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The FragmentatiOn Of Target Experiment (FOOT) and its DAQ system

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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. Dose deposition is dominated by electromagnetic interactions but nuclear interactions between the beam and patient tissues inducing fragmentation processes must be carefully taken into account. The FOOT experiment (FragmentatiOn Of Target) is a funded project designed to study these processes. The detector includes a beam monitor, a magnetic spectrometer based on silicon pixel and strip detectors, a TOF and ΔE scintillating detector and a crystal calorimeter. The experiment is being planned as a 'table-top', relocatable experiment in order to cope with the small dimensions of the experimental halls and the different beams available at the CNAO, LNS, GSI and HIT treatment centers, where the data takings are foreseen in the near future (2020-2021). The experiment goals, the detector and the distributed data acquisition system will be presented. The latter is a fully distributed and real-time system, made with PCs, SOC-FPGA boards and dedicated electronic boards which allows DAQ rates of order 1kHz, with minimal dead time and with full control on the data quality.

Minioral

No

IEEE Member

No

Are you a student?

No

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