Adopted Levels

S(p)=−966 *80*; 2014Wa09,2012Wa38

Theoretical works:

2013Fo01: Analyzed mirror N=8, 10 and Z=8, 10 nuclides to develop a paramertization based on the difference in the 2-neutron/2-proton separation energies (S_{2p}-S_{2n}) and the amount of S^2 strength in the ground state wavefunction.

2013Ti01: Developed an improved Kelson-Garvey mass relations analysis, which relates the mass difference systematics of similar sets of mirror nuclides to predict unknown masses.

2000Po32: Calculated mass excesses by comparison with mirror nuclides.

^{15}Ne Levels

Cross Reference (XREF) Flags

A ^{12}C(^{17}Ne,^{15}Ne)

E(level)†	J^π	Γ	XREF	Comments
0	(3/2$^-$)	0.59 MeV	A	%2p=100 E(level): First observation at E(^{13}O+2p)=2522 keV *66*. This corresponds to a mass excess=40215 keV *69*. J^π: From mirror symmetry with ^{15}B. Decays via 3-body ^{14}O+2p decay.
1.90×10^3 *8*	(5/2$^-$)	<100 keV	A	E(level): From E(^{13}O+2p)=4.42 MeV *4*.

† Excited states deduced using ^{13}O and p mass excesses from (2012WA38).

^{12}C(^{17}Ne,^{15}Ne) 2014Wa09

The authors analyzed the kinematic relations between ^{13,14,15}O+2p coincidences and deduced information on ^{15,16}Ne levels. The main emphasis was on the first observation of ^{15}Ne.

A beam of 500 MeV/A ^{17}Ne ions was produced by fragmenting ^{20}Ne nuclei on a Be target. The ^{17}Ne ions impinged on either carbon or polyethylene targets that were positioned at the ALADIN large-gap dipole magnet target position. The protons and oxygn isotope reaction products were detected in separate arrays, which determined their momenta following ^{17}Ne breakup.

The relative energy spectra of 2p+^{13,14,15}O products were analyzed to determine the ^{15,16,17}Ne states populated in the reactions. Analysis of ^{15}O+2p events, which involved ^{17}Ne*(1764 keV) with E(^{15}O+2p)=831 keV *12* (observed at E(^{15}O+2p)=881 keV *5*), was used as a calibration reaction. A systematic correction of the relative energy spectrum based on the analysis (detailed in F. Warmers, private communication, May 28, 2014) was applied to all relative energy spectra. Analysis of the ^{14}O+2p products, which populated ^{16}Ne*(1.4, 3.2 MeV), provided a verification of the method.

The ^{13}O+2p relative energy spectrum revealed three structures: a peak at E(^{13}O+2p)=2.522 MeV that is associated with ^{15}Ne$_{g.s.}$, a peak at E(^{13}O+2p)=4.42 MeV that is associated with the first excited state and a broad group at E(^{13}O+2p) ≈ 6-9 MeV that is associated with multiple unresolved states.

Analysis of the ^{13}O+p and p+p correlations indicates that the ^{15}Ne$_{g.s.}$ decay proceeds via 3-body decay to the continuum. Therefore sequential decay via ^{14}F, and 2p decay do not play a role in the decay.

^{15}Ne Levels

E(level)[†]	J$^\pi$	Γ	Comments
0	(3/2$^-$)	0.59 MeV	%2p=100 E(level): First observation at E(^{13}O+2p)=2522 keV *66*. This corresponds to a mass excess=40215 keV *69*. J$^\pi$: From mirror symmetry with ^{15}B. Decays via 3-body ^{13}O+p+p decay.
1.90×10^3 *8*	(5/2$^-$)	<100 keV	E(level): From E(^{13}O+2p)=4.42 MeV *4*.
5×10^3		2.5 MeV	E(level): Broad structure attributed to multiple unresolved states, E(^{13}O+2p)=6-9 MeV.

[†] Excited states deduced using ^{13}O and p mass excesses from (2012WA38).

REFERENCES FOR A=15

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2014WA09	F.Wamers, J.Marganiec, F.Aksouh et al. - Phys.Rev.Lett. 112, 132502 (2014).