Adopted Levels 2010Sp02

Q(β^-)=2.693×10^4 *18*; S(n)=−5 *5*; 2012Wa38

The particle instability of ^{18}B was established with the failure to observe ^{18}B nuclei in the fragmentation products of 44 MeV/nucleon ^{40}Ar ions on a Ta target (1985La03,1986Po13), or in the fragmentation products of 12 MeV/nucleon ^{56}Fe ions on a Be target (1984Mu27). Its neutron separation energy is well known as S(n)<10 keV, hence the uncertainty in its mass excess (ΔM= 51850 keV *170*) is mainly determined by uncertainty in the ^{17}B mass (ΔM=43770 keV *170*) (2012Wa38).

Theoretical Predictions:

The s-wave neutron emission, observed in (2010Sp02), is consistent with a Jπ=2$^-$ spin assignment for ^{18}B. The shell model calculations of (1992Wa22) predict Jπ=2$^-$ for the ground state with the first three excited states at 0.45, 0.52, 0.839 MeV with Jπ=4$^-$, 2$^-$, 3$^-$; an update of this calculation is given in (2010Sp02). On the other hand, (1985Po10) predicted the ^{18}B ground state to have Jπ=4$^-$ and to have excited states at 0.62, 0.86, and 1.59 MeV with Jπ=1$^-$, 2$^-$ and 2$^-$ (1985Po10). As discussed in (2010Sp02), the inability to definitively identify the ^{18}B and ^{17}B states participating in the observed decay leaves some uncertainty in the Jπ assignment.

See other general predictions in (1997Ba54,2004La24,2006Ko02,2012Yu07).

^{18}B Levels

Cross Reference (XREF) Flags

A ^{9}Be(^{19}C,^{18}B)

E(level)	Jπ	XREF	Comments
0	(2$^-$)	A	%n=100

^{9}Be(^{19}C,^{18}B) 2010Sp02

2010Sp02: The authors measured the unbound ground state of ^{18}B by carrying out a single proton knockout reaction on ^{19}C (E=62 MeV/nucleon). The resulting unbound ^{18}B nuclei decayed into ^{17}B+n, which were detected using the NSCL/MoNA array and a charged particle detector. The ^{18}B ground state energy was determined by kinematic reconstruction.

^{18}B Levels

E(level)	J^{π}	Comments
0	(2^-)	%n=100 E(level): The upper limit of the scattering length is −50 fm, which corresponds to $E_{rel.}(^{17}B+n)<10$ keV for the unbound ^{18}B ground state. E(level): The observed state corresponds to an unbound neutron s-wave state. Such a ground state is consistent with the systematics of N=13 isotones where the $s_{1/2}$ orbit is expected to be lower than the $d_{5/2}$ orbit in ^{18}B. E(level): It is possible that ^{18}B is produced in an excited $J\pi=1^-$ state which neutron decays to ^{17}B*(1080). However, discussion is given suggesting this is not the case.

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