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# Status of the FOOT experiment and first measurements of 16O fragmentation cross sections on C target

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The study of nuclear fragmentation plays a central role in many important applications: from the study of Particle Therapy up to radiation protection for space missions.
In Particle Therapy, nuclear interactions of the beam with the patient's body causes fragmentation of both the projectile and target nuclei.
In treatments with protons, target fragmentation generates short range secondary particles along the beam path, that may deposit a non-negligible dose especially in the entry channel. On the other hand, in treatments with heavy ions, such as C or other potential ions of interest, like He or O, the main concern is long range fragments produced by projectile fragmentation, that release the dose in the healthy tissues downstream of the tumor volume. 
Fragmentation processes need to be carefully taken into account when planning a treatment, in order to keep the dose accuracy within the recommended 3% of tolerance level.
The assessment of the impact that these processes have on the released dose is currently very limited from the lack of experimental data, especially for the relevant fragmentation cross sections. For this reason, treatment plans are not yet able to include the fragmentation contribution to the dose map with the required accuracy.
The FOOT (FragmentatiOn Of Target) collaboration designed an experiment to fill this gap in experimental data, aiming the measurement of the differential cross sections of interest. In this contribution, an overview of the FOOT experiment, including the present detector design and the expected performances will be discussed.
In addition the measurement of the elemental fragmentation cross sections for a 16O beam of 400 MeV/u kinetic energy interacting with a graphite target using a partial setup composed of the FOOT scintillator detectors for the time of flight (TOF) and energy loss (ΔE) measurements together with a drift chamber, used as beam monitor, will be shown.

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