

$^2\text{H}(^{14}\text{Be}, ^{15}\text{Be})$ 2013Sn02

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	J. Kelley	ENSDF	29-Sept-2014

The authors populated a state in the neutron unbound ^{15}Be nucleus and measured its decay energy. This constitutes the first positive observation of any level in ^{15}Be .

An $E(^{14}\text{Be})=59$ MeV/nucleon beam, produced by fragmentation of a ^{18}O beam on a ^9Be target, impinged on a 435 mg/cm² deuterated polyethylene target. The produced ^{15}Be nuclei decayed in the target; levels decaying to the ^{14}Be ground state were characterized by measurement of the neutron momentum (in the MoNA array) and the ^{14}Be momentum (in the focal plane detectors of a large-gap dipole magnet). Neutrons and ^{14}Be particles were detected in coincidence mode. The kinematic reconstruction of the $^{14}\text{Be}+n$ relative energy yields a broad resonance at $E_{\text{res}}=1.8$ MeV *I* with $\Gamma=575$ keV *200*. This level is identified as the lowest $J^\pi=5/2^+$ state of ^{15}Be .

Two states are predicted in the low-energy region of ^{15}Be ; one with $J^\pi=3/2^+$ and another with $J^\pi=5/2^+$. The $J^\pi=3/2^+$ state is unbound by at least 1.54 MeV (2011Sp01) and is expected to decay to the $J^\pi=2^+$ first excited state of ^{14}Be , which decays via $^{14}\text{Be}^* \rightarrow ^{13}\text{Be}+n \rightarrow ^{12}\text{Be}+2n$. Observation of the $J^\pi=3/2^+$ state will be difficult.

The predicted order of the $J^\pi=3/2^+$ and $5/2^+$ states is controversial. The present $J^\pi=5/2^+$ state is accepted as the ground state since it is the only level observed experimentally.

 ^{15}Be Levels

<u>E(level)</u>	<u>J^π</u>	<u>Γ</u>	<u>Comments</u>
0	(5/2 ⁺)	0.58 MeV <i>20</i>	<i>%n</i> ≈100 Observed in the $^{14}\text{Be}_{\text{g.s.}}+n$ relative energy spectrum at $E_{\text{rel}}=1.8$ MeV <i>I</i> .