



Contribution ID: 67

Type: **not specified**

Study of the unbound ^{13}Be and the future of $p2p$ reactions at FAIR

Friday, 26 September 2014 10:00 (30 minutes)

The field of nuclear physics is interested in the understanding of the properties of nuclei in and beyond the drip-line, especially the last decade the interest in research on halo and non-bound nuclei has been growing fast [1, 2].

This contribution is about a study of the unbound system ^{13}Be produced from a ^{14}B ($p, 2p$) reaction at high energy. The experiment was performed in complete kinematics using the R3B setup in Cave C at GSI.

A primary beam of ^{40}Ar at energy 490 MeV/u was let to impinge on a Beryllium target producing a mixed beam, which was separated in the fragment separator (FRS) before reaching the reaction target and the detection setup. As incoming nuclei the ^{14}B was selected and after a $p2p$ knockout reaction on CH_2 , the products of the unbound nuclei of interest ^{13}Be was selected in the detector set-up .

The isotope ^{13}Be has a half-life in the order of 10-21 s, not allowing us to detect it directly, forcing us to look for the $^{12}\text{Be}+n$ system. The invariant mass technique is used in the analysis in order to reconstruct the relative energy of the $^{12}\text{Be}+n$ system. The reconstructed excitation spectra combined with the measurement of the gamma emitted from the excited ^{12}Be fragments permits us to extract information about the ^{13}Be structure.

In this contribution these results will be explained together with a comparison to the latest published data, [3, 4], in order to reach a conclusion about the shell structure of ^{13}Be .

For the future R3B experiments at FAIR a new calorimeter, CALIFA, optimized for ($p, 2p$) reaction is being constructed [5]. For the front end-cap of CALIFA a demonstrator CEPA4 [6] is currently being tested. The main results and the future applications of the new detection technique used in the framework of probing unbound nuclei will be discussed.

- 1) H. Simon, Phys., Scr. T 152, 014024 (2013).
- 2) T. Baumann et al., Rep. Prog. Phys.75, 036301(2012).
- 3) Yu. Aksyutina et al. ,Phys. Rev. C 87, 064316 (2013).
- 4) G. Randisi et al., Phys. Rev. C. 89 034320 (2014).
- 5) D. Cortina-Gil et al., Technical report for the CALIFA Barrel (2011).
- 6) O. Tengblad et al. NIM A 704 19-26(2013).

Primary author: Mr RIBEIRO, Guillermo (CSIC-IEM)

Co-author: Prof. TENGBLAD, Olof (IEM-CSIC)

Presenter: Mr RIBEIRO, Guillermo (CSIC-IEM)

Session Classification: Talks