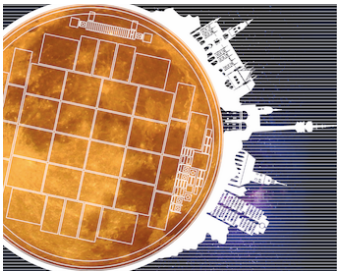

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Results on Proton Tomography

Proton Computed Tomography (pCT) is a medical imaging method aimed at improving the accuracy of treatment planning in hadron therapy through a direct measurement of tissues' stopping power distribution. A pCT image can be obtained, with a single event approach, by directly measuring each proton position and direction upstream and downstream the volume under study using a tracker and, at the same time, evaluating the particle residual energy by a calorimeter or a range counter.
A pCT system based on a silicon microstrip tracker and a YAG:Ce scintillating calorimeter has been developed within the INFN-RDH-IRPT collaboration and recently tested with a 228 MeV proton beam at the Proton Therapy Center (Trento, Italy).
Algebraic iterative reconstruction methods, together with the most likely path (MLP) formalism, have been used to obtain stopping power images of an anthropomorphic phantom and an electron density calibration cylinder.
Due to the heavy computation load required by the algebraic algorithms and the MLP trajectory determination, the reconstruction programs have been written to fully exploit the high calculation parallelism of Graphics Processing Units.
The phantoms' proton tomographies, together with the experimental methodologies used to acquire, analize and reconstruct data, will be presented and discussed.

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