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A novel range telescope concept for proton CT

Proton beam therapy can potentially offer improved treatment for cancers of the head and neck and in pediatric patients. Proton therapy is a promising new type of cancer treatment, can be targeted more directly at the tumor and does less damage to other tissue. Treatments are currently planned using conventional X-ray CT images. It is happening due to the absence of devises able to perform high quality proton computed tomography (pCT). However, this system (X-ray image + proton therapy) increases the dose obtained by the patients. To avoid this a new plastic-scintillator-based range telescope concept, named ASTRA, is proposed to measure the proton's energy loss in a pCT system.

The performance of ASTRA has been tested by simulating the imaging of phantoms. The results show excellent image contrast and relative stopping power reconstruction.

The first tests of selected kind of scintillators and the SiPMs were performed by the DPNC at the University of Geneva and the University of Birmingham, the prototype and the readout system (using the BabyMind CITIROC) will be prepared by the DPNC group at the University of Geneva.

In this poster I present a concept of ASTRA, the simulation results and further development of the project.

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