^{9}Be(^{13}O,^{12}O) 2012Ja11

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, J. E. Purcell and C. G. Sheu	NP A968, 71 (2017)	1-Jan-2017

1995Kr03,1995Kr24,1998Az03: At E(^{13}O)=33.4 MeV/nucleon, single-neutron stripping reactions were measured on a ^{9}Be target and the ^{10}C+2p products were measured and momentum analyzed in ΔE-E telescopes. A reconstruction of the ground state energy gives E_{res}(^{10}C+2p)=1.77 MeV *2* with Γ=578 keV *205*. Analysis of the p-p angular correlations indicates isotropic proton emission.

2012Ja11: XUNDL dataset compiled by TUNL, 2012.

The authors impinged a ^{13}O beam onto a ^{9}Be target producing ^{12}O and ^{12}N* in one-neutron or one-proton knockout reactions. The reaction products subsequently decayed by two-proton emission and the excitation spectrum was deduced from a kinematic reconstruction of the breakup particles. Several states are observed including $^{12}O_{g.s.}$ and its analog in ^{12}N; discussion of the IMME mass equation is given.

A beam of E(^{13}O)=30.3 MeV/nucleon ions was created using the ^{1}H(^{14}N,^{13}O)2n reaction at E(^{14}O)=38 MeV/nucleon at the Texas A&M cyclotron facility. The beam was purified with the MARS spectrometer. The ^{13}O projectiles impinged on a 45.6 mg/cm^2 ^{9}Be target and sometimes underwent 1n and 1p knockout reactions that populated ^{12}O and ^{12}N states, respectively. The unbound ejectiles proton decayed and the resulting 2p+^{10}C of interest were detected in a 10 cm×10 cm position sensitive Si strip detector that was backed by a 32 element CsI(Tl) array to give ΔE-E particle identification. A kinematic reconstruction of the 2p+^{10}C momenta yielded the excitation energies of produced ^{12}O. With the new data the IMME can be fitted with a parabolic form.

^{12}O Levels

E(level)	J^π	Γ	Comments
0	0^+	<72 keV	E(level): From E(2p+^{10}C)=1.638 MeV *24*; corresponds to ΔM=31.914 MeV *24*. Γ: The observed Γ is ≈230 keV, however analysis of the experimental resolution yields Γ<72 keV. This is much narrower than prior measurements.
1968 *52*		0.48 MeV *11*	E(level): From E(2p+^{10}C)=3.606 MeV *60* and ΔM=33.882 MeV *60* (2012Ja11).