

## AbstractID: 9319 Title: Fabrication of A 3D Moving Phantom

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**Purpose:** A moving phantom without computer interface was fabricated to simulate the motions of external contours in 1D, semi-2D, and semi-3D translational movements using a single motor, and to investigate the geometrical distortion and the resolution of a moving object.

**Method and Materials:** A moving phantom consists of a base plate, a motor, 3 adaptors, a phantom supporter, and a pelvic phantom. A single motor with 10 steps of speed controller is used to convert the rotating movements to translation (up/down) movements. It rotates a metal wheel (20cm diameter and 2cm width, and made of stainless steel to stabilize the motion) with three options (+/- 1, 1.5, 2cm amplitude), one of which can easily be replaced to select the amplitude of the up/down movements. The metal wheel moves a bar, which is connected to one of the adaptors. There are three different adaptors: 1D, semi-2D, and semi-3D adaptors, one of which can be replaced. A pelvic phantom (30cm diameter \* 20 cm height \* 10cm width) can be installed on the top of the adaptors. Resolution plate and geometrical plate can be inserted to investigate the resolution or geometrical distortion of the moving phantom.

**Results:** The moving mechanism can move the ~ 10 Kg phantoms, when it is completely filled up with water. The simulated 2/3D motions were verified with +/-0.5, +/- 1.0, and +/- 1.5cm options.

**Conclusion:** This phantom will be used to investigate the dosimetric effects from uniform scanning proton beam as well as to systematically determine the dynamic resolution or uniformity of the 4D CT scanner.

**Conflict of Interest (only if applicable):** None