

SENIOR CAPSTONE PRESENTATIONS

PHYSICS DEPARTMENT

WHEN

December 1
12pm – 1pm

LOCATION

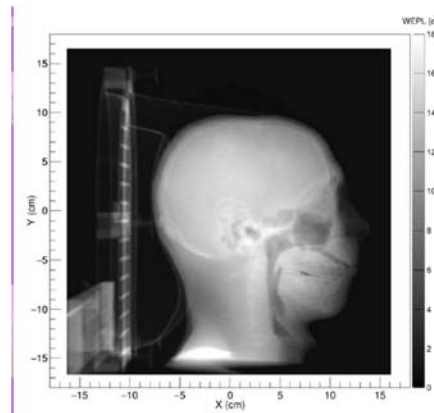
Mara Auditorium
Masters Hall, Room 110

MADelyn SEIBEL
GETTYSBURG COLLEGE, '22

TITLE

Proton Radiography for Improving Proton Therapy Treatment Planning

ABSTRACT



Proton radiography is an imaging tool that uses protons instead of x-rays to capture images and information about the subject being irradiated. While proton radiography is not yet used clinically, it is possible to implement it in clinical treatment planning in the future with more research.

Proton radiography has the potential to increase the accuracy of proton therapy treatment plans and position verification by providing information about the radiological thickness and internal structure of an object or patient. The CT scans that are currently used for proton treatment planning have an associated uncertainty because electrons are being used to estimate how protons will travel through tissue in the body, and there is a difference between these particles with electrons being much lighter than protons. Using the dual energy method, it was possible to capture four separate images in scattering and absorption mode with two different energies on a scintillation detector, and these images were then processed together using Matlab. Processing the images allowed for the acquisition of one corrected image that removed the contributions of proton scattering and energy loss as the protons traveled through an object. It was found that using protons to image an object can provide information about radiological thickness and internal structure by providing a clear image. With this result and future research, proton radiography offers a more accurate way to image a patient and plan proton radiation treatments from these images.

Light snacks provided.
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