

A New Generation of Quality Assurance For Radiation Oncology

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under the auspices of Professor John W. Wong and Dr. Kai Ding

Goals:

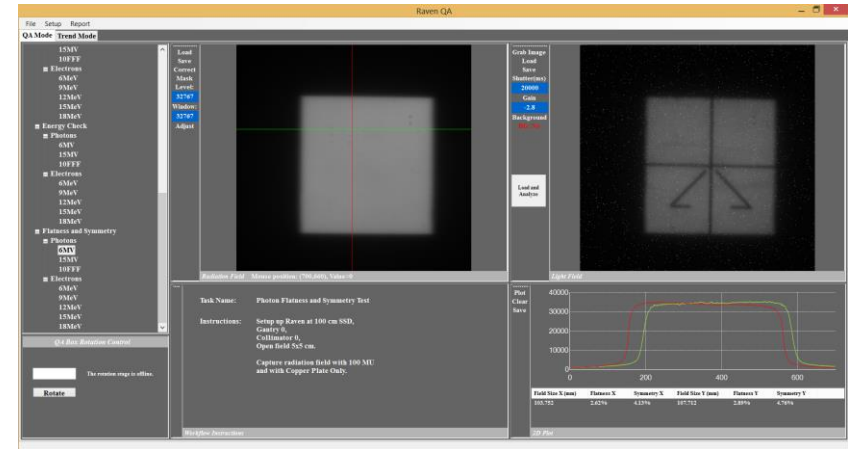
- To release a commercial software for Raven QA including image acquisition, image processing, motor control and user workflow guidance.

Significance:

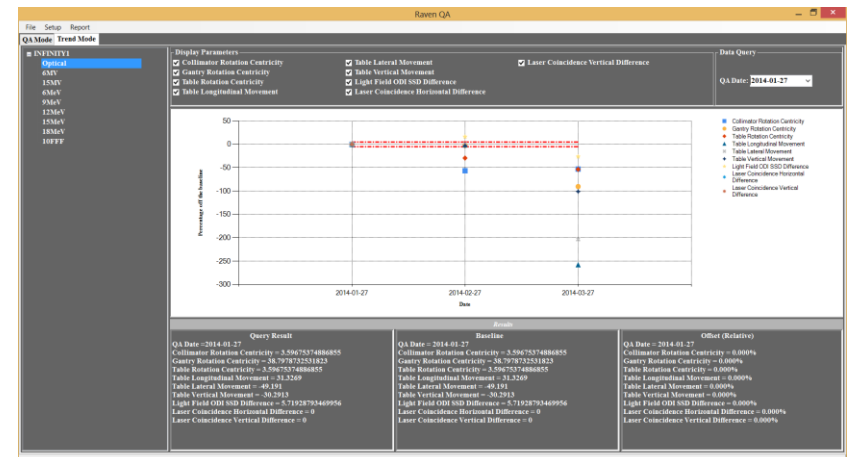
- The software will provide a unifying QA for radiation oncology.

Results:

- Most tasks are done. Working on distortion map.
- A software demo was shown in Dr. Wong's group.
- AAPM 2014 live demo.

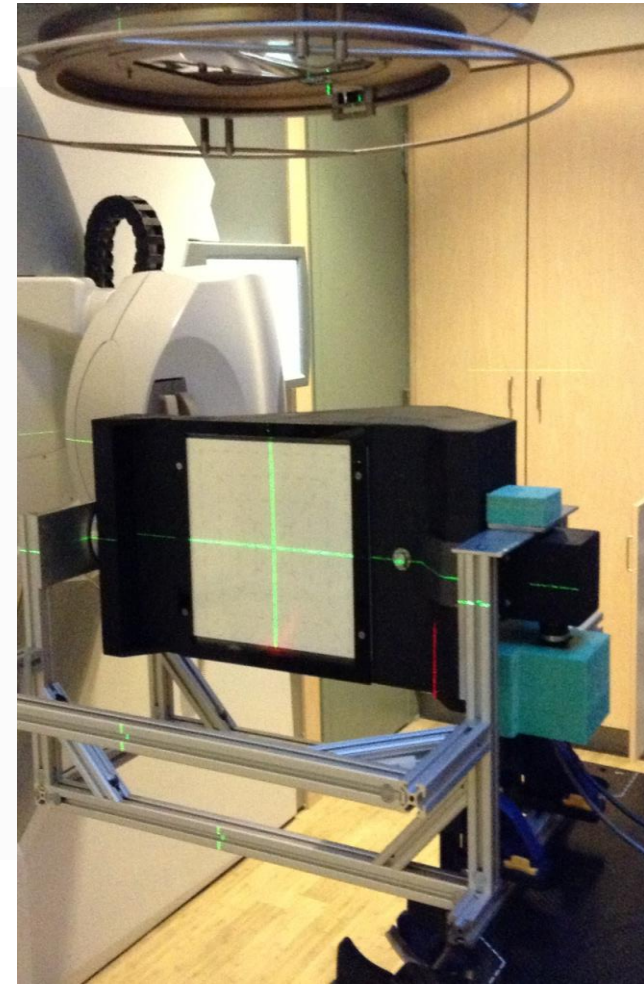
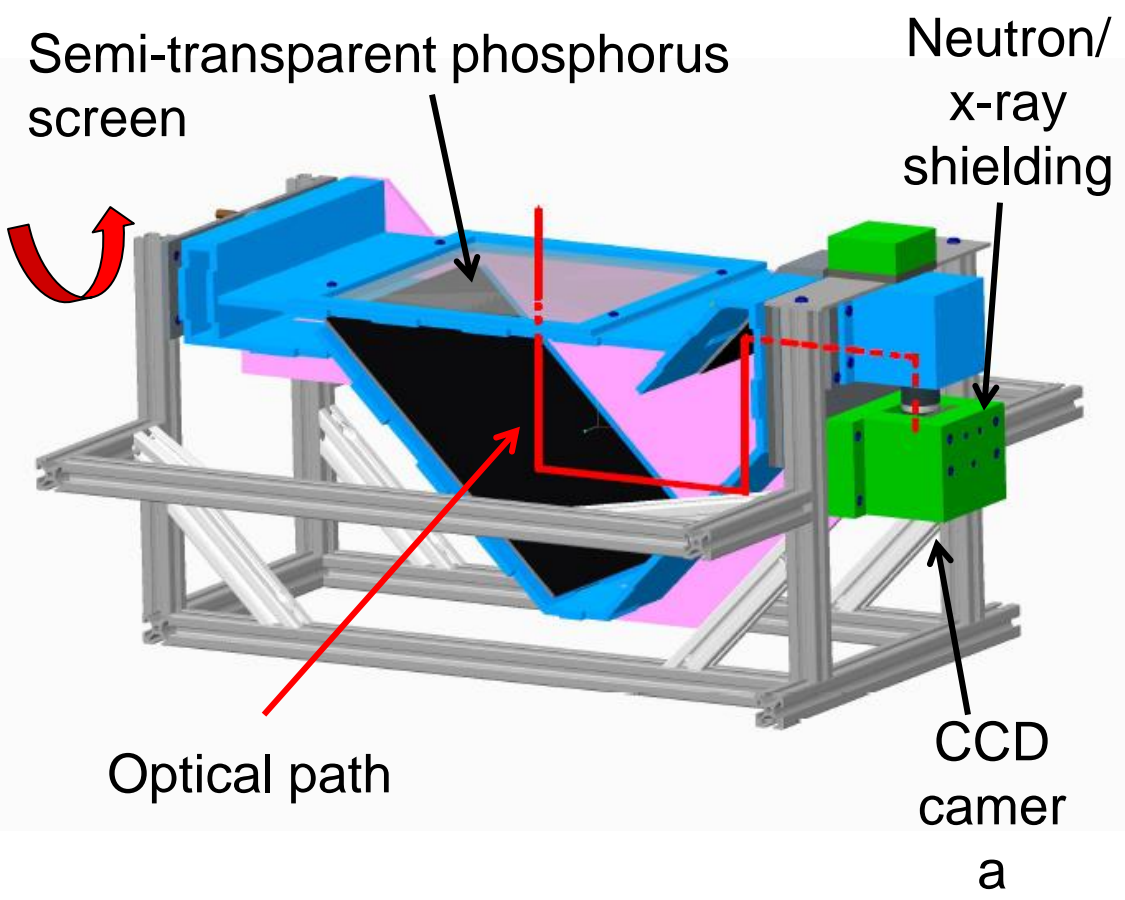


Flatness and Symmetry Test

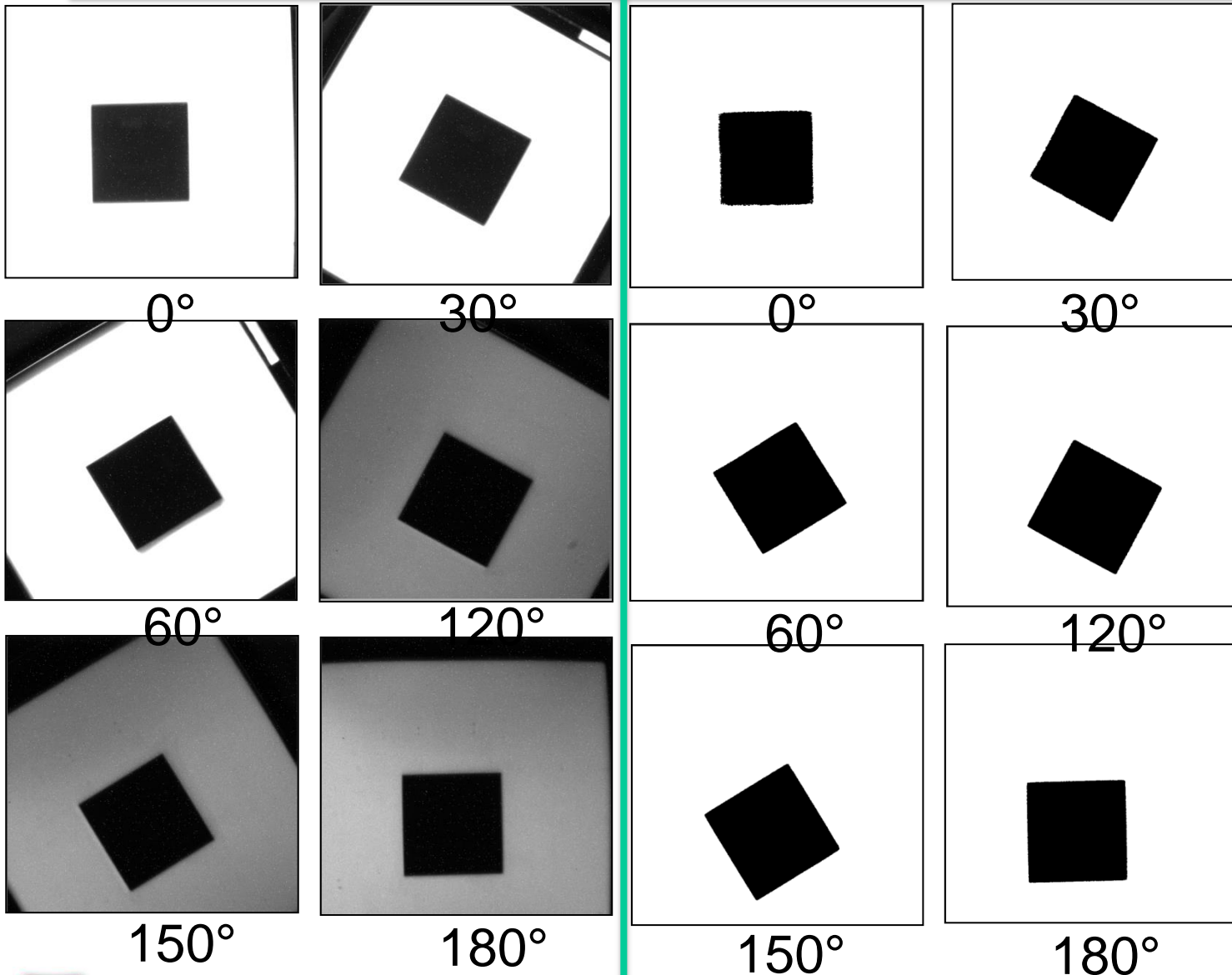


Trend Analysis





Auto-alignment Map



Algorithm:

QA Box Rotation

Capture Images

Pre-filter

Hough Algorithm

Point Cloud Regist

Time Cost:

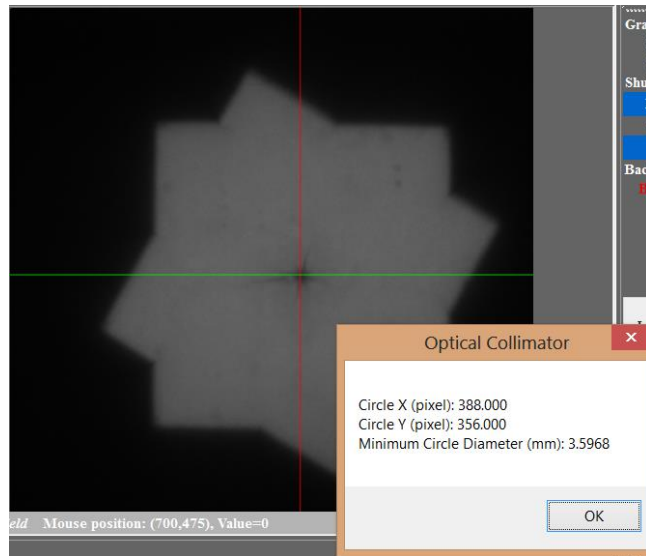
**Monthly: 3 min
(Rough Check)**

**Yearly: ~15min
(Fine Check)**

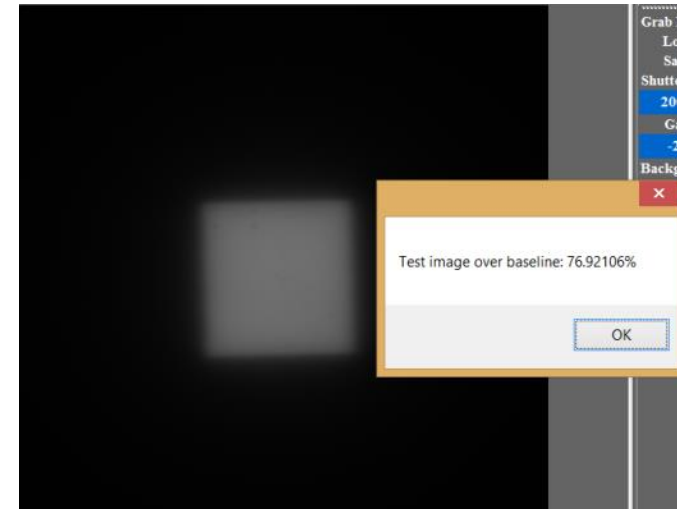


Image Processing

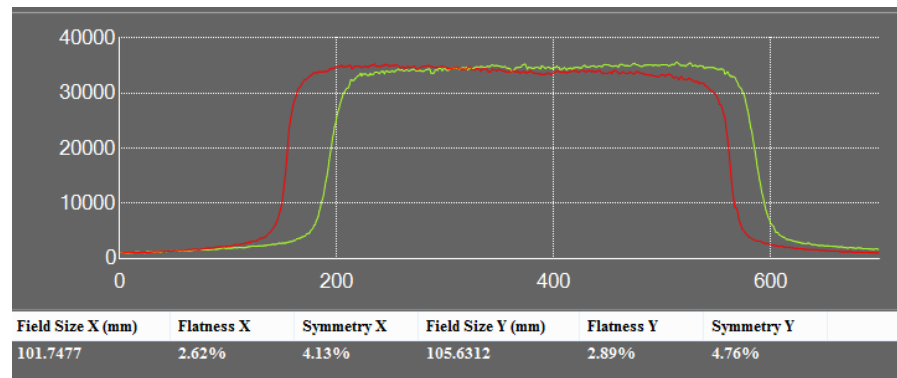
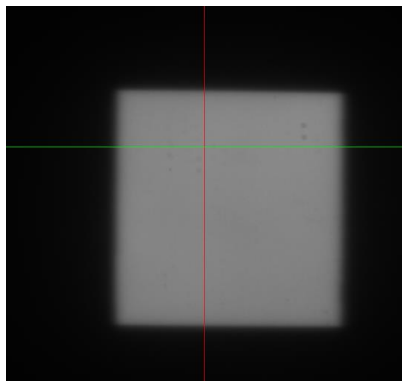
MLC Collimator Rotation Test



Energy Comparison Test



Flatness and Symmetry Test



Workflow Guidance: TG-142 Standard

- Facility
- Machine
- Month
- Collimator Rotation**
 - Gantry Rotation
 - Table Rotation
 - Table Longitudinal Movement
 - Table Lateral Movement
 - Table Vertical Movement
 - Light Field
 - Laser Coincidence
 - Light Field Radiation Coincidence
 - Collimator Rotation
 - Gantry Rotation
 - Table Rotation
 - Photons
 - Electrons
 - Photons
 - Electrons
 - Photons
 - Electrons

Machine Setup

- INFINITY
 - 6MV
 - INFINITY1
 - 6MV
 - 15MV
 - 6MeV
 - 9MeV
 - 12MeV
 - 15MeV
 - 18MeV
 - 10FFF
 - tryOptical
 - Optical

Machine Label: INFINITY

Serial Number: _____

Type: _____

Comments: _____

Add Template to Machine

Energy: _____ MV + Add

Existing Templates: 6MV

Create Machine
Delete Machine
Exit

Raven QA

- INFINITY
 - 6MV
 - INFINITY1
 - 6MV
 - 15MV
 - 6MeV
 - 9MeV
 - 12MeV
 - 15MeV
 - 18MeV
 - 10FFF
 - tryOptical
 - Optical

Display Parameters

Light Field Radiation Coincidence

Collimator Rotation

Gantry Rotation

Table Rotation

Output Photons

Output Electrons

Energy Check Photons

Energy Check Electrons

Flatness And Symmetry Photons

Flatness And Symmetry Electrons

Data Query

QA Date: 2014-01

Date	Percentage off the baseline
2014-01	0
2014-02	-2
2014-03	-1
2014-04	1
2014-05	-1
2014-06	-1

Query Result

QA Date = 2014-01

Light Field Radiation Coincidence = 2.3

Collimator Rotation = 0

Gantry Rotation = 0

Table Rotation = 0

Output Photons = 0

Output Electrons = 0

Energy Check Photons = 0

Energy Check Electrons = 0

Flatness And Symmetry Photons = 0

Flatness And Symmetry Electrons = 0

Baseline

QA Date = 2014-01

Light Field Radiation Coincidence = 2.3

Collimator Rotation = 0

Gantry Rotation = 0

Table Rotation = 0

Output Photons = 0

Output Electrons = 0

Energy Check Photons = 0

Energy Check Electrons = 0

Flatness And Symmetry Photons = 0

Flatness And Symmetry Electrons = 0

Offset (Relative)

QA Date = 2014-01

Light Field Radiation Coincidence = 0.000%

Collimator Rotation = 0.000%

Gantry Rotation = 0.000%

Table Rotation = 0.000%

Output Photons = 0.000%

Output Electrons = 0.000%

Energy Check Photons = 0.000%

Energy Check Electrons = 0.000%

Flatness And Symmetry Photons = 0.000%

Flatness And Symmetry Electrons = 0.000%

