ID de la contribución : **28** Tipo : **Oral contribution (15'+5')**

PEPITES : A Transparent Beam Profiler based on Secondary Electrons Emission for Hadrontherapy

jueves, 22 de febrero de 2024 12:25 (15)

The PEPITES detector is an ultra-thin, radiation-resistant profiler capable of continuous operation on mid-energy (O(100 MeV)) charged particle accelerators. With a water equivalent thickness of 10 microns, it induces minimal beam disturbance and is highly resistant to radiation.

Secondary electron emission (SEE) is used for the signal because it only requires a small amount of material (10 nm); very linear, it also offers large dynamics. The lateral beam profile is sampled using segmented electrodes, constructed by thin film methods. Gold strips, as thin as the electrical conductivity allows (~ 50 nm), are deposited on an insulating substrate as thin as possible. While crossing the gold, the beam ejects the electrons by SEE, the current thus formed in each strip allows the sampling. The detector works in the vacuum of the beam line.

SEE signal was characterized at ARRONAX*cyclotron with 68 MeV proton beams and at medical energies at CPO**. Electrodes were subjected to doses of up to 10^9 Gy without showing significant degradation.

A demonstrator with dedicated electronics (CEA) is installed at ARRONAX where it is used routinely with proton beams of 17-68 MeV for intensities from 100fA to 100nA. Measurements of a Flash 68 MeV proton beam were also done here (10 ms pulses with mA intensity).
Carbon ion beam profiles with an energy between 115 MeV and 395 MeV were measured at CNAO using a portable version of the detector.

An overview of the design and first measurements will be presented, and system performances will be assessed.

*ARRONAX cyclotron, Saint Herblain (France)**Orsay Protontherapy Center (Institut Curie, Orsay, France)

Primary author(s) : THIEBAUX, Christophe (Laboratoire Leprince-Ringuet CNRS-Ecole polytechnique)

Presenter(s) : THIEBAUX, Christophe (Laboratoire Leprince-Ringuet CNRS-Ecole polytechnique)