^{2}H(^{24}O,p)   2017Jo06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171, 1 (2021)	1-Jun-2020

Target: Liquid deuterium (LD$_2$); Projectile: ^{24}O beam, E = 83.4 MeV/nucleon, was produced from fragmentation of primary beam of ^{48}Ca, E=140 MeV/nucleon, bombarding a ^{9}Be target at NSCL facility. A1900 fragment separator was used to select ^{24}O from reaction products. Remaining contaminants were removed by time-of-flight (TOF) in the off-line analysis. Finally, the ^{24}O beam was directed to bombard the liquid D$_2$ target. ^{23}N promptly decayed to ^{22}N. The resulting charged fragments were swept 43.3° by a 4-Tm superconducting sweeper magnet into a collection of position- and energy-sensitive charged particle detectors. Elemental identification was done by ΔE and TOF; Isotope identification was done through correlations in the TOF, dispersion position, dispersive angle following the sweeper magnet. Neutrons were detected by Modular Neutron Array (MoNA) and the Large-area multi-Institutional Scintillation Array (LISA), each consisted of 144 bars of plastic scintillator. Measured decay energy of the ^{22}N+n system, deduced excited energies above the Sn(^{23}N). Shell model calculations.

^{23}N Levels

E(level)[†]	J$^\pi$[‡]	Comments
0.0	1/2$^-$	
≈3600	3/2$^-$	E(level): Decay Energy=1070 keV *100*. Sn(^{23}N)=2460 keV *380* (2012Ga45) gives an excitation energy of 3530 keV *400* (100 (stat)+400 (sys)) (Sn+Decay energy). In 2016-AME Sn(^{23}N)=3120 keV *470* (2017Wa10).
≈5000	3/2$^-$	E(level): Decay Energy=2500 keV *+500−700*. Sn(^{23}N)=2460 keV *380* (2012Ga45) gives an excitation energy of 4960 keV *+630−800* (Sn+Decay energy). In 2016-AME Sn(^{23}N)=3120 keV *470* (2017Wa10).

[†] Level energies were interpreted in 2017Jo06 within the context of shell-model predictions, as it was not possible to discern between any number of degeneracies or level orderings. 2017Jo06 deduce Sn(^{23}N)=2460 keV *380* using data in 2012Ga45. In 2017Wa10, Sn(^{23}N)=3120 keV *470*.

[‡] From shell model calculations.