Contribution ID: **14** Type: **not specified**

Image Reconstruction with Proton CT

Wednesday 13 March 2024 15:30 (30 minutes)

One of the most successful treatments in cancer therapy is proton therapy, with radiation planning being a key element. Photon CT is commonly used for this purpose; however, it does not provide sufficiently accurate information about the range of protons. Therefore, proton CT imaging is more favorable for radiation planning. Due to the Coulomb scattering of protons, it is important to calculate the Relative Stopping Power at the voxel level (thus, appropriate handling of trajectories is also required), for which several algorithms have been developed. The aim of my research is to test, further develop and optimize a software package using the Richardson-Lucy algorithm developed in the Bergen Proton CT Collaboration.
The simulations necessary for the research were performed using the Geant4 and Gate software. I optimized the framework using the Richardson-Lucy algorithm with appropriate methods for faster and more efficient operation. I tested the operation of the algorithm and image reconstruction on phantoms developed to measure the performance of medical imaging systems at different energies.
During my work, I managed to optimize the algorithm reducing the runtime. Based on the evaluation of phantom reconstruction, I found that the algorithm operates with the desired accuracy.
Among my long-term goals are further optimization and achieving clinical usability (including further reducing runtime).

Author: JOLESZ, Zsofia

Presenter: JOLESZ, Zsofia

Session Classification: Short talks