Dose Calculation Algorithms

Overview

The decimal eRT software application uses the Pencil Beam Redefinition Algorithm (PBRA) as primary means of computing electron beam dose. This is a semi-analytical model that combines pencil beam theory with a localized electron transport process to create a fast and accurate dose calculation. Many published references exist in the literature for this algorithm, including: 1. Fix Me! REFERENCE 1 2. Fix Me! REFERENCE 2 3. Fix Me! REFERENCE 3

While the PBRA is well described in the literature, as shown above, a basic description is also provided herein, to allow users to develop a more complete understanding of the eRT software and the commissioning data it uses.

Pencil Beam Redefinition Algorithm

Fix Me! Details of the PBRA here

Include: details regarding (at a minimum): the handling of tissue heterogeneities, the mathematical equations forming the basis of the calculations, the limits of the variables used in these equations, and a statement of accuracy (with results) for a pre-de□ned set of dose calculation conditions (with a full description of said conditions).

Data Regularization (Interpolation)

Fix Me! Describe the process of moving from the PBRA dose aligned grid to the DICOM regular grid.

Out of Bounds (Extrapolation)

Fix Me! Describe when and how eRT extrapolates data in regards to beam models and dose calculations.

Dose Volume Histogram (DVH) Calculation

Fix Me! Ensure that the User Guide contains information describing the interpolation and extrapolation techniques and their usage within the context of dose calculation, DVH computation, and data exporting.