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Study of the T=5/2 states in ^{9}Li (analogs of the lowest states in ^{9}He) as a test of nuclear structure theory for drip line nuclei VLADILEN GOLDBERG, G.V. ROGACHEV, Cyclotron Institute Texas A&M University, M. ALCORTA, B. DAVIDS, TRIUMF, Canada, J. HOOKER, H. JAYATISSA, E. KOSHCHIY, A. NELSON, B. ROEDER, E. UBERSEDER, R.E. TRIBBLE, Cyclotron Institute Texas A&M University — About 20 years ago, a group of Hahn-Meitner Institute made precision measurements of a multi nucleon transfer reaction to populate the lowest states in ^{9}He. They found [1,2] a state of ^{9}He($1/2^{-}$) at 1.27 $\pm$ 0.10 MeV above the ^{8}He + n threshold with $\Gamma = 0.10 \pm 0.06$ MeV. Since then, many groups tried to obtain detailed information on ^{9}He mainly using rare isotope beams. However, the energy resolution and counting statistics was never sufficient to test the data [1,2] (see a review in [3]). Additionally an MSU group [4] found a virtual s-wave state within 0.2 MeV of the ^{8}He+n threshold which they claimed to be the ground state of ^{9}He. The theoretical calculations demonstrate rare unanimity. A variety of approaches including the recent [5] *ab initio* calculations predict a broad state, approximately ten times broader than given in Refs. [1,2]. So it can be that our understanding of nuclear structure at the border of nuclear stability is seriously deficient. To date, it looks like all straightforward ways to obtain spectroscopic information on ^{9}He were tested. So, we populated T=5/2 states in ^{9}Li (analogs of ^{9}He) in ^{8}He+p resonance elastic scattering using the TTIK method [5,6]. The measurements were performed using 4 MeV/A ^{8}He beam provided by TRIUMF facilities. The scattering chamber was filled with CH_4 gas. The proton recoils were detected by an array of position sensitive proportional counters and silicon detectors. The experimental equipment was tested using 3.5 and 7 MeV/A ^{12}C beams of Cyclotron Institute at TAMU.

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