The FOOT (FRAGMENTATION OF TARGET) EXPERIMENT

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Particle therapy uses proton or ^{12}C beams for the treatment of deep-seated solid tumors. Due to the features of energy deposition of charged particles a small amount of dose is released to the healthy tissue in the beam entrance region, while the maximum of the dose is released to the tumor at the end of the beam range, in the Bragg peak region. However nuclear interactions between beam and patient tissues induce fragmentation both of projectile and target and must be carefully taken into account.
In proton treatment the target fragmentation produces low energy, short range fragments along all the beam range. In ^{12}C treatments the main concern are long range fragments due to projectile fragmentation that release dose in the healthy tissue after the tumor.
The FOOT experiment (FragmentatiOn Of Target) of INFN (Istituto Nazionale di Fisica Nucleare) is designed to study these processes. Target (^{16}O,^{12}C) fragmentation induced by 150-250 AMeV proton beam will be studied via inverse kinematic approach, where ^{16}O,^{12}C therapeutic beams, with the quoted kinetic energy, collide on graphite and hydrocarbons target to provide the cross section on Hydrogen. This configuration explores also the projectile fragmentation of these beams.
The detector includes a magnetic spectrometer based on silicon pixel detectors, a scintillating crystal calorimeter with TOF capabilities, able to stop the heavier fragments produced, and a ΔE detector to achieve the needed energy resolution and particle identification.
The detector, the physical program and the timetable of the experiment will be presented