MR-LINAC: A NEW AGE IN RADIOTHERAPY AND DOSIMETRY

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Over the past two decades, there has been a major push towards the integration of imaging systems with radiation delivery units for the purposes of online imaging and adaptive delivery in radiotherapy. Although to date, the integration of kV cone beam imaging, MV imaging, ultrasound and other imaging instruments with conventional radiotherapy delivery units have posed no effect on reference dosimetry and the existing protocols, the recent integration of MRI with clinical high energy photon radiotherapy units is known to affect reference dosimetry. In such cases, the ion collection may be slightly different depending on the type of the ionization chamber, the magnetic field strength, and the orientation of the chamber with respect to the magnetic field. Other effects of MRI on accurate radiation dosimetry have also been noted. The goal of this presentation is to introduce MR-linac, review some of the challenges with reference dosimetry in the presence of the magnetic field, and to present some of the research we have done in building novel technology to measure radiation dose in such systems.

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