

The FOOT experiment: a first measurement of nuclear fragmentation cross section for hadrontherapy

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1 Abstract

The FOOT (FragmentatiOn Of Target) experiment has been conceived with the main aim of measuring differential nuclear cross sections of target and beam fragments in the energy range of interest for hadrontherapy and space radioprotection, which suffers of lack of experimental results.

A first analysis of data taken at the GSI with a beam of ^{16}O at both $200\text{ MeV}/n$ and $400\text{ MeV}/n$ against two targets of polyethylene (C_2H_4) and carbon (C) will be presented, showing the first measurements of differential cross sections as a function of the fragment charge ($1 \leq Z \leq 8$) and angle ($1^\circ \leq \theta \leq 10^\circ$) and total energy distribution.

The analysis is performed taking full advantage of the current performances of the apparatus, with a particular focus on the charge estimation algorithm and on the optimization of the track reconstruction Kalman filter algorithm, both fundamental for the correct fragment identification and the measurements of its kinematics. A pile-up reduction method will also be shown, specifically developed studying the data present in this analysis.