


Tomotherapy and Patient QA (Part 2)




The image shows a large white and grey Tomotherapy machine with a patient table. In the top left, there are two smaller images: a white cylindrical phantom and a blue cylindrical phantom. A watermark for 'PARDISNOOR IMAGING AND CANCER CENTER' is visible in the background.

Aliasghar Rohani
Medical Physicist

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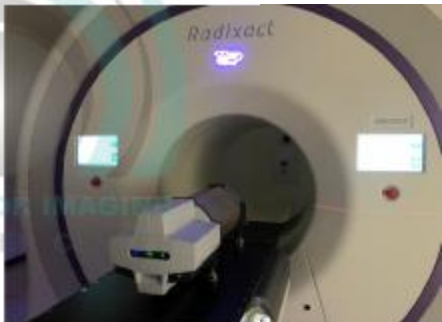
Tomo Patient Specific QA

Cheese Phantom



The image shows the Tomotherapy machine with a blue Cheese Phantom on the table. The brand name 'Radixact' is visible on the machine's gantry.


Delta4+ Phantom




The image shows the Tomotherapy machine with a Delta4+ Phantom on the table. The brand name 'Radixact' is visible on the machine's gantry.

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Tomo Patient Specific QA (Cheese Phantom)



Standard Imaging A15L
"Slimline Miniature Shonka Chamber"




Collecting Volume:	0.955 cm ³
Nominal Calibration Factor:	60.14152
Centroid of Collecting Volume:	4.7 mm from tip of chamber
Collector Diameter:	1.8 mm
Outside Diameter of Shell:	6.25 mm
Wall Thickness:	1.7 mm
Shell, Collector, and Base Material:	A15L - Shonka AA-Epoxi plastic 6552



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Tomo Patient Specific QA (Cheese Phantom)

- ❖ It is Possible to measure 8 points in one radiation ,but it's not practical.
- ❖ Measure the dose in horizontal and vertical direction of phantom's center.



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Tomo Patient Specific QA (Cheese Phantom)

- ❖ It is Possible to measure the dose distribution on the film.



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Other Uses

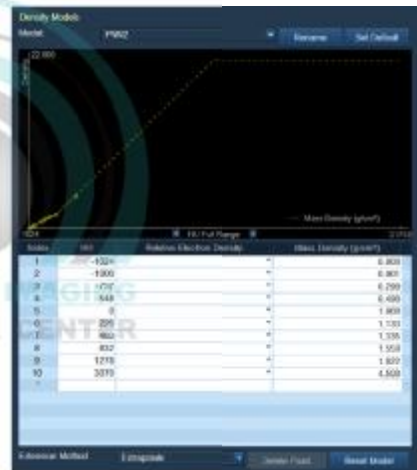
- CT number calibration



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Other Uses

- HU-Density Curve



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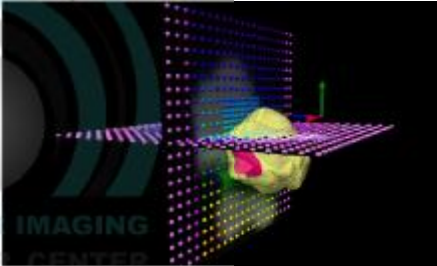
Tomo Patient Specific QA



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Tomo Patient Specific QA (Delta4+ Phantom)


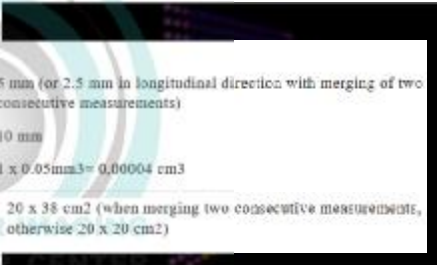
1069 P-type Diodes

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Tomo Patient Specific QA (Delta4+ Phantom)

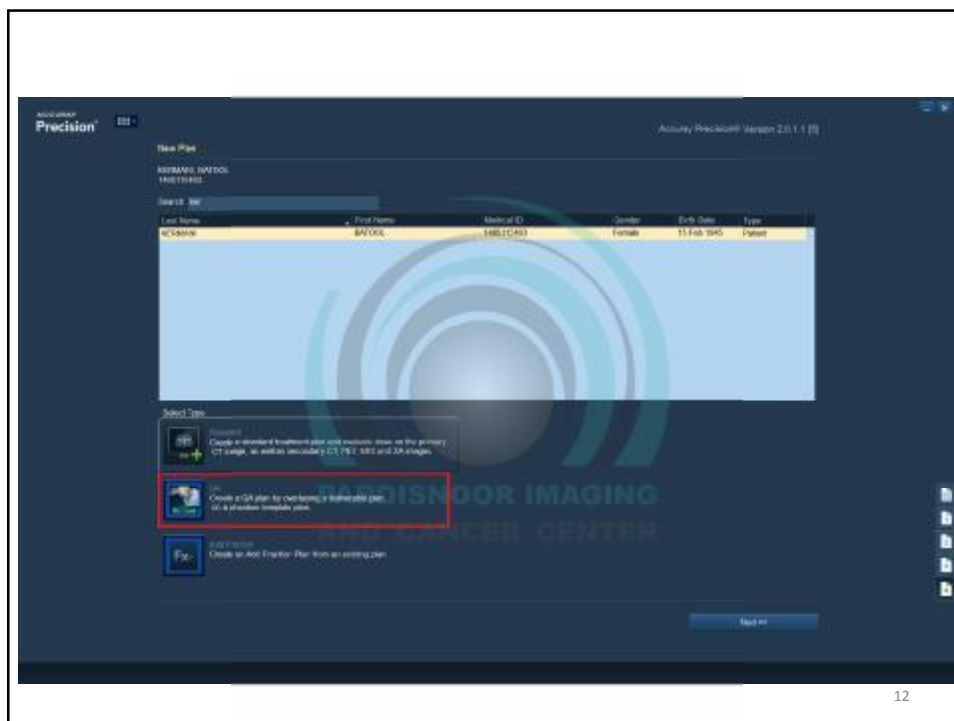
Distance between detectors	5 mm (or 2.5 mm in longitudinal direction with merging of two consecutive measurements)
Central area (6 x 6cm²)	10 mm
Outer area	$1 \times 0.05 \text{mm}^3 = 0.00004 \text{cm}^3$
Size (radial x axial)	20 x 38 cm ² (when merging two consecutive measurements, otherwise 20 x 20 cm ²)
Max field size	

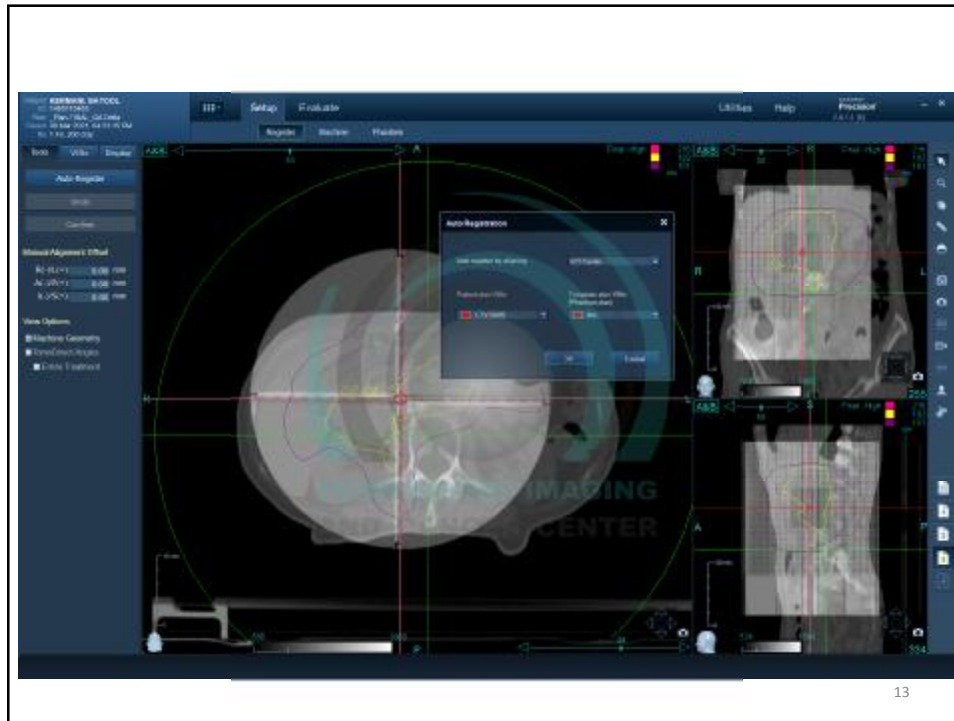
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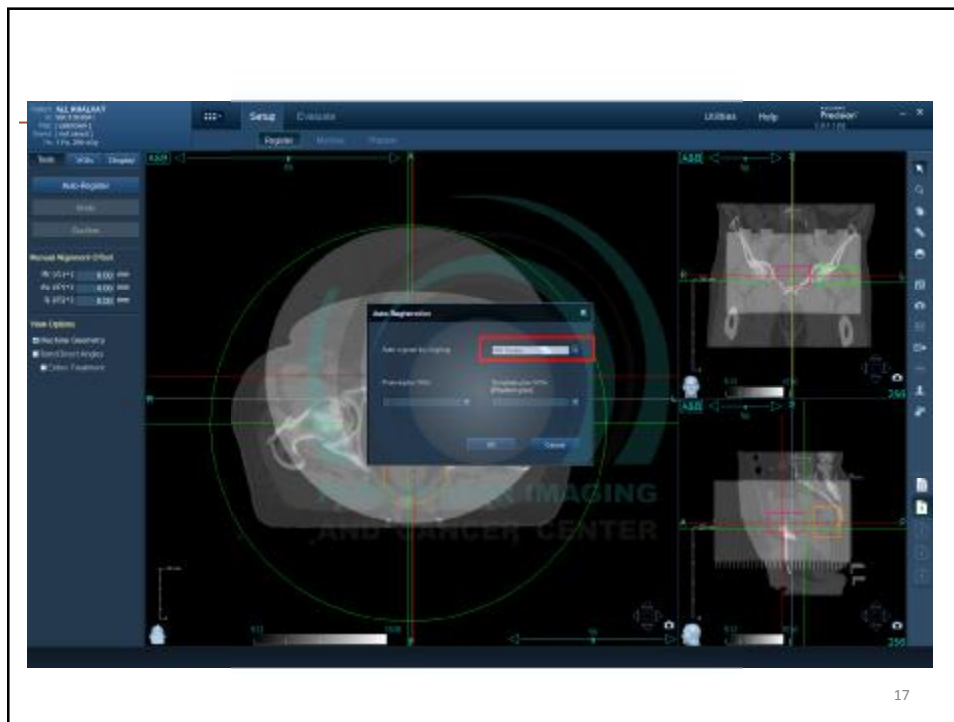




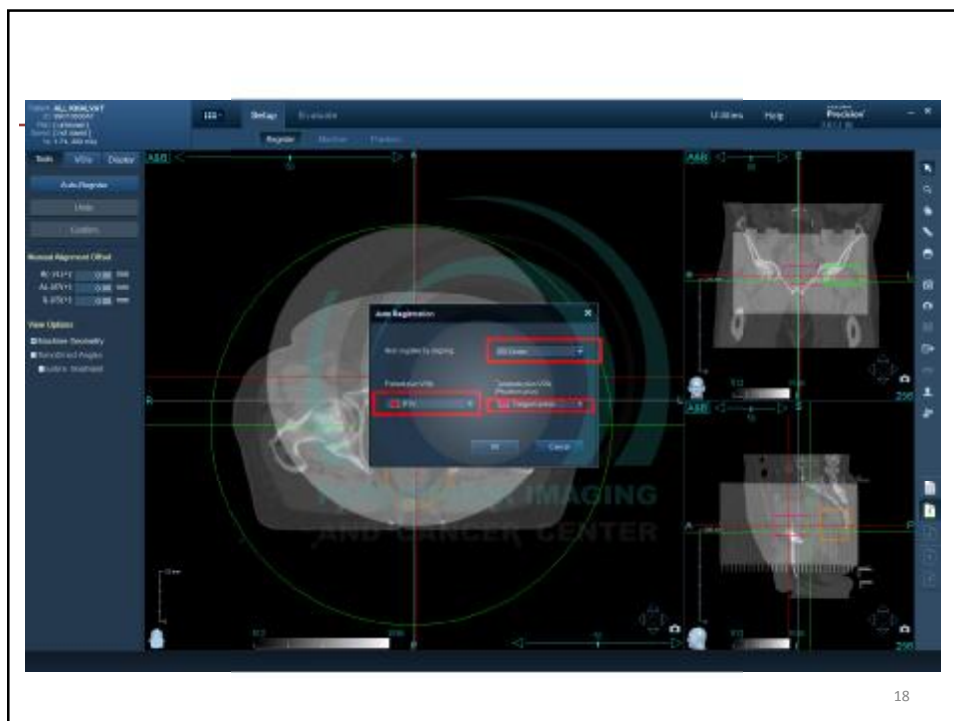
Create a Patient QA in cheese phantom

Create a new Plan

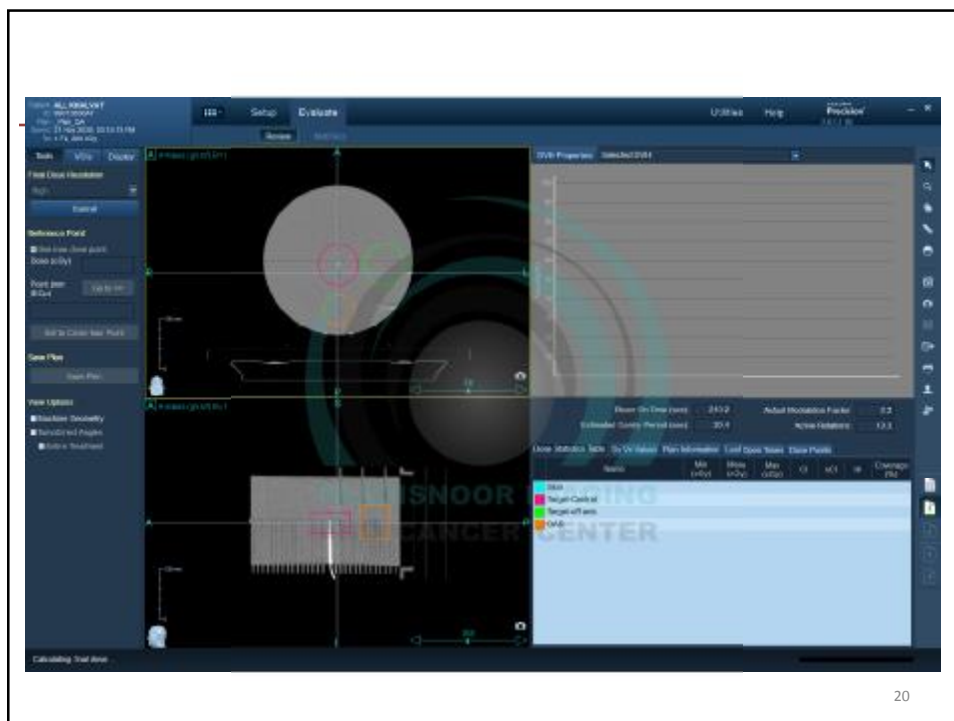
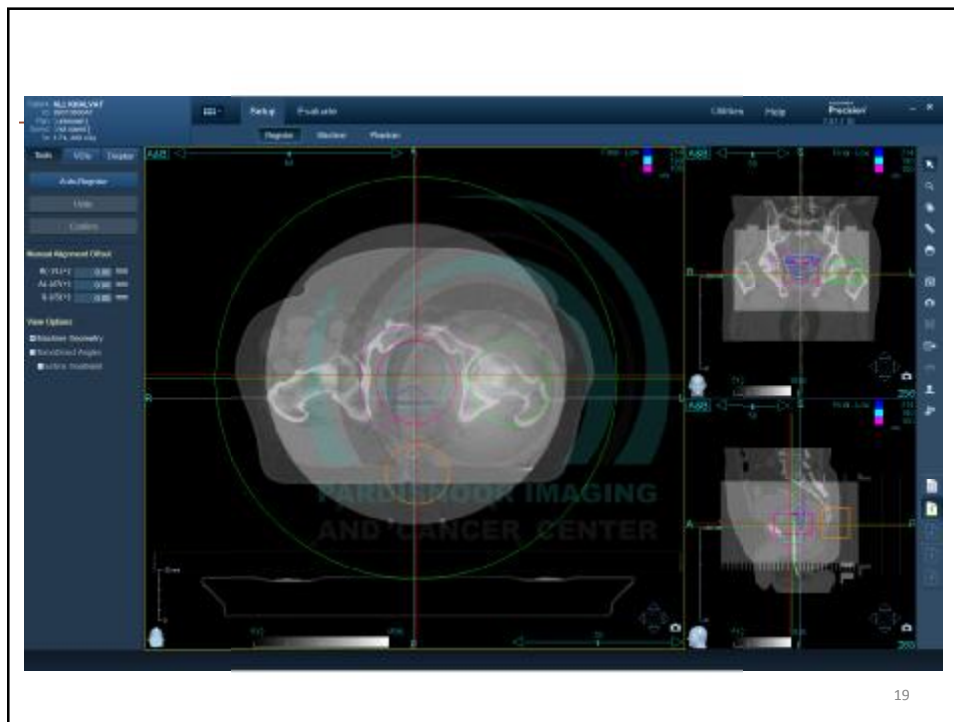
PARDISNOOR IMAGING AND CANCER CENTER

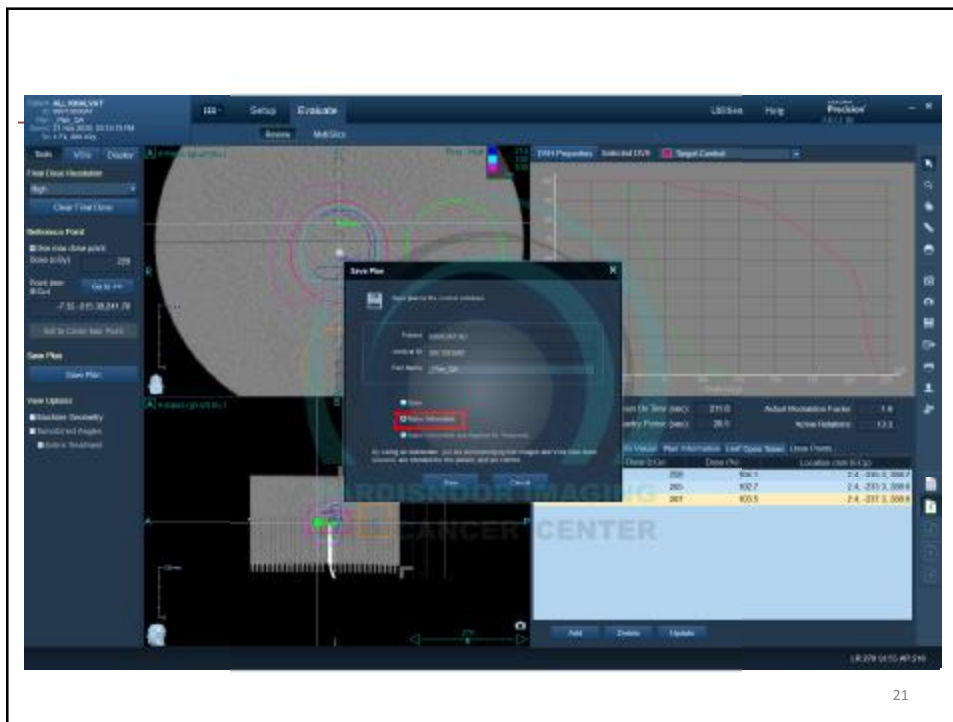


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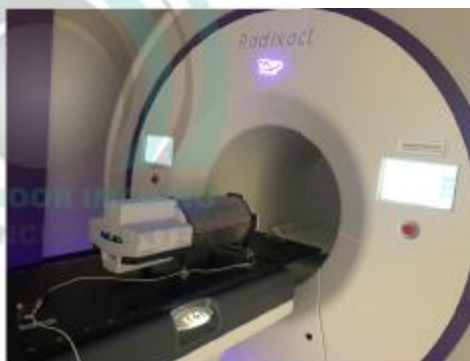


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Patient Specific QA

What We need to do before Using Delta4+ for Tomo Patients QAs:

- Delta4 Phantom+ calibration:
 - 1) Relative
 - 2) Directional
 - 3) Reference
 - 4) Absolute


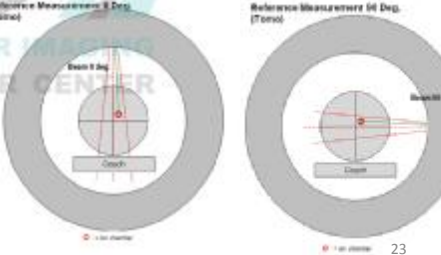


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Patient Specific QA

What We Did to Use Delta4+ for Tomo Patients:

- Delta4 Phantom+ calibration:
 - 1) Relative
 - 2) Directional
 - 3) Reference**
 - 4) Absolute

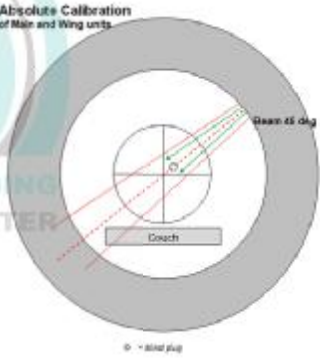
Field Size: 20 x 5 cm field static beam
Gantry: 0 and 90 degree
Beam duration: 60 S

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Patient Specific QA

What We Did to Use Delta4+ for Tomo Patients:

- Delta4 Phantom+ calibration:
 - 1) Relative
 - 2) Directional
 - 3) Reference
 - 4) Absolute**

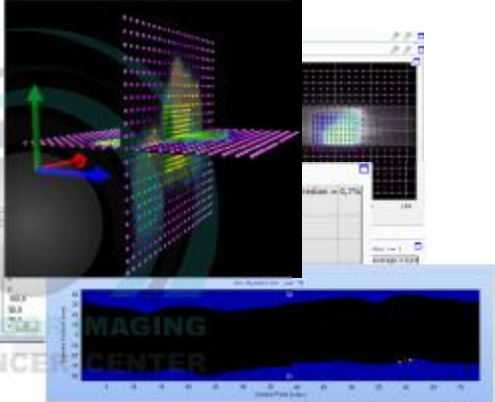



Field Size: 20 x 5 cm field static beam
Gantry: 45 degree
Beam duration: 60 S

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Delta4+ Software Capabilities

- Algorithms
 - 3D Gamma,
 - 3D DTA,
 - Dose deviation
- Display
 - 3D,
 - 2D,
 - 1D
 - Histograms
 - Tables
 - Together with Patient structures






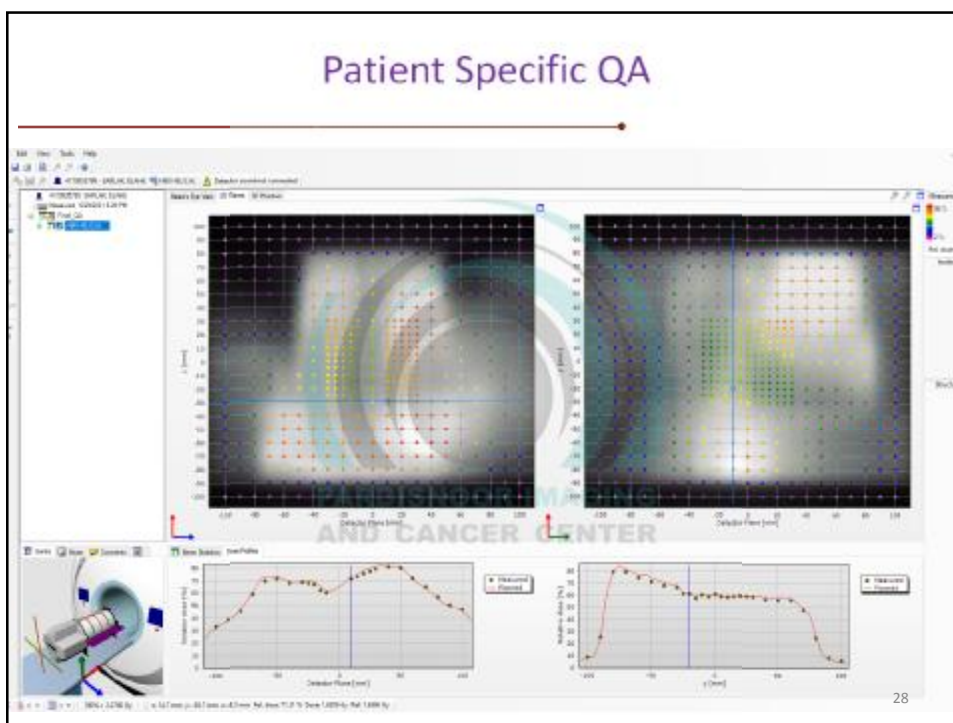
Patient Specific QA

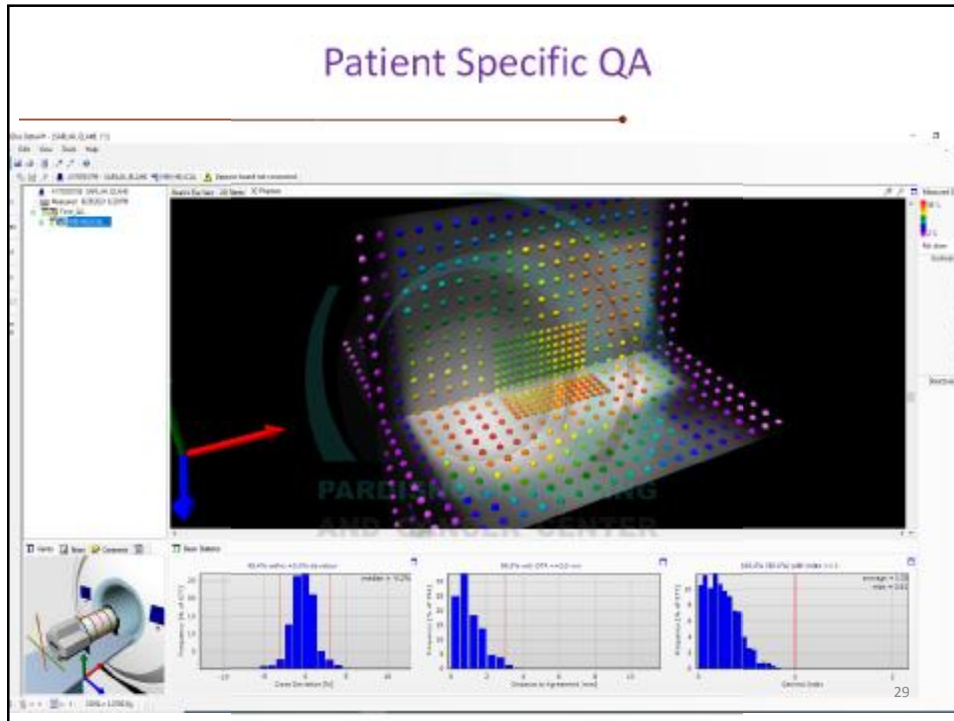
Case #1

- 47 years female
- Oral Tongue
- LN positive
- CTV54 – CTV60 – CTV64
- Duration: 240 sec



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Patient Specific QA in Pardis

We in Pardis Noor niloo cancer center :
 Have treated 250 cancer patients with Radixact .
 The average gamma pass rate :

98.75% , 3% 3mm

88.47% , 2% 2mm

PARDISNOOR IMAGING
AND CANCER CENTER

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Synchrony

- Real-time tracking technology.
- This technology using image guidance and camera to model the motion of the target and synchronizes the delivery of radiation with this motion using the jaws and multi-leaf collimators (MLCs).



4D Patient QA (HexaMotion)

- Simulates patient breathing motion in PSQA
- 6 degrees of freedom



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Thank You For Your Attention



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