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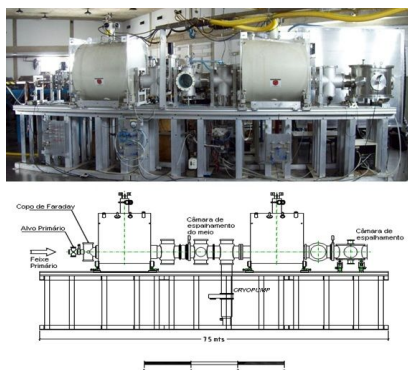
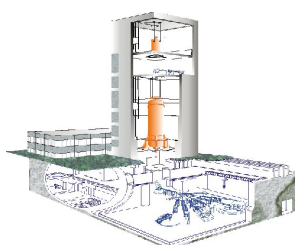
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Abstract

A study of the mechanisms involved in the production of alpha particles from reactions induced by a ^6He radioactive beam on a ^9Be light target, is presented. The experimental data was obtained using the RIBRAS (Radioactive Ion Beams in Brasil) facility of the Institute of Physics of the University of São Paulo, Brazil [1, 2]. The RIBRAS system consists of two superconducting solenoids used to select and focus light secondary beams of nuclei far from the stability line. A high yield of α -particles has been observed in the measurement performed for the $^6\text{He}+^9\text{Be}$ system [3], which was not present with the gold target, used for normalization purposes. In the present work, the energy and the angular distributions of those events have been analysed. The results will be compared with theoretical calculations performed using the Ichimura-Austern- Vincent (IAV) formalism, a new model recently applied to study inclusive reactions [4,5].

Experimental Setup

- Experimental measurement performed in 2008 using the RIBRAS facility;
- The $^6\text{He}+^9\text{Be}$ elastic scattering was available on Ref. [3];

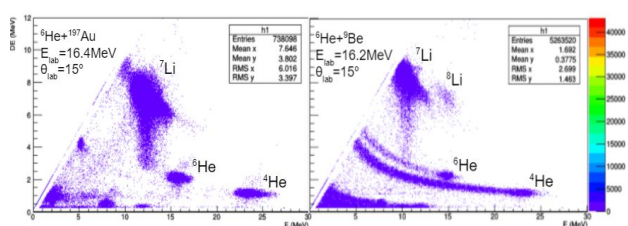


Pelletron Accelerator: electrostatic machine Tandem type, made by NEC. Installed in 1972 in the Institute of Physics of the University of São Paulo.

RIBRAS: consists of two superconducting solenoids able to select and focus light secondary beams of nuclei far from stability line [1,2].

Experimental Data

- Bidimensional spectra



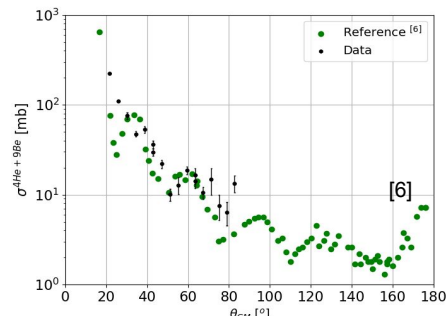
Experimental Cross Section

$$\sigma^{4\text{He}+^9\text{Be}} = \sigma^{4\text{He}+^{197}\text{Au}} \cdot \frac{N_c^{Be}}{N_c^{Au}} \cdot \frac{J^{Be}}{J^{Au}} \cdot \frac{I^{Au}}{I^{Be}} \cdot \frac{N_t^{Au}}{N_t^{Be}}$$

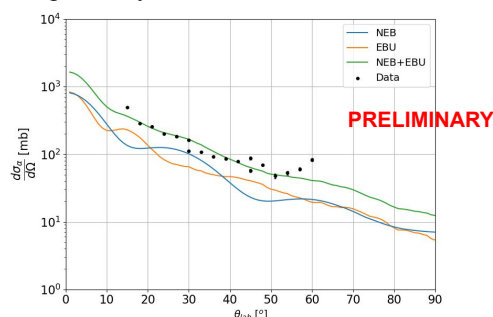
$$\sigma_\alpha = \frac{N_\alpha}{N_c^{Be} \cdot N_t^{Be}} \left(\frac{N_c^{7\text{Li}}}{\sigma_{Ruth}^{7\text{Li}}} + \frac{N_c^{6\text{He}}}{\sigma_{Ruth}^{6\text{He}}} + \frac{N_c^\alpha}{\sigma_{Ruth}^\alpha} \right)$$

Results

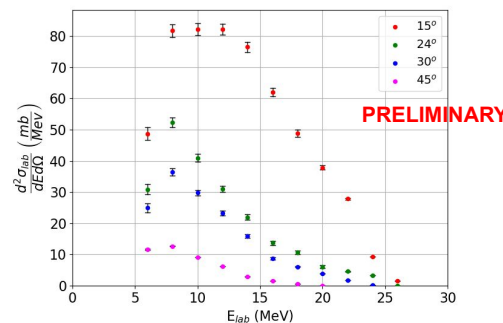
- The $^4\text{He}+^9\text{Be}$ elastic angular distribution



- The α -particle yield distribution



- The α -particles energy distribution



Conclusions

- Experimental cross sections of $^4\text{He}+^9\text{Be}$ and α -particle production in the $^6\text{He}+^9\text{Be}$ collision have been study using data from Ref. [3].
- The $^4\text{He}+^9\text{Be}$ angular distribution has been obtained and compared, with success, with data from literature.
- The elastic breakup (CDCC) added to the nonelastic Ichimura, Austern, and Vincent, provides a good agreement with the ^4He experimental cross sections, although the α -particle production observed in the present case has probably contributions from reactions involving the contaminant ^7Li and α -beams as taken into account, in estimated mode, in the experimental analysis.
- This analysis is still in progress.

References

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