

# **Respiratory Gating and 4D Tomotherapy**

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Helical tomotherapy is a new IMRT delivery modality developed at the University of Wisconsin and TomoTherapy Inc. Tomotherapy may be of great advantage in lung cancer treatment since it is able to spread the unwanted entrance and exit beams to as large a volume as possible and thus minimize the dose to surrounding normal tissue. However, similar to conventional IMRT delivery, during tomotherapy treatment the intrafraction respiratory motion causes severe non-uniform dose distribution due to the interplay of MLC leaves and target motions.

Possible solutions of the intrafraction motion will be presented: Spirometry based respiratory motion tracking system has been developed and used for Deep Inspiration Breath-Hold (DIBH) treatment; an improved laser-spirometer combined system may provide more accurate target tracking; a new 4D treatment technique has been developed to compensate intrafraction motion in treatment planning. Results show that this new 4D treatment technique significantly reduces motion effects and provides better patient tolerance.