

# Abstract Title: Electron Return Effect Predictions From Treatment Planning System of An MR-Linac Underestimate the Observations Seen Using Scintillation and Cherenkov Optical Imaging

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In this work, ERE was measured for the first time on an MR-linac using a novel optical method (scintillation and Cherenkov excited fluorescence) in phantoms. This method allows for real-time, 2-D measurement of dose distributions without the need to perturb the beam and solid-air interface with a detector. Results suggest that it is possible that the TPS is under-reporting the extent of dose escalation due to ERE, as well as the localization of the dose escalation.

**ViewRay TPS predicts areas of elevated dose due to the electron return effect (ERE)**

**Optical images of Cherenkov light and scintillation experimentally visualize ERE**

**Comparison of horizontal cross beam profiles through the center of each cavity**

**Comparison of vertical PDD curves 2mm to the left of each cavity**

**Comparison of vertical PDD curves through the center of each cavity**

