987Me06). Iγ(1022.5)/Iγ(535.7)=12.3 *11*/100 *8* (2012Ro01). (1022γ)(528γ)(θ): A_2=+0.08 *5*, A_4=+0.27 *7* (1987Me06). (1022γ)(1064γ)(θ): A_2=+0.41 *25*, A_4=+1.28 *43* (1987Me06) is typical of 0-2-0 cascade. (1022γ)(536γ)(θ): A_2=−0.01 *4*, A_4=+0.15 *6* (1987Me06).
1063.7 *1*	3.3 *2*	1063.918	2$^+$	0.0	0$^+$	E2[b]	6.72×10^{-4}	α(K)=0.000591 *9*; α(L)=6.68×10^{-5} *10*; α(M)=1.192×10^{-5} *17*; α(N+..)=1.91×10^{-6} *3* α(N)=1.81×10^{-6} *3*; α(O)=1.015×10^{-7} *15* E_γ: 1063.7 *1* (1982VoZP), 1063.9 *2* (1987Me06). Iγ(1063.7)/Iγ(535.7)=8.9 *7*/100 *8* (2012Ro01).
1071.6 *2*	0.49[&] *8*	1607.30	(3$^+$)	535.663	2$^+$			E_γ: 1071.7 *2* (1982VoZP), 1071.5 *3* (1987Me06). Iγ(1071.6)/Iγ(535.7)=0.9 *1*/100 *8* (2012Ro01).
1125.8 *2*	0.31 *6*	2189.65	(0$^+$,1,2)	1063.918	2$^+$			E_γ: 1125.8 *2* (1982VoZP), 1125 *1* (1987Me06).
1257.0 *6*	0.90 *8*	2320.4	(0$^+$,1,2)	1063.918	2$^+$			E_γ: 1256.5 *4* (1982VoZP), 1257.8 *5* (1987Me06). Iγ(1256.5)/Iγ(535.7)=2.1 *3*/100 *8* (2012Ro01).
1281.8[a] *5*	0.14[&] *4*	1977.15	(1,2$^+$)	695.21	0$^+$			
1362.5 *10*	0.10[&] *7*	2970.3	4$^+$	1607.30	(3$^+$)			
[x]1391 *1*	0.07[&] *3*							Suggested placement from 2086, 0$^+$ level to 695, 0$^+$ level by 1982VoZP is incorrect. The peak in $\gamma\gamma$-coin spectrum (1982VoZP) may have resulted from 622+769 coincidental summing.
1397 *1*	0.10[&] *7*	3004.3		1607.30	(3$^+$)			
1432 *1*	0.06[&] *5*	3039.3	(4$^+$)	1607.30	(3$^+$)			
1441.5 *2*	0.27[&] *6*	1977.15	(1,2$^+$)	535.663	2$^+$			Iγ(1441.5)/Iγ(535.7)=1.2 *2*/100 *8* (2012Ro01).
1501.9 *1*	4.4[&] *3*	2037.55	0$^+$	535.663	2$^+$	(E2)[b]	4.09×10^{-4}	α(K)=0.000286 *4*; α(L)=3.19×10^{-5} *5*; α(M)=5.68×10^{-6} *8*; α(N+..)=8.49×10^{-5} *12* α(N)=8.65×10^{-7} *13*; α(O)=4.93×10^{-8} *7*; α(IPF)=8.40×10^{-5} *12* E_γ: 1501.9 *1* (1982VoZP), 1502.0 *3* (1987Me06). Iγ(1501.9)/Iγ(535.7)=12.7 *11*/100 *8* (2012Ro01). (1502γ)(536γ)(θ): A_2=+0.36 *8*, A_4=+1.05 *14* (1987Me06) is typical of 0-2-0 cascade.
1550.5 *3*	0.68 *9*	2086.38	0$^+$	535.663	2$^+$			Iγ(1550.5)/Iγ(535.7)=2.3 *2*/100 *8* (2012Ro01).
1598.7 *3*	0.21 *5*	3062.64	(0$^+$,1,2)	1463.95	2$^+$			
1653.9 *2*	1.23 *10*	2189.65	(0$^+$,1,2)	535.663	2$^+$			E_γ: 1653.9 *2* (1982VoZP), 1653.9 *4* (1987Me06). Iγ(1653.9)/Iγ(535.7)=3.0 *4*/100 *8* (2012Ro01).
1665.7 *4*	0.28 *5*	3129.7	(0$^+$,1,2)	1463.95	2$^+$			

$^{100}_{42}$Mo$_{58}$-10

γ(^{100}Mo) (continued)

E_γ [†]	I_γ [‡c]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1871 *1*	0.33 *6*	2934.9	(4$^+$)	1063.918	2$^+$	
1906.6 *5*	0.39[&] *14*	2970.3	4$^+$	1063.918	2$^+$	
2434.6 *5*	1.39[&] *11*	2970.3	4$^+$	535.663	2$^+$	Iγ(2434.6)/Iγ(535.7)=3.3 *5*/100 *8* (2012Ro01).
2526.9 *4*	0.34 *5*	3062.64	(0$^+$,1,2)	535.663	2$^+$	
2534.6 *4*	0.81 *9*	3070.3	(0$^+$,1,2)	535.663	2$^+$	

† Weighted averages of values from 1982VoZP and 1987Me06. Values in column 1 of Table 1 in 2012Ro01 seem to have been taken from β^- decay datasets in 2008Si01 (A=100 NDS evaluation), although, in the text, the authors of 2012Ro01 seem to suggest that values given in their Table 1 are from their observations.

‡ From 1982VoZP. Relative intensities given in 1987Me06, 1976Ah06 and earlier studies were not used by the evaluators, as the sources used in these studies were mixtures of the ground state as well as isomeric activities, and only the composite intensities were provided. 2012Ro01 claimed to separate the two activities using laser technique combined with a Penning trap system, but it appears that complete separation was not achieved.

\# From the Adopted Gammas, unless otherwise stated.

@ From measurement with a curved-crystal spectrometer (1979Bo26).

& From γγ data in 1982VoZP, as the singles spectra were contaminated by other activities.

a Not reported in (n,n′γ).

b γγ(θ) data typical of 0 → 2 → 0 cascade, where both transitions are expected as E2 (from RUL), as levels with long lifetimes are not observed.

c For absolute intensity per 100 decays, multiply by 1.00 *13*.

d Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

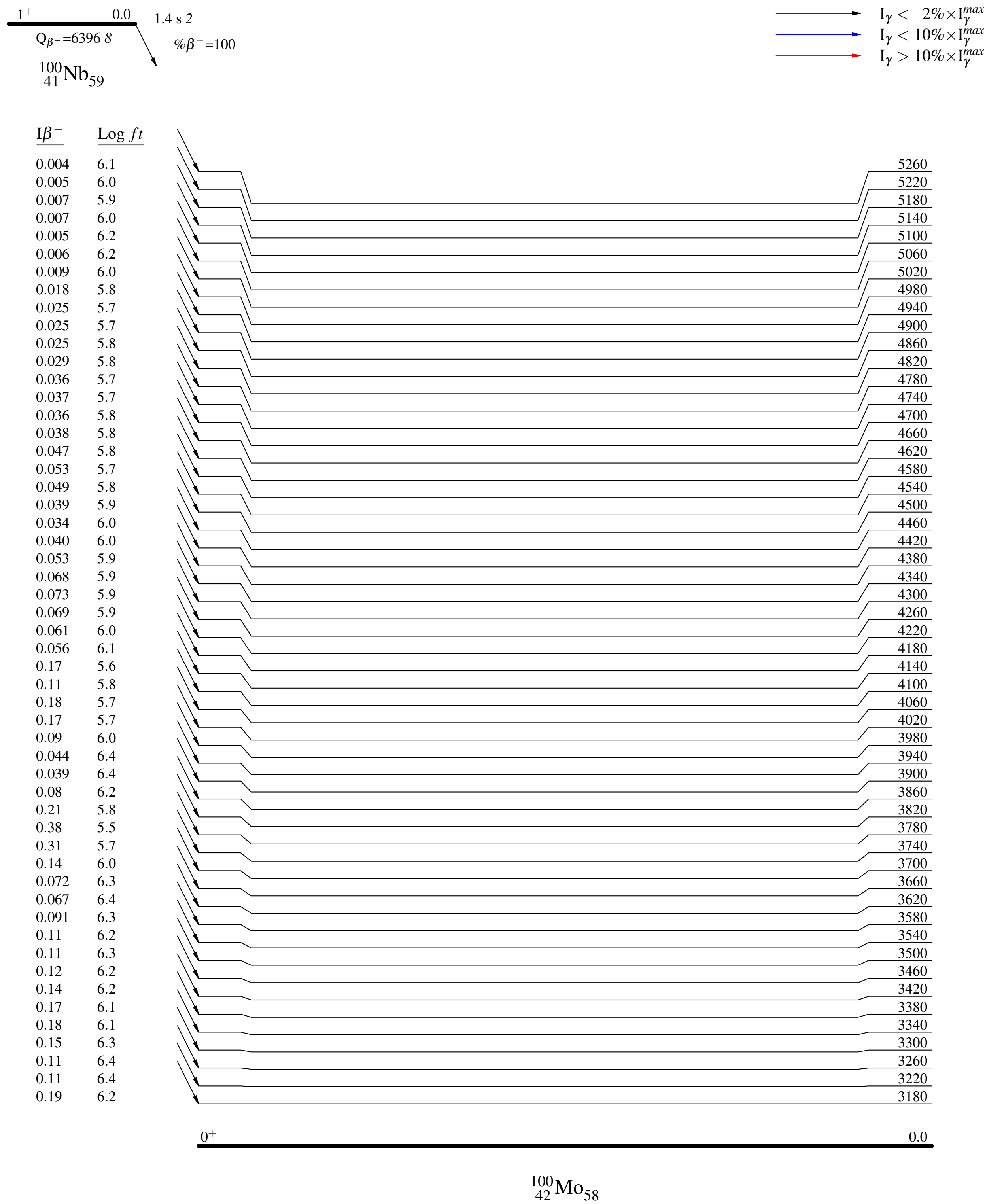
x γ ray not placed in level scheme.

^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend

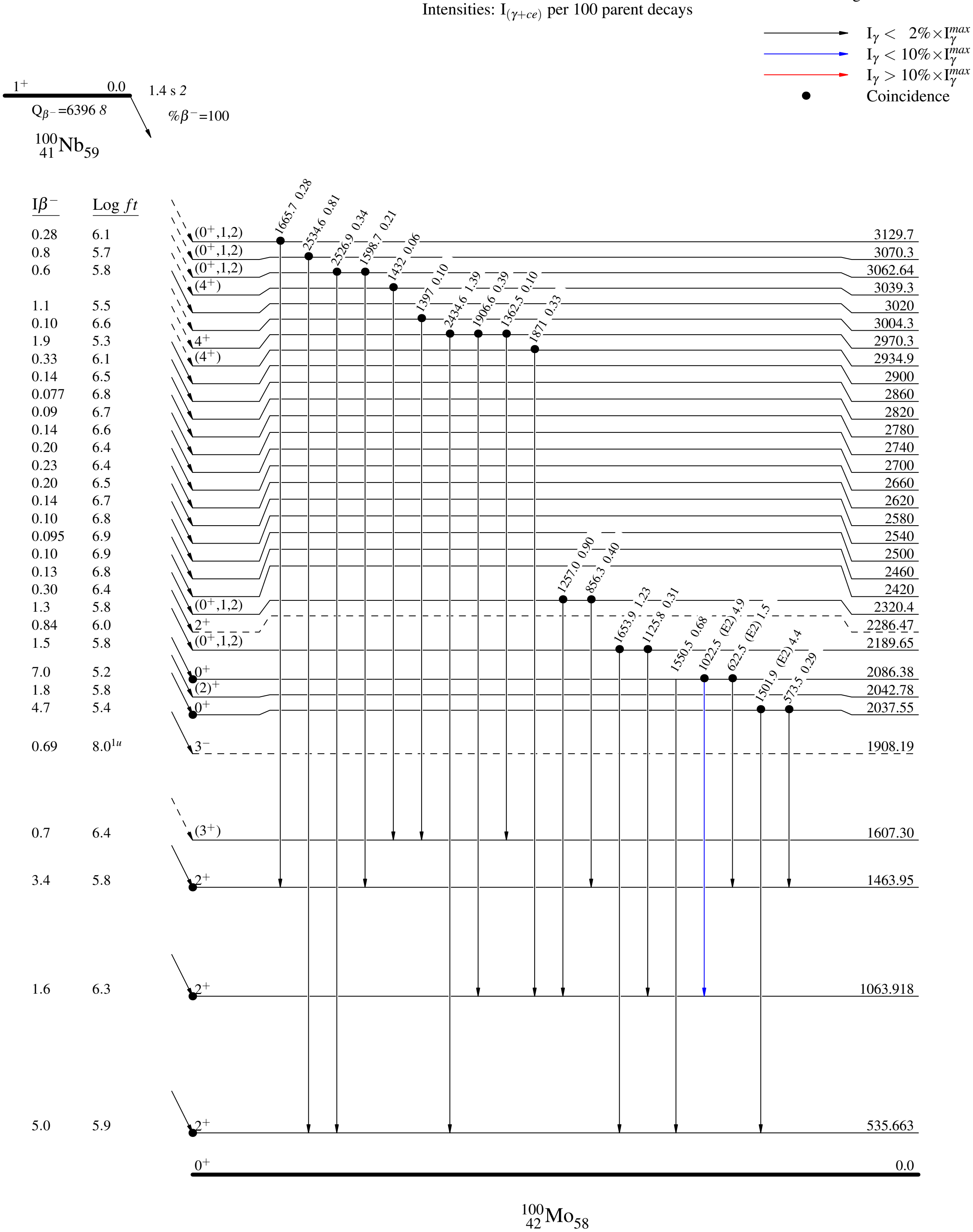


^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

Legend



^{100}Nb β^- decay (1.4 s) 1982VoZP,1987Me06,2019Gu20