^{9}Be(^{26}F,^{25}O),C(^{26}F,^{25}O) 2016Ko11,2013Ca18,2008Ho03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 205,1 (2025)	31-May-2025

2016Ko11: C(^{26}F,^{25}O), ^{26}F beam was produced by fragmentation of ^{48}Ca primary beam, E=345 MeV/nucleon, on a Be target at RIKEN Nishina Center and Center for Nuclear Study, University of Tokyo. The fragments were separated by BigRIPS separator and ^{26}F secondary beam bombarded a C (thickness 1.8 g/cm^2) target with mean energies of 201 MeV/nucleon (mid target). The impact position on the target and incident angles of beam particles were determined event by event using two multiwire drift chambers (MWDCs). The decay products, ^{24}O and neutron were measured in coincidence using a magnetic spectrometer, SAMURAI, for momentum analysis of charged particles and by plastic scintillator array, NEBULA, consisting of 120 detector modules and 24 charged particle veto detectors, respectively. The trajectories of the charged fragments were determined using two MWDCs and a 16 element plastic scintillator hodoscope was used for energy loss and time-of-flight measurements.

2013Ca18: C(^{26}F,^{25}O), ^{26}F beam, E=442 MeV/nucleon, produced via fragmentation of a 490 MeV/nucleon ^{40}Ar primary beam on a 4 g/cm^2 ^{9}Be target using the R3B-LAND reaction setup at GSI. Neutron-unbound states in ^{25}O were populated via one-proton knockout reactions on different secondary targets: 922 mg/cm^2 CH_2, 935 mg/cm^2 C, and 2145 mg/cm^2 Pb. The secondary target was surrounded by the 4π Crystal Ball detector comprising 160 NaI(Tl) elements for photon and light-particle detection. Energy-loss and position measurements for charged beam particles were accomplished using two silicon-strip detectors placed behind the target. Ions were identified through time-of-flight and energy-loss measurements. Neutrons were detected 12 m downstream of the target using the LAND neutron detector with 92% single-neutron efficiency.

2008Ho03: ^{9}Be(^{26}F,^{25}O), E=85 MeV/nucleon, ^{26}F beam was produced from fragmentation of ^{48}Ca beam on a Be target and using A1900 fragment separator at NSCL facility. The ^{26}F beam was counted on an event-by-event basis by time-of-flight method. The neutrons emitted by ^{25}O decay were detected with a Modular Neutron array. The ^{24}O fragments were deflected by the large-gap Sweeper magnet, and were recorded by position and energy sensitive detectors. Neutron peak from ^{25}O decay was observed at 770 keV.

^{25}O Levels

E(level)	J$^\pi$	Γ	L	Comments
0	3/2$^+$	88 keV *6*	[2]	E(level): g.s. of ^{25}O is neutron unbound with a measured resonance of 749 keV *10*, FWHM=430 keV at 750 keV, includes both statistical and systematic uncertainties (2016Ko11); 725 keV *+54−29* in 2013Ca18; 770 keV *+20−10* in 2008Ho03. Γ: from 2016Ko11 − authors pointed out that their measured width is close to the calculated value of 63 keV reported in 2014Vo09. Others: 172 keV *30* (2008Ho03) − authors noted that their observed decay width was a factor of 2 larger than the calculated single-particle width using a Woods-Saxon potential; 20 keV *+60−20* (2013Ca18). Width Γ=88 keV *6* corresponds to half-life=5.2×10^{-21} s *4*. L: used for simulating the distribution of the neutron decay in 2008Ho03. E(n)=770 keV *+20−10*. Authors (2008Ho03) deduced mass excess 27440 keV *110* for ^{25}O, using the mass excess 18600 keV *100* of ^{24}O in 2007Ju03.