

Reconstruction of Proton Radiography Images

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Abstract

We report the analysis of a beam experiment to develop proton Computed Tomography (pCT). The set-up consists of telescopes of silicon strip detectors at the entrance and exit of a phantom to predict the path of the proton within the phantom and of a crystal calorimeter to measure the proton energy loss with high precision. The energy loss permits calculating the integrated proton stopping power along each proton path.

We describe the 2D-image reconstruction of both a low-contrast extended phantom and a high contrast QC-3 phantom (Masthead Imaging Corporation), derive the relationship between contrast, pixel size and dose, and study the spatial resolution achievable with this set-up.