

Nuclear structure beyond the drip-line: structure of ^9He and ^{10}N isotopes

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Significant progress have been made toward achieving the goal of describing properties of nuclei starting from realistic nucleon-nucleon interactions in the last two decades. The ab initio models were very successful in pushing the limits of their applicability toward nuclear systems with ever more nucleons and exotic neutron to proton ratios. Predictions of these models are often in good agreement with the experimental data, but sometimes deviate from experiment substantially. For example, the exotic isotope of helium, ^9He , represents a curious case of stark disagreement between the predictions of modern theories and what is believed to be the experimental knowledge for this nucleus. Another interesting exotic system that has been a target of numerous experimental studies is ^{10}Li . Level structure of this nucleus is still uncertain and presents a major challenge (both theoretically and experimentally).

Recent experimental results that shed light on structure of ^9He and ^{10}Li will be discussed. The level structure of ^9He was studied through the T=5/2 isobaric analog states in ^9Li , populated via $^8\text{He}+p$ resonance scattering [1]. The low-lying levels in ^{10}N (^{10}Li mirror) have been populated in $^9\text{C}+p$ resonance scattering. Properties of the ground and first excited states of these exotic isotopes will be discussed.

[1] E. Uberseder, G.V. Rogachev, V.Z. Goldberg, et al., Phys. Lett. B 754 (2016) 323.

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