

**AbstractID: 1271 Title: A New Method for Image Guided Radiation Therapy Using CT**

Current methods for CT based image guided radiation therapy (IGRT) rely on external patient markers, such as BB's or wires, to indicate the treatment planning isocenter in the CT scan and to calculate shifts. We have developed a system that does not require these markers and is able to position any pixel in the CT volume at the linac isocenter. By removing the need to place radiopaque markers on the patient, we have eliminated a source of error and simplified the IGRT process.

Custom-milled "anchor points" were mounted to three walls and the ceiling of our treatment room. These anchor points were designed to allow precise radial distances to be measured in any direction using a tape measure. Measurement of the distance from each anchor point to any location in the room was converted into an x, y, and z coordinate using custom software, thereby establishing a coordinate system fixed to the room. A CT-to-room transform was then established that could translate any pixel in the CT volume into its associated coordinate in the room reference frame. After measuring the location of the linac isocenter and the treatment table axis of rotation, custom software was created that could calculate the shift and rotation required to place any pixel in the CT volume at the linac isocenter. The performance of the system was tested using a custom IGRT phantom.