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Probing clustering in light nuclei through particle decay measurements

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The concept of clustering - that nuclei can contain sub-groups of correlated nucleons combining into larger structures rather than consisting simply of individual nucleons - has become extremely important in understanding the structure of light nuclei. The Hoyle state, the second 0+ state at 7.654 MeV in 12C, is considered the archetype of alpha cluster states in nuclei, and its existence is considered to be closely tied to that of organic life, as it is the portal through which 12C is created in stars. While this state has been, and remains, the focus of numerous theoretical and experimental studies, some of which were performed at iThemba LABS, the search for analogues of the Hoyle state in the neighboring A=11 and A=13 nuclei is also of interest. We will focus on the A=13 system, and in particular on 13N, which can be populated through a (3He,t) reaction. The utility of particle decay measurements from excited states in 13N in search of odd Hoyle states will be discussed.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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