

AbstractID: 1581 Title: The effects of beamlet size on IMRT

In planning intensity-modulated radiation therapy (IMRT), radiation fields are often divided into two-dimensional arrays of beamlets and the optimized weights for each of the beamlets form the desired intensity distributions. The size of the beamlets imposes an artificial constraint on the IMRT planning process. This study assesses the effects of beamlet size on dose conformity. Plans for an IMRT benchmark case were developed using different beamlet sizes including 0.5, 1.0, 2.0, 2.5, 5.0, and 10.0 mm. The results show that: 1) the objective function value decreases dramatically as the beamlet size becomes finer; 2) 1 mm is found to be the smallest beamlet size that one has to go down for the best planning result; 3) DVHs have a significant improvement of dose conformity with small beamlet sizes; 4) dose distribution along central axis intuitively proves that smaller beamlet size gives a better dose conformity. Since both the MLC leaves and jaws can move continuously, removing this constraint may potentially improve dose conformity. Potential ways to achieve this without adding significant calculation burden are discussed.