

Medical Accelerator Accessory for Routine QA of Geometric Treatment Parameters

Broad acceptance of 3D-conformal radiotherapy technique requires increased confidence in the accuracy of medical accelerator readouts. Daily QA checks of field-size, gantry and collimator angles, ODI, and triangulation lasers are advisable. We have developed a single self-contained accelerator accessory that improves the efficiency and precision of these measurements.

The geometric accuracy accessory (GAA) consists of two digital levels mounted on an aluminum frame that slides securely into the blocking-tray slot. They are oriented to enable measurements of both gantry and collimator angles across their entire operating range with a precision of ± 0.05 degrees. A set of four field-size test patterns for 5x5cm through 20x20 cm are projected to the isocenter plane. The GAA includes an electronic tape measure for checking the ODI at an arbitrary SSD to a precision of 0.1cm. This feature can be used to assist patient set-up for extended SSD treatments up to 5 meters. It can also be used to measure SSD to off-axis dose specification points for "irregular field" calculations. Cross-hair marks are provided for a sensitive check of room laser alignment.

We have conducted experiments on the GAA for accuracy, reproducibility, and ease of use in performing QA tests for the accelerator *and* the record and verify readouts. The results are consistent with the measurement tolerances recommended by AAPM TG40 and are presented.

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