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**Theme: Physics**
**Abstract No:. 0167**
**Abstract Title: Design, Fabrication and Characterization of a Multifunctional Phantom for Quality Assurance of a Carbon Ion Radiotherapy System**

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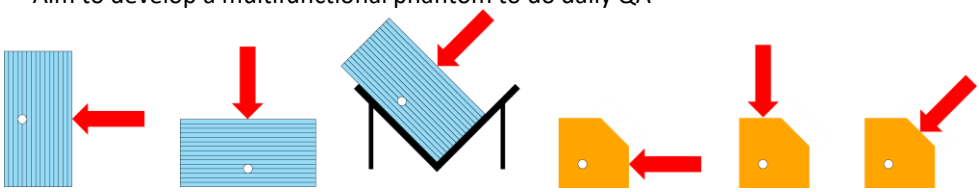
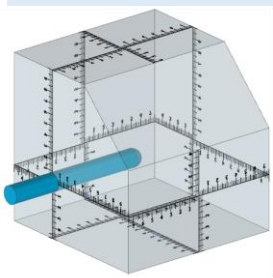
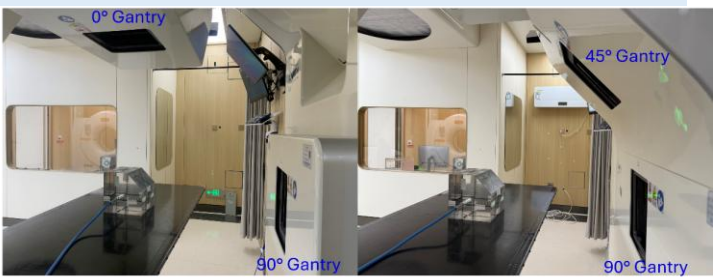
## Background / Aims:

- The carbon ion therapy system in Zhejiang Cancer Hospital use pencil beam scanning method with carbon ion energy ranges between 120 MeV and 400 MeV
- Fixed gantries: Room 1: 90°, Room 2: 0°+90°, Room 3: 45°+90°, Room 4: 90° (a large space is reserved for further possible installation of rotational gantry)
- Room 2 and 3 are under operation
- Daily dosimetry QA is troublesome: need to align the solid water perpendicular to the beam: time consuming, induced radiation to medical physicists
- Aim to develop a multifunctional phantom to do daily QA

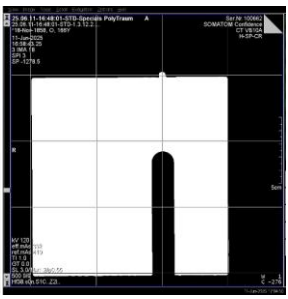


## Subjects and Methods:





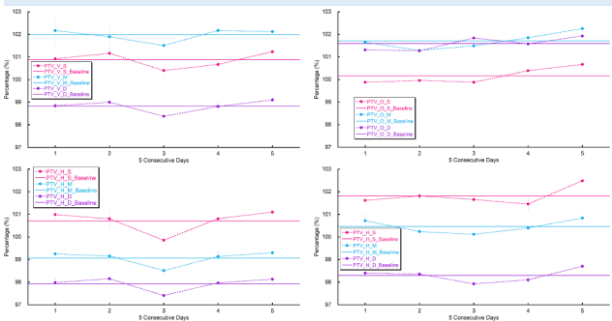

- A cube phantom with a corner truncated
- The distance from center of ion chamber insertion hole to 3 surfaces are all 10 cm



- A tungsten bead was stick on the side surface for daily imaging (DR, CT) QA

## Result:

Dosimetry QA



DR QA: the errors between the daily QA images and the reference image are all less than 0.5 mm (with the national standard requiring less than 1 mm).
CT QA: the imaging centers are all within 0.5 mm of the center of bead (with the national standard requiring less than 1 mm).