

Beam Data Collection, Commission and Modeling in Treatment Planning System

AAPM Task Group-106¹ provided detailed information on the beam data collection for the commissioning of a linear accelerator. Based on the task group recommendation, this presentation will provide procedures for acquiring specific photon and electron beam parameters and methods to reduce measurement errors. Additionally following topics will be elaborated: need for commissioning data, issues with beam commissioning measurements, selection of phantom size and material, selection of cable, adopter, detectors, scanning system setup problems, (possible solution and examples), scanning speed, hysteresis, saturation, time delay, sampling, orientation of the detector for profiles, type and quality of scanning data, point data, problems with large fields such as total body irradiation (TBI) and total skin electron irradiation (TSEI) and small fields used in stereotactic radiosurgery (SRS), and intensity modulated radiation therapy (IMRT), smoothing, filtering and processing and presentation of commissioning data in external beam as well as small fields used in many advanced treatment techniques. Examples of the inaccurate and poor data with figures will be presented. An overview and limitation of the task group will be discussed in the context of rational for the beam data commissioning, time needed for data collection and the legality of the data for future use.

Learning objective:

1. Rational for beam data commissioning for a linear accelerator
2. Differences in golden and measured data
3. Typical problems, choice of detectors, data collection accuracy
4. Large and small fields problems
5. Data processing and accuracy needed
6. Detecting errors in beam data
7. Legality of beam data

¹Das et al "Accelerator beam data commissioning equipment and procedures: Report of the TG-106 of the therapy physics committee of the AAPM." *Med Phys* 35:4186-4215, 2008.