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## Investigation of the 11.16 MeV state of $^{12}\text{C}$

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### Abstract content <br> &nbsp; (Max 300 words)

For many years there has been a question mark over the existence of the 11.16 MeV state in  $^{12}\text{C}$  which is listed in the NNDC database. This state was assumed to be a candidate for the  $2^+$  excited state of the famous Hoyle state (the second  $0^+$  state in  $^{12}\text{C}$ ). However, this state was only reported once in 1971, with no other measurements supporting the existence of such a state in  $^{12}\text{C}$ . Positive identification of the  $2^+$  excited state of the Hoyle state has attracted much interest since the publication of  $(\alpha, \alpha')$  data by Itoh et al. in 2004. This measurement, along with other more recent experiments, show evidence of the existence of a  $2^+$  state in  $^{12}\text{C}$  around 10 MeV.

With interest in locating the  $2^+$  alpha cluster state growing rapidly, it was considered important to perform an experiment, with improved equipment and analysis techniques available today, to provide answers regarding the existence of the 11.16 MeV state. An experiment was performed at iThemba LABS with the high energy resolution K600 magnetic spectrometer to investigate the  $^{11}\text{B} (^{3}\text{He}, d) ^{12}\text{C}$  reaction for an incident beam energy of 44 MeV. These experiment conditions mirrors those used in the 1971 study. Measurements were performed at the three spectrometer angles where a clear signature was reported in the previous measurement. The results from the recently completed data analysis will be presented.

### Apply to be<br> consider for a student <br> &nbsp; award (Yes / No)?

yes

### Level for award<br>&nbsp;(Hons, MSc, <br> &nbsp; PhD)?

PhD

### Main supervisor (name and email)<br>and his / her institution

Dr. Paul Papka, papka@sun.ac.za, University of Stellenbosch

### Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

No

**Primary author:** Mr NEMULODI, fhumulani (university of stellenbosch)

**Co-authors:** Dr SMIT, Frederick (iThemba LABS); Dr USMAN, Iyabo (University of the Witwatersrand); Mr SWARTZ, Jacobus (university of stellenbosch); Mr MIRA, Joel (university of stellenbosch); Prof. CARTER, John (University of the Witwatersrand); Prof. FREER, Martin (University of Birmingham); Mr JINGO, Maxwell (University of the Witwatersrand); Mr KUREBA, Oscar (University of the Witwatersrand); Dr PAPKA, Paul (university of stellenbosch); Dr NEVELING, Retief (iThemba LABS); Prof. FEARICK, Roger (university of Cape Town); Dr FORTSCH, Siegfried (iThemba LABS); Dr BUTHELEZI, Zinhle (iThemba LABS)

**Presenter:** Mr NEMULODI, fhumulani (university of stellenbosch)

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