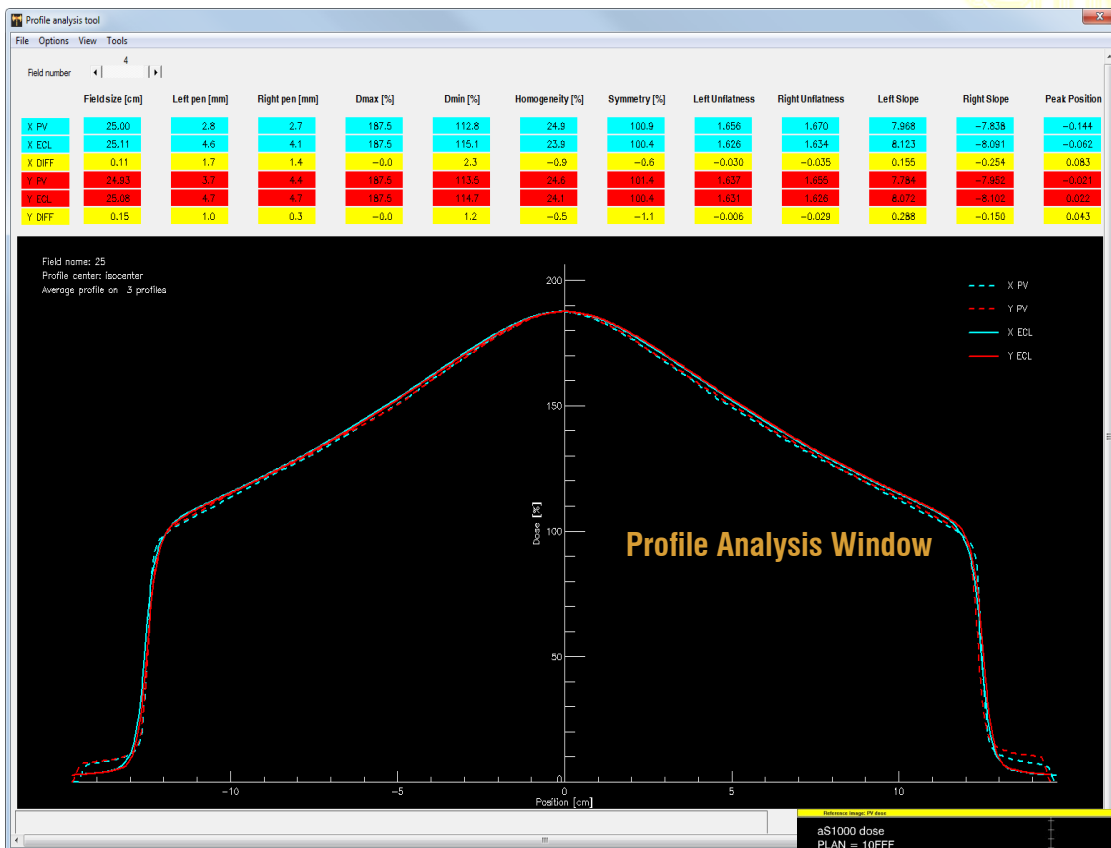


FFF Beam QA

FLATTENING FILTER FREE BEAM PARAMETERS

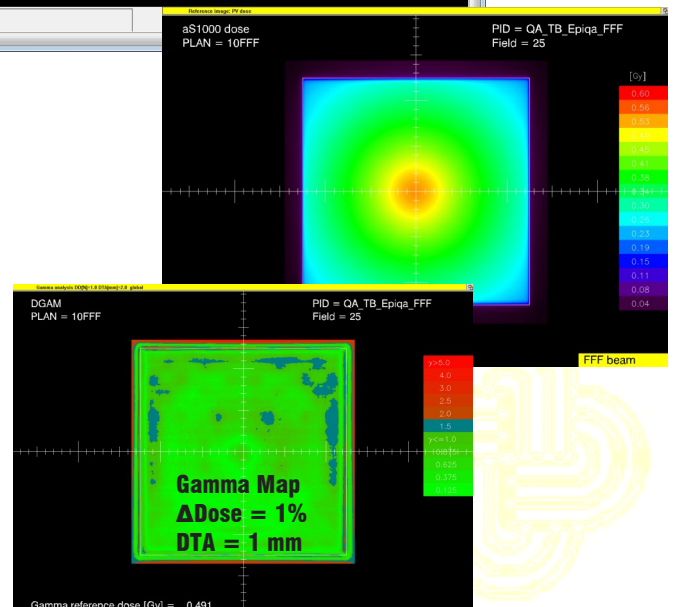
Machine QA module provides physicist with following tools

Implementation of FFF beam parameters evaluation - determination of the core beam parameters and its long term stability as proposed in paper published in Medical physics, Volume 39, No. 10 [1]. The parameters for FFF beam profile shape, next to penumbra and symmetry determination, as part of FFF beam complementary analysis include also automatic calculation of newly proposed properties – Unflatness, Slope and Peak position.



Short and long term beam stability evaluation - comparison of 2D dosimetry images with the reference image using well established gamma analysis provides instant information of any change in beam quality.

FFF beam planning - by comparing calculated open fields module Athena provides great help to quickly asses TPS output with the real beam without need to use film.



Reference

[1] Fogliata, et al.: Definition of parameters for quality assurance of flattening filter free (FFF) photon beams in radiation therapy. Med Phys 2012, 39: 6455–6464



FFF Beam QA

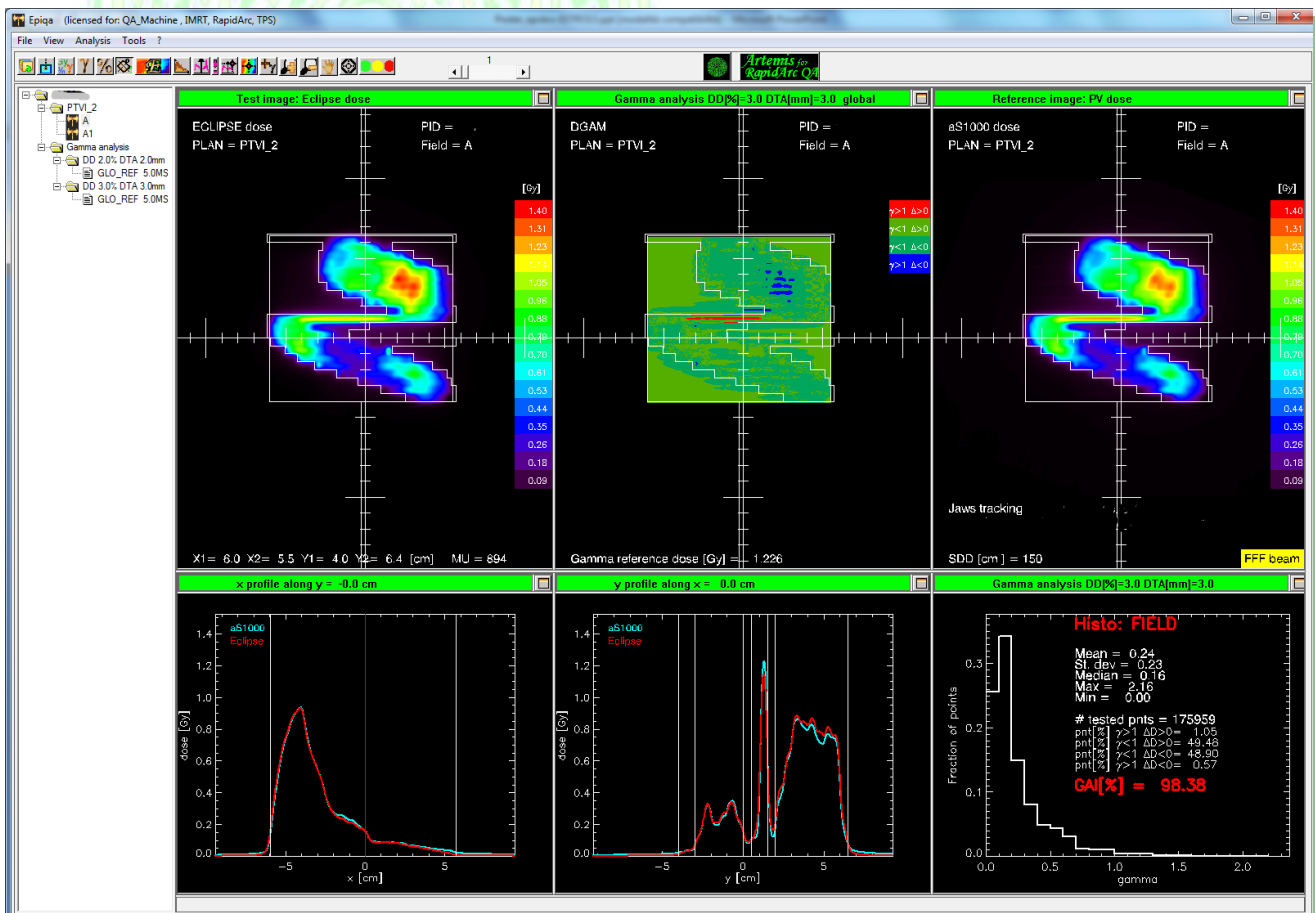
RapidArc patient plan QA

Epiqa transforms Portal imager into absolute dosimeter with very high resolution

- ◆ Flattening Filter Free beams are typically used to treat small targets therefore QA procedure must use detector with high spatial resolution
- ◆ To prevent detector saturation with high dose rates the SDD distance equals to 150 cm, giving effective dose matrix resolution at isocentre 0.26 mm per pixel
- ◆ Utilization of HD MLC with leaf width of 2.5 mm to treat small targets presents challenge for dose calculation algorithm
- ◆ Quality Assurance of TPS becomes equally important as treatment device QA and this can only be done by comparison of calculated vs. delivered DOSE [1]

Solution for challenging FFF plan QA

- ◆ Absolute dose in water (Gy) results provide option for verification of calculation algorithm performance without need to use any phantom
- ◆ High resolution detector provides complete information of dose distribution without dose averaging or interpolation
- ◆ Independent monitor units verification
- ◆ Quick results evaluation. In just few minutes user can print final protocol for approval of radiotherapy or radiosurgery treatment



Comparison of calculated (right) vs. measured (left) dose with gamma analysis map. 6X FFF beam, DR 1400 MU/min, 5 fractions x 7 Gy, SDD = 150 cm

Reference

[1] Fredh, et al.: Patient QA systems for rotational therapy: A comparative experimental study with intentional errors. Med Phys 2013, 40: 031716-1 - 031716-9