A Fast Dose Calculator (FDC) for Proton Cancer Therapy

Published date: Oct. 24, 2014

Technology description

Challenge

The dose that cancer patients receive from proton radiotherapy requires long computation times for precise determination. Faster computation methods using an analytical approach exist, but have a tradeoff in precision. For ideal purposes, there needs to be a fast dose calculator with the speed of analytical approaches while maintaining the precision of stochastic approaches.

Solution

This invention provides a process to calculate the dose deposited by a proton beam. The Fat Dose Calculator (FDC) uses an algorithm nearly one hundred times faster than conventional stochastic algorithms. A database of proton trajectories is generated, and then used to quickly simulate proton trajectories in any material by scaling the trajectory lengths and scattering angles.

Technology Relevant Papers and Web Links

P. Yepes et al, "Monte Carlo fast dose calculator for proton radiotherapy: application to a voxelized geometry representing a patient with prostate cancer", Phys. Med. Biol. 54 (2009) N21-N28.
J.S Li et al, "A particle track-repeating algorithm for proton beam dose calculation", Phys. Med. Bio. 50 (2005) 1001.

Case

2009-020

Application area

The FDC may be applied to a variety of fields. The most immediate application will be the calculation of the dose received by patients treated at proton therapy centers. Stochastic methods are more precise than currently used analytical models, but are extremely time-consuming.

Advantages

Stochastic methods and results with the speed of analytical approaches
100 times faster than traditional stochastic algorithms

Institution

Rice University

Inventors

Pablo P.

联系我们

叶先生

电 话：021-65679356
手 机：13414935137
邮 箱：yeyingsheng@zf-ym.com