^{19}B β^-n decay 1998Yo06,2003Yo02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Kelley, C. G. Sheu	ENSDF	01-May-2017

Parent: ^{19}B: E=0; J^π=(3/2$^-$); $T_{1/2}$=2.92 ms *13*; Q(β^-n)=2.579×10^4 *43*; %β^-n decay=71.8 *83*

^{19}B-$T_{1/2}$: from 2003Yo02.

^{19}B-Q(β^-n): from 2012Wa38.

1998Yo06: A beam of ^{19}B was produced by fragmentation of a 95 MeV/nucleon ^{40}Ar beam on a ^{181}Ta target. ^{19}B was selected using the RIKEN Projectile-fragment Separator (RIPS) and was implanted into a 12 mm thick plastic scintillator stopper. The β-decays were observed during the 100 ms beam-off period. The active stopper detected β-rays and a neutron detector array, consisting of 14 liquid scintillation counters covering about 80% of 4π detected delayed neutrons. The efficiency of the neutron array was 30% by comparison of a measurement of β-delayed neutrons of ^{15}B, which has a known delayed neutron emission probability of 100%.

A preliminary value of $T_{1/2}$=3.3 ms *2* was dedcued from the least-squares fits to the data, and P_n=125% *32* was determined from the ratio of the number of detected neutrons to that of β-rays. P_n is more than 100% which implies the existence of significant multineutron emissions in the decay, reflecting its large Q_β value (26.5 MeV) compared with the multineutron separation energies of daughter nucleus ^{19}C (S_{1n}=160 keV, S_{2n}=4.4 MeV,.....).

2003Yo02: The authors reevaluated the preliminary values $T_{1/2}$ and P_n reported in 1998Yo06. The new experiment was performed using RIPS at RIKEN Accelerator Research Facility as was in 1998Yo06. A beam of ^{19}B was produced by the projectile-fragmentation reaction of a 95 MeV/*u* ^{40}Ar beam on a 670 mg/cm^2 ^{nat}Ta target. The values of $T_{1/2}$ and P_{in} were determined by fitting a set of decay curves altogether to remove possible complication and inconsistency. The method of maximum likelihood was applied for deducing $T_{1/2}$ and P_{in}. The neutron detection efficiencies were treated carefully, the total detection efficiencies of direct and scattered neutrons are 31.5% *3* and 4.7% *+2-6*, respectively. The new values of $T_{1/2}$=2.92 ms *13*, P_{1n}=71.8% *+83-91* and P_{2n}=16.0% *+56−48* were determined with a better precision. P_{3n} was not determined because of the limited statistics. In the text it is unclear if the 1998Yo06 "preliminary" data are included in the 2003Yo02 analysis; we assume that it is and use the 2003Yo02 result to avoid possible data correlations.

1999Re16: A low statistics determination of $T_{1/2}$=4.5 ms *15* was given.

^{18}C Levels

E(level)	J^π[†]	$T_{1/2}$[†]
0.0	(0$^+$)	92 ms *2*

[†] From Adopted dataset for ^{18}C in ENSDF database.

Delayed Neutrons (^{18}C)

E(^{18}C)	I(n)	Comments
0.0	71.8 *83*	In=71.8 *+83−91*.