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# Experimental tests of the scanner prototype for imaging with protons developed at IEM-CSIC

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Proton therapy requires precise knowledge of the patient's anatomy to guarantee an accurate dose delivery [1]. X-ray computed tomography (CT) images are used nowadays to calculate the relative stopping power (RSP) needed for proton therapy treatment planning [2]. Recent studies indicate that tomographic imaging using protons has the potential to provide a more accurate and direct measurement of RSP with a significantly lower radiation dose than X-rays [3].
The proton CT (pCT) scanner prototype developed at IEM-CSIC is composed of a tracking system of two double-sided silicon strip detectors, and the CEPA4 detector as the residual energy detector. Our pCT scanner prototype was tested at the Cyclotron Centre Bronowice (CCB) facility in Krakow, Poland during three experimental campaigns conducted in 2021 and 2022. Radiographs were generated from pixelated detectors. Volumetric phantoms composed of matrices made of PMMA with inserts of air, ethanol, water, Delrin, Teflon, and aluminum were imaged. The radiographs displayed great fidelity with respect to the shapes of the studied samples. The spatial resolution of this proton imaging scanner prototype is better than 2 mm and the MTF-10%=0.3 line pairs per mm [4]. We are currently engaged in the data analysis of new samples for the study of radiographs and tomography scans using proton beams with energies up to 200 MeV.
At this conference, we will present preliminary findings, including the imaging capabilities of our prototype, showcasing its potential applications for the future of medical imaging detectors.

**References**

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