$^{12}C(^{22}N,19\beta n)$ 2018Le18

History

Type	Author	Citation	Literature Cutoff Date
Update	J. H. Kelley, C. G. Sheu	ENSDF	1-Jan-2019

In the case of ^{20}B population, a beam of $E_{effective}$=225 MeV/nucleon (target midpoint) ^{22}N ions, from the RIKEN/RIBF facility, impinged on a 1.8 g/cm^2 carbon slate that was located at the target position of the SAMURAI spectrometer. The ^{19}B reaction products were momentum analyzed using the SAMURAI focal plane, while the momentum of coincident neutrons was determined using the 120 module NEBULA plastic scintillator array. A prevalent peak near E(n+^{19}B)≈2.5 MeV was observed in the relative energy spectrum, which was determined by analysis of invariant mass spectrum; note: the absence of ^{19}B excited states simplifies the analysis. No similar peaks were observed in n+^{19}B pairs resulting from 1p-removal reactions from ^{22}C.

A straightforward analysis of the relative energy spectrum is consistent with a peak at E(n+^{19}B)=2.44 MeV *9* with Γ=1.2 MeV *4*; however, shell model expectations suggest a different plausable explanation of the data that also provide a reasonable fit of the spectrum. (2018Le18) argues that since single proton removal from ^{22}N almost exclusively populates $^{21}C_{g.s.}$($J^{\pi}=1/2^+$), then the two-proton removal should favor population of a $J^{\pi}=1^-,2^-$ doublet (i.e. valence neutron coupled to a $0p_{3/2}$ proton hole). The (n+^{19}B) relative energy spectrum is well fitted by assuming a doublet near 2.5 MeV rather than one single peak; in this case, the prominence of a third peak near E(n+^{19}B)=5 MeV becomes a relevant issue. Resonances with $J^{\pi}=0^-$ and/or 3^- could be expected in the E(n+^{19}B)=5 MeV region. In summary, the analysis favors three resonances at E_{res}=1.56, 2.50 and 4.86 MeV.

^{20}B Levels

E(level)‡	J^{π}†	Γ	$E_{rel.}$(n+ ^{19}B) (MeV)	Comments
0	$(1^-,2^-)$	<500 keV	1.56 *15*	%n=100
0.94×10^3 *17*	$(1^-,2^-)$	0.9 MeV *3*	2.50 *9*	%n≈100
3.30×10^3 *30*	$(0^-,3^-)$	<500 keV	4.86 *25*	%n≈100

† From shell model systematics.

‡ $E_{g.s.}$ from E_{res}(^{19}C+n)=1.56 MeV *15*.