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## **Dose Perturbation Measurement on Moving Organ with Home-Made Catholic Dynamic Phantom System**

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Respiratory motion in the thorax and abdomen is an important limiting factor for high-precision radiation therapy. The lung tumor and tumors (liver, pancreas, stomach) in abdomen therefore are internal motion due to breathing. We will perform the measurement and analysis of a delivered dose distributions for these moving organ. In preliminary study, we investigated the displacement of moving tumors in the abdominal regions such as liver, lung and heart with previously reported papers. With the analytical motion model described by Lujan et al., internal motion of organ was reproduced with home-made catholic dynamic phantom system (CDPS), which appear three dimensional motions of x, y and z axis with 3 step motors. The CDPS was used to evaluate the delivered dose distribution of organ with and without internal motion under similar condition, although there was not mimic motion of the organ. In this study, EDR2 film (KODAK) was used to measure the dose distributions. Difference of dose distribution to the motion of internal organ was observed. Little difference appeared in the maximum dose. But the difference of minimum dose irradiated on moving organ is apparently higher than 10% in the dose distribution. The dose distribution for moving organ was also increased more than 10 mm of the penumbra region during respiration. In the future, we will obtain the data of exact analysis to the dose distributions if improved in programmed software of moving control device and measure precise internal motion using image modality such as fluoroscopy, simulator in based on this study.

**Keywords :** Respiratory Motion, Dynamic Phantom System, Dose Distribution