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Imaging and Treatment Isocenter Coincidence for a Linear Accelerator Using Oblique Projection Imaging JAKE DOWNEY, University of Tennessee Chattanooga, MARIAN AXENTE, CHENGUANG LIU, Erlanger health systems, Department of Radiation Oncology, Chattanooga Tennessee — Modern radiotherapy treatments involve advanced patient imaging systems to allow for more accurate and reproducible patient positioning. This is known as image guided radiotherapy (IGRT). To conduct IGRT, the user needs to validate that the coincidence of the imaging system and the treatment beams' center is within acceptable tolerances (<2mm). The equipment under investigation was a double oblique kV projection imaging system and a C-arm gantry mounted medical linear accelerator (linac). Using radiochromic film, the coincidence of the linac mechanical center, and radiation beam center was found to be 0.91mm. The imaging system center was calibrated to be <1mm from linac mechanical center. Using IGRT, a hidden spherical target phantom was aligned. Marked radiochromic films were also inserted in the phantom to capture the target shadow made by the treatment beam. The test indicated an alignment error of 1.30.27mm between the imaging and treatment center, which was within stated tolerance. These experiments provide a conclusive and deconvoluted map of uncertainties using IGRT as well as understanding of quality assurance methods used by a medical physicist in a clinical setting.

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