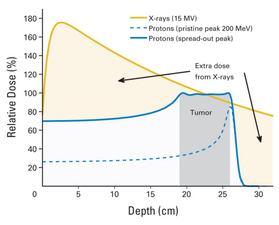
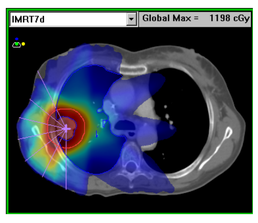
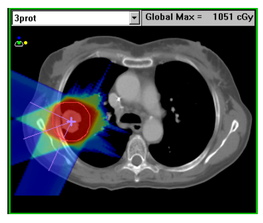
FragmentatiOn Of Target (FOOT)

Measurement of Light Ion Fragmentation Cross Sections for Particle Therapy and Space Radio-protection Applications

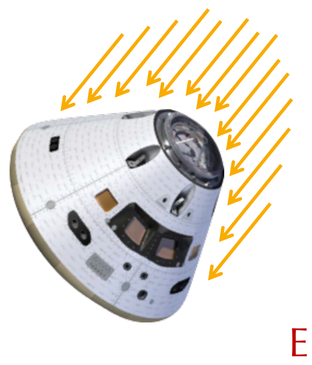


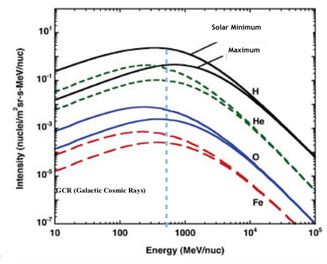




E < 430 MeV/u

Particle Therapy Treatment Plans do not account for beam-induced tissue fragmentation, because there exist no accurate measurement of fragmentation cross sections



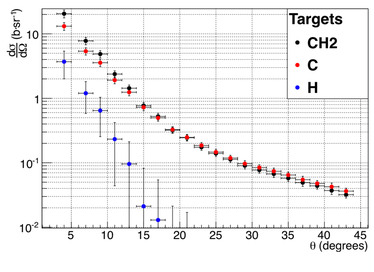


E < 800 MeV/u

Spacecraft shielding design does not account for fragmentation, because there exist no accurate measurement of fragmentation cross sections

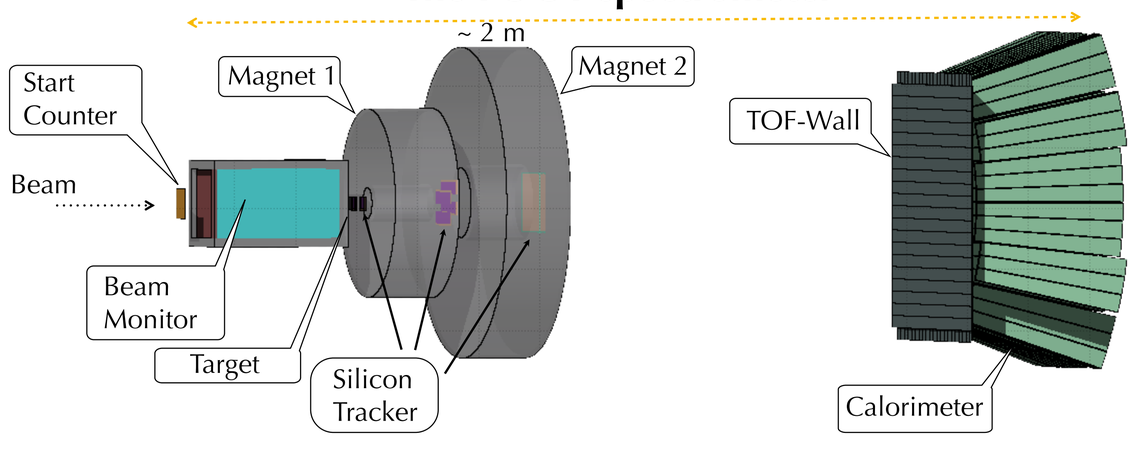
Inverse Kinematics, to make the fragments detectable

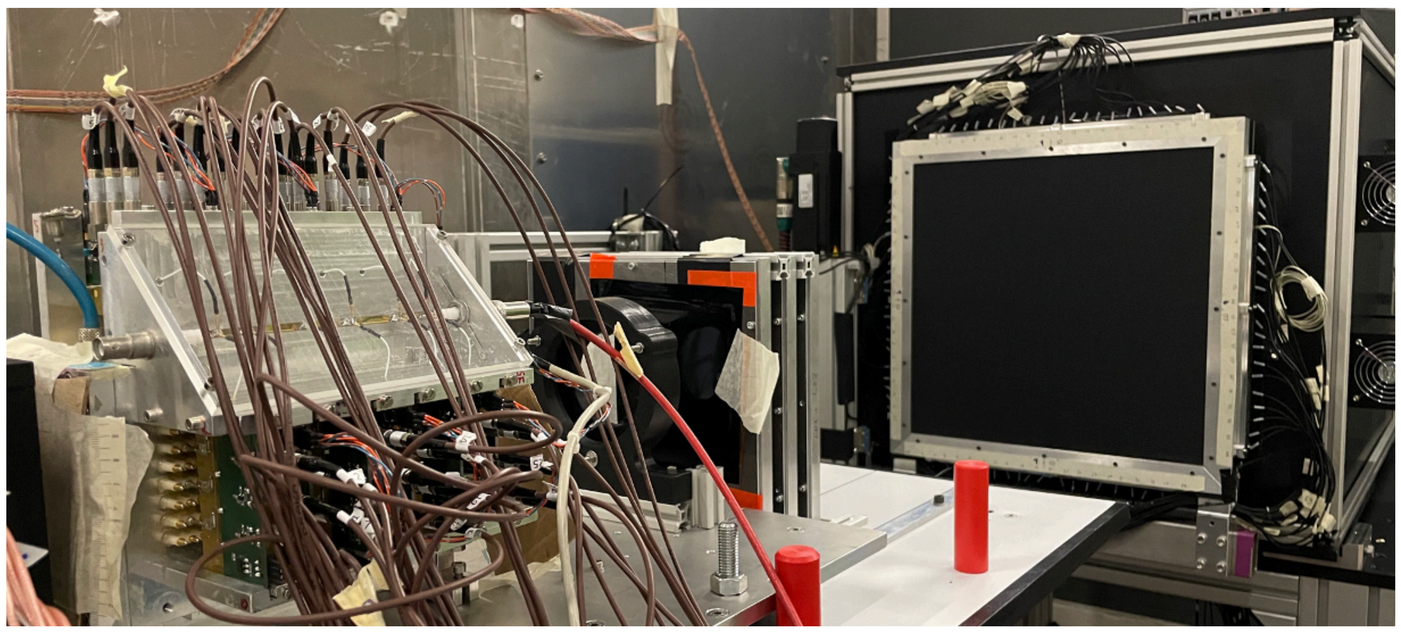
C / C_2H_4 targets

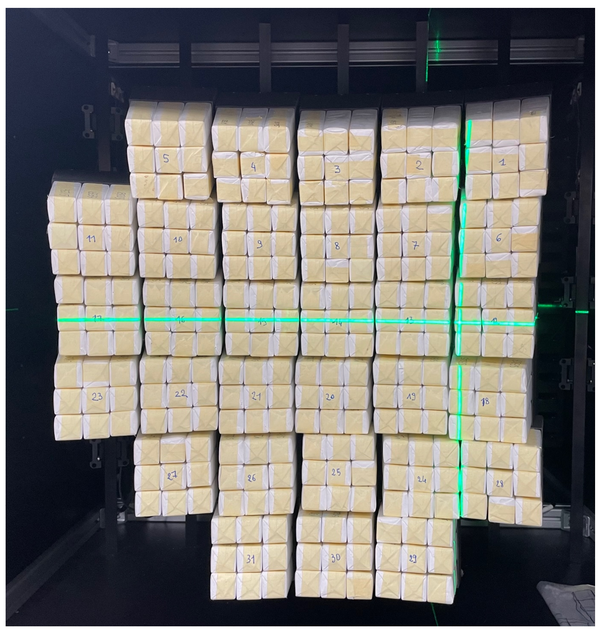


$$\frac{d\sigma}{d\Omega}(H) = \frac{1}{4} \cdot \left(\left(\frac{d\sigma}{d\Omega}(C_2H_4) - 2 \cdot \frac{d\sigma}{d\Omega}(C)\right)\right)$$

The FOOT spectrometer

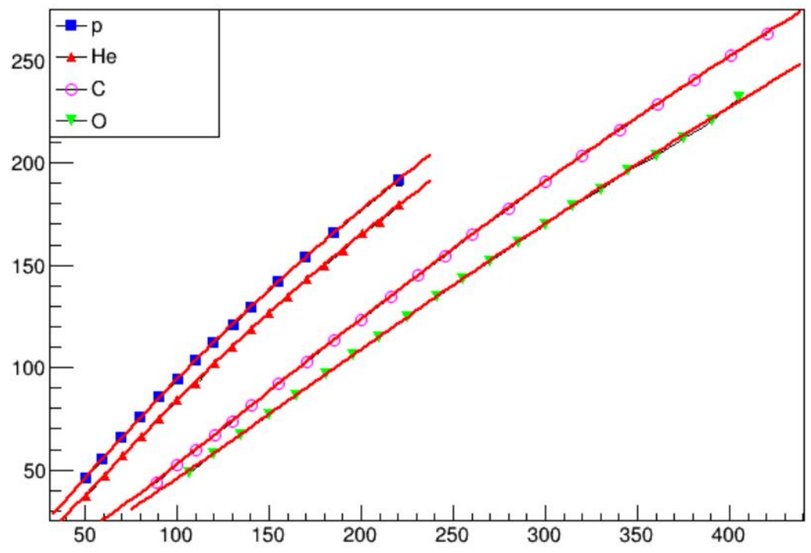




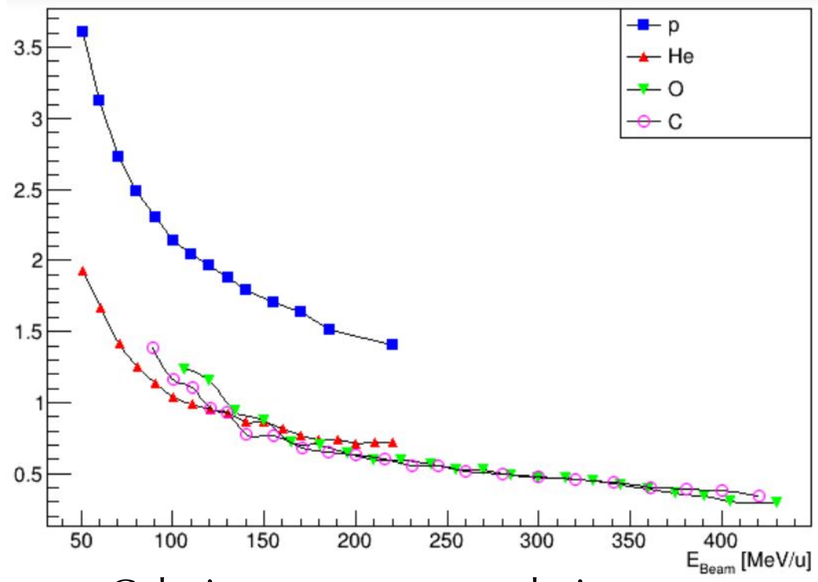


FOOT: International collaboration with about 100 members

INFN-Torino is responsible for the calorimeter,
a segmented BGO detector composed of 320 crystals



Calorimeter response (non) linearity



Calorimeter energy resolution

Bachelor thesis: characterization and energy calibration of the calorimeter

Master thesis: data analysis of ^{12}C fragmentation, based on 2023-2024 CNAO data takings

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