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Recent results on the development of a proton Computed Tomography system

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Proton Computed Tomography (pCT) is an imaging technique based on the use of proton beams with kinetic energies above 200 MeV to directly measure stopping power (SP) distributions inside the tissue volume. PRIMA (PRoton IMAging) is an italian collaboration working on the development of a pCT scanner based on a tracker and a calorimeter to measure single protons trajectory and residual energy. The tracker is composed by 4 x-y planes of silicon microstrip detectors to measure entry and exit positions and angles. Residual energy is measured by a segmented calorimeter composed by YAG:Ce scinitillating crystals which also provides the trigger signal for the read-out chain. A first prototype of pCT scanner, with an active area of about 5x5 cm2 and a data rate capability of 10 kHz, has been constructed and characterized with 60 MeV protons at Laboratori Nazionali del Sud –Catania (Italy) and with 180 MeV protons at Svedberg Laboratory –Uppsala (Sweden). A new pre-clinical prototype with an extended active area up to ˜ 5x20 cm2, real time data acquisition and a data rate up to 1 MHz is under development. Test beam results of the present prototype and a description of the new prototype under development will be presented. Moreover, first results concerning tomographic image reconstruction will be presented and discussed.

quote your primary experiment

PRIMA-INFN Project

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