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(Zoom) Measurements of Interaction and Charge-Changing Cross-Section of Carbon Isotopes 10,11,12C at the FRS

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The advancement of production techniques to access unstable nuclei far from the stability line has resulted in the discovery of many exotic nuclei characterized by short half-lives and an unusual neutron-to-proton ratio. Such nuclei are of particular interest in fundamental and applied physics. For instance, measurement of interaction (σ_I) and charge-changing cross sections are essential for the deduction of the interaction and charge radii, respectively and input in treatment planning programs for radiotherapy with heavy ions such as ^{12}C. However, the case of positron emitters (^{10,11}C) is of special interest in ion beam therapy owing to their potential application in range verification in patients directly. Thus, an experiment has been performed at GSI Darmstadt to produce and separate the fragments (^{10,11}C) of interest using the in-flight fragment separator and spectrometer FRS. The aim of the experiment was to measure the interaction and charge-changing cross-sections of ^{10,11,12}C nuclei on a carbon interaction target at therapeutically relevant energies. The measurements were done with the transmission method, which means that the unreacted part of the beams is being analysed for σ_I using the FRS spectrometer. The measurements were accompanied with Monte Carlo simulations using the MOCADI. In this contribution, the experimental overview, data analysis, together with the preliminary results will be presented.
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