Universitätsklinikum Würzburg

VMAT Verifikation mit dem Octavius 4D

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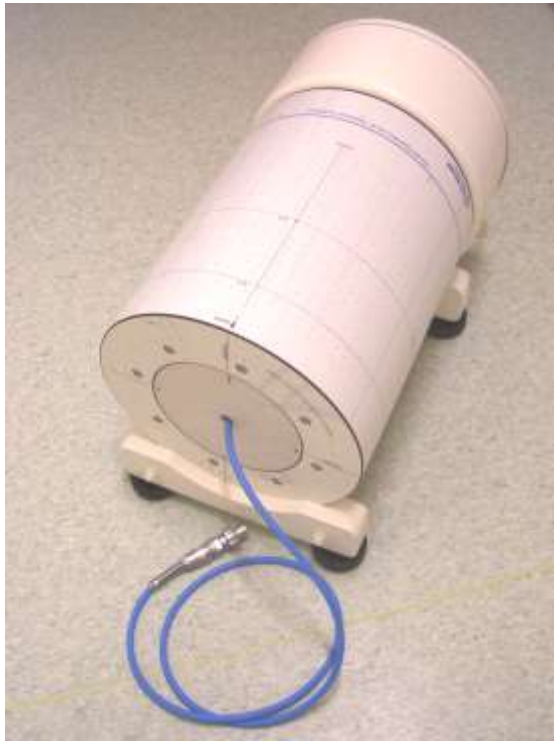
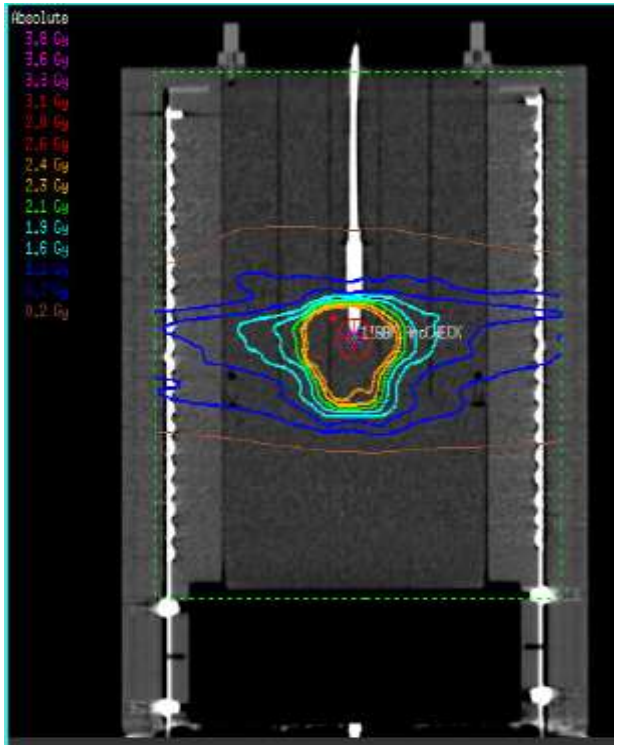
VMAT-QA mit dem ArcCheck (Sun Nuclear)



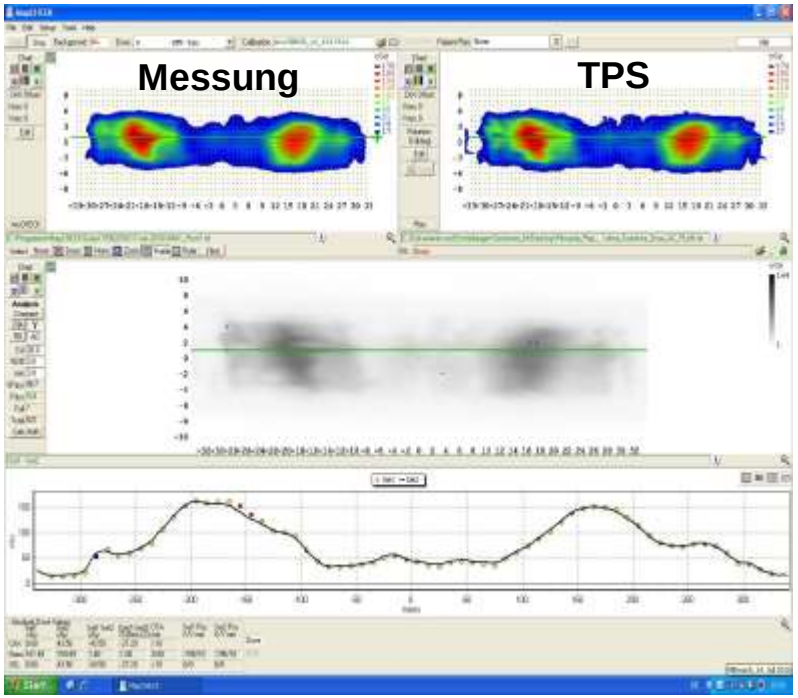
Inneneinsatz (RW3) mit Ionisationskammer

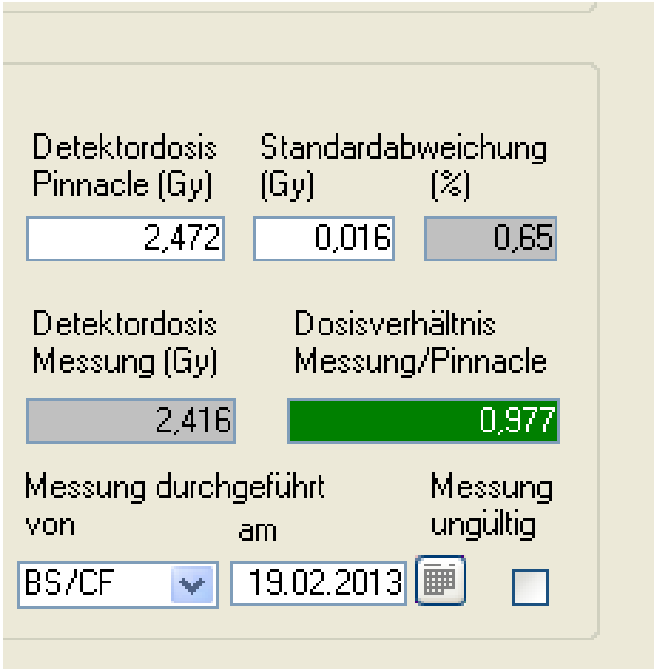


Plan auf ArcCheck-CT übertragen

Dosisverteilung exportieren

VMAT-QA mit dem ArcCheck - Auswertung





Auswertung in SNC Patient

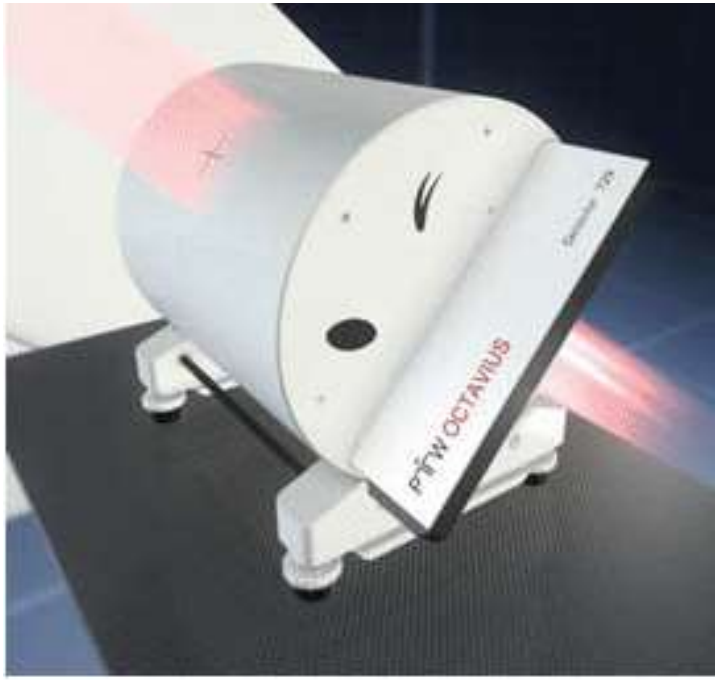
Gamma Kriterium (3%,3 mm)

pass rate > 90%

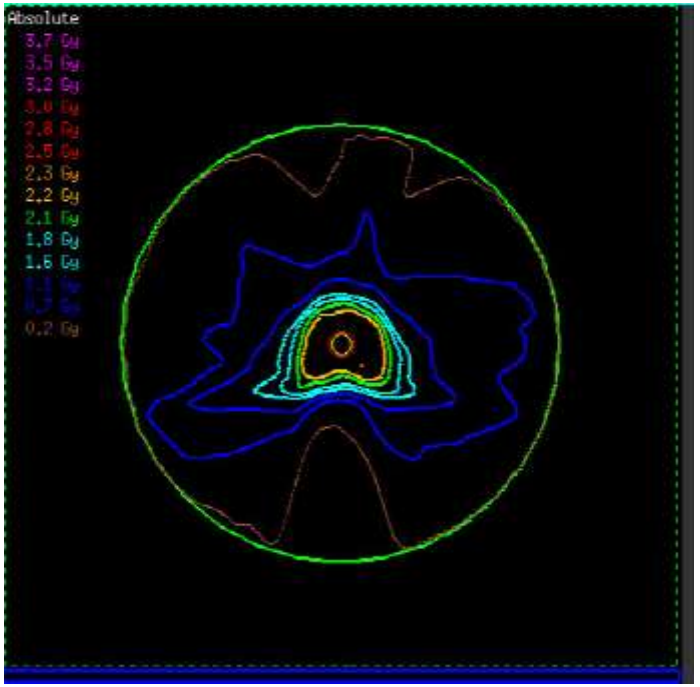
Auswertung Detektordosis

Abweichung < 3 %

VMAT-QA mit dem Octavius (PTW)



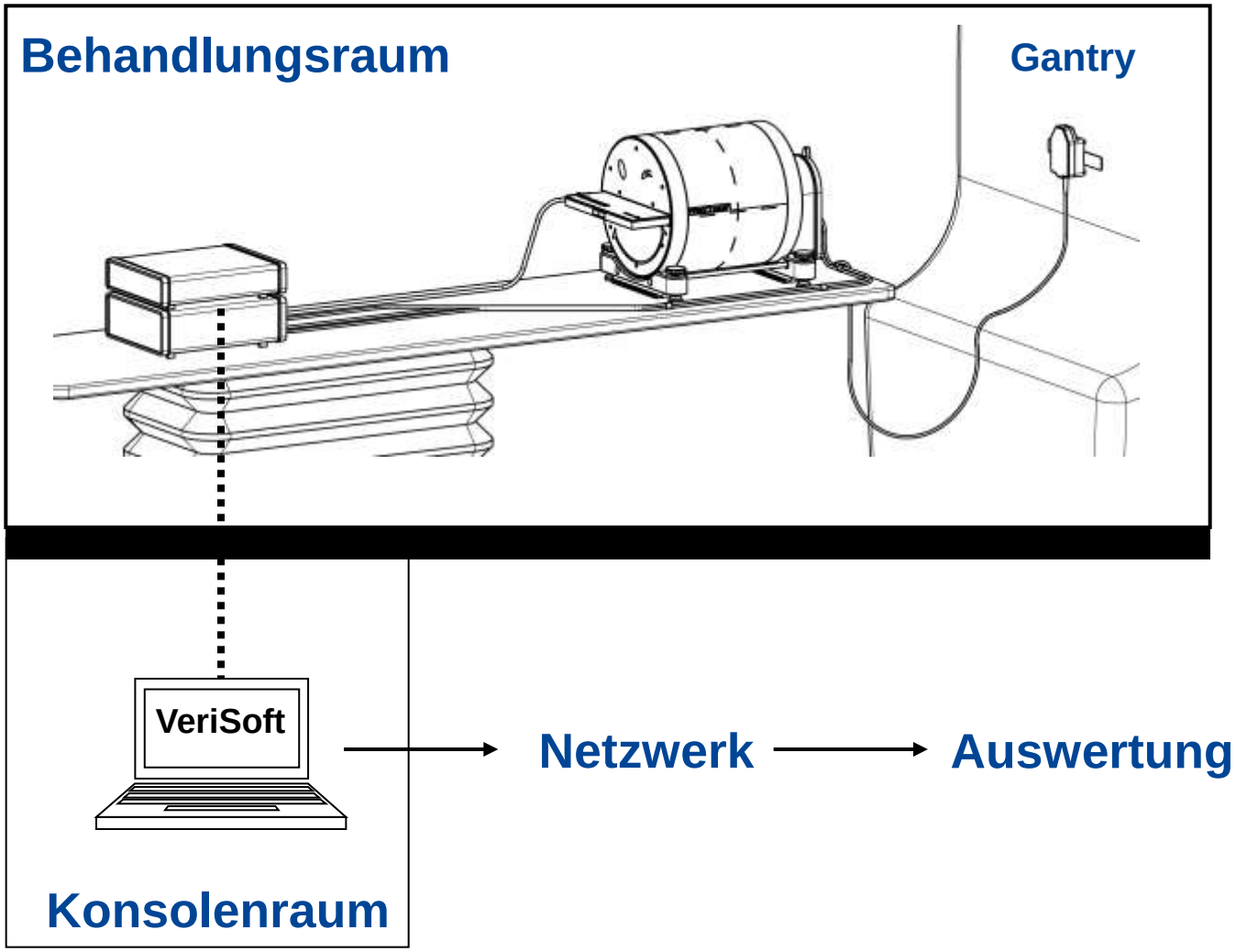
Phantom mit OCTAVIUS Detector 729: 27 x 27 Kammern, 10mm Abstand)



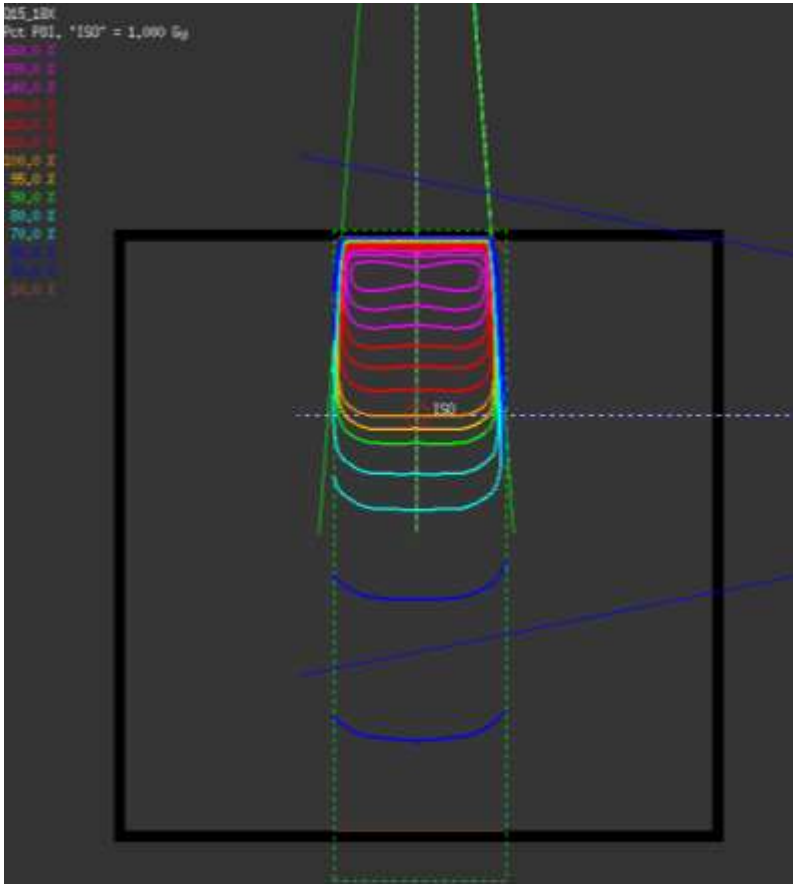
Plan auf Octavius-CT übertragen

Dosisverteilung exportieren

VMAT-QA Octavius (PTW) - Aufbau



Erzeugung von Tiefendosiskurven im Planungssystem (pinnacle)



Wasserphantom

- SSD: 85 cm
- Feldgrößen: 2,3,4,5,10,15,26
- Energien: 6,18 MeV

→ PDD Datei

VeriSoft: VMAT Auswertung

Volume Analysis - Parameters

3,0 mm Distance- To- Agreement
3,0 % Dose difference with ref. to selected dose 2,21 Gy (or AU)
Suppress dose below 10,0 % of max. dose of calculated 4D data

Statistics	
Number of Voxels	1.113.945
Evaluated Voxels	172.637 (15,5 %)
Passed	170.415 (98,7 %)
Failed	2.222 (1,3 %)
Result	98,7 % (Green)

Settings	
Passing criteria	Gamma ≤ 1,0
Green	90,0 % to 100,0 %
Yellow	75,0 % to 90,0 %
Red	0,0 % to 75,0 %

PDD TPS

Volume Analysis - Parameters

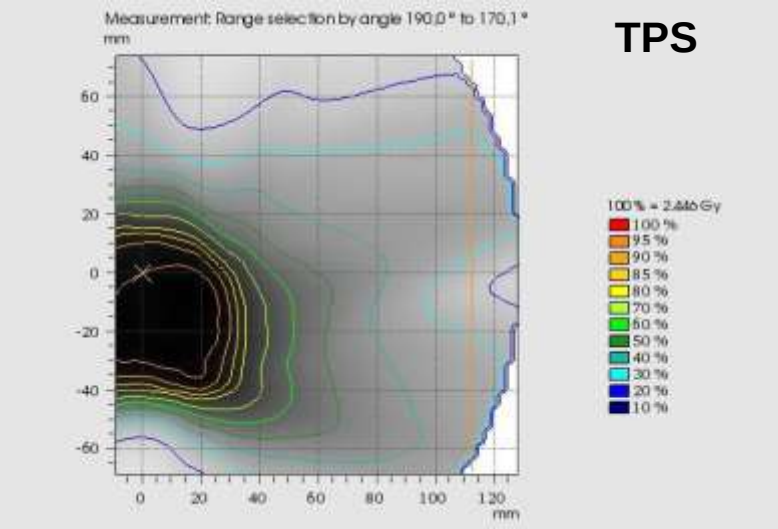
3,0 mm Distance- To- Agreement
3,0 % Dose difference with ref. to selected dose 2,21 Gy (or AU)
Suppress dose below 10,0 % of max. dose of calculated 4D data

Statistics	
Number of Voxels	1.113.945
Evaluated Voxels	172.630 (15,5 %)
Passed	170.203 (98,6 %)
Failed	2.427 (1,4 %)
Result	98,6 % (Green)

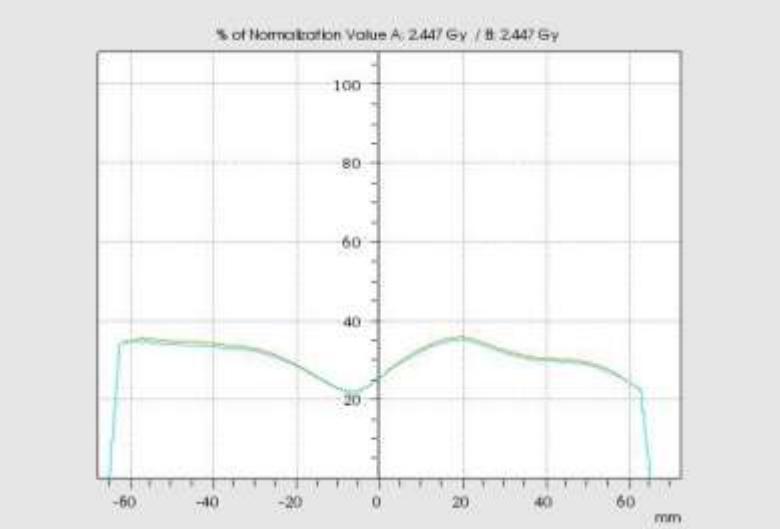
Settings	
Passing criteria	Gamma ≤ 1,0
Green	90,0 % to 100,0 %
Yellow	75,0 % to 90,0 %
Red	0,0 % to 75,0 %

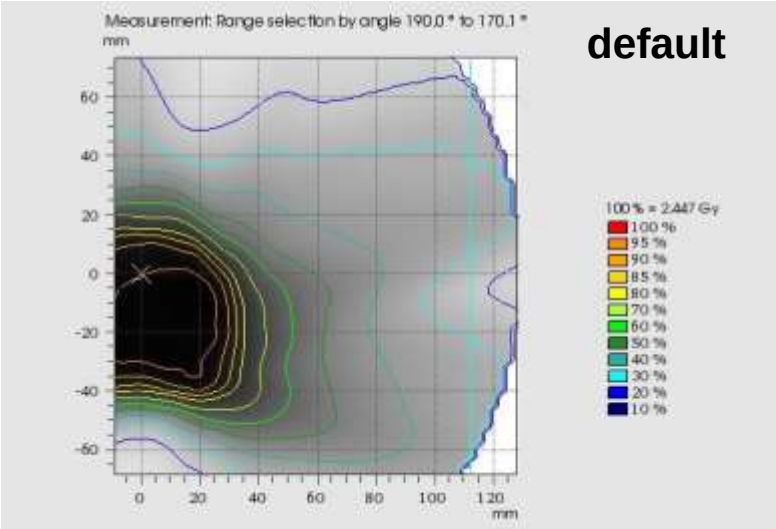
PDD default

VeriSoft: PDD berechnet vs. PDD default

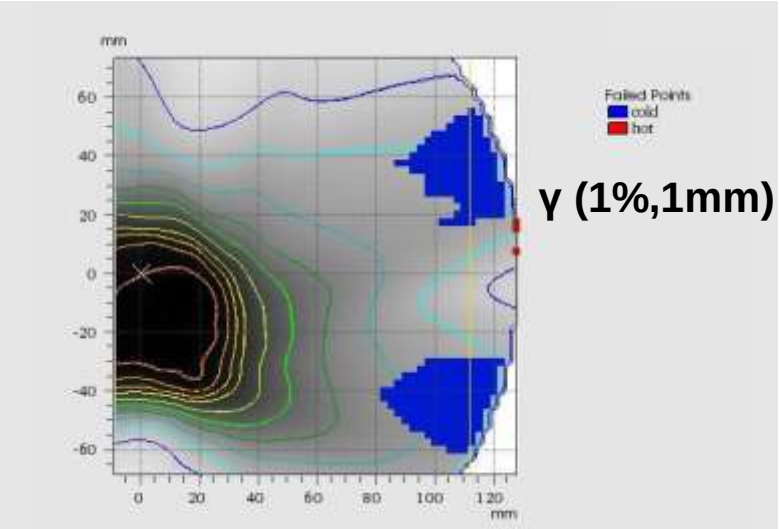


TPS





default



γ (1%,1mm)

Auswertung (VeriSoft 5.1)

Volume Analysis - Parameters

3,0 mm Distance- To- Agreement
3,0 % Dose difference with ref. to selected dose 2,49 Gy (or AU)
Suppress dose below 10,0 % of max. dose of calculated 4D data

Statistics

Number of Voxels	1.113.945
Evaluated Voxels	202.156 (18,1 %)
Passed	201.284 (99,6 %)
Failed	872 (0,4 %)
Result	99,6 % (Green)

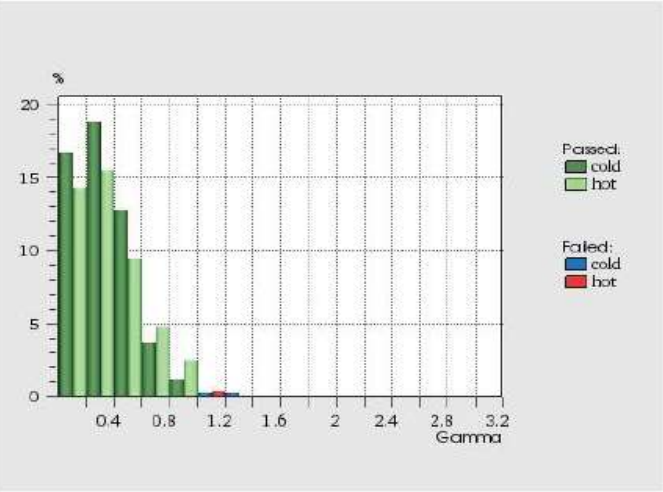
Settings

Passing criteria	Gamma ≤ 1,0
Green	90,0 % to 100,0 %
Yellow	75,0 % to 90,0 %
Red	0,0 % to 75,0 %

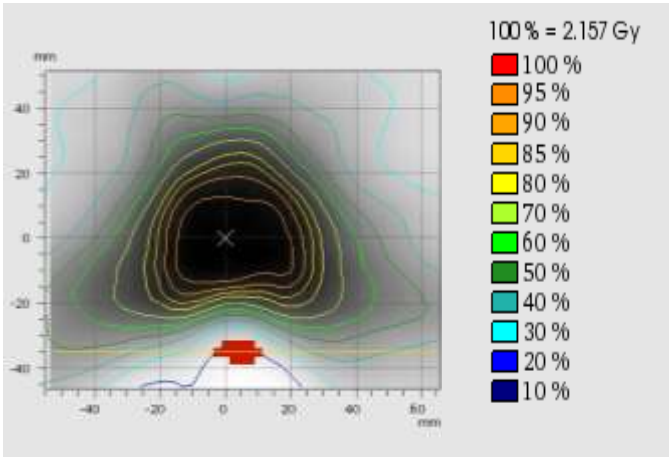
Volume Analysis

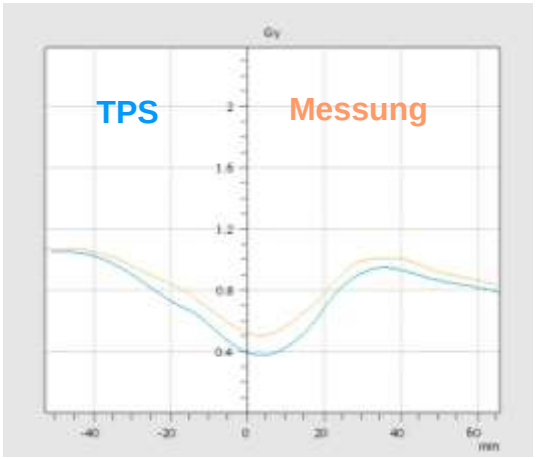
Dose level for evaluation in % of normalization value (= 2.493 Gy) of Data Set B

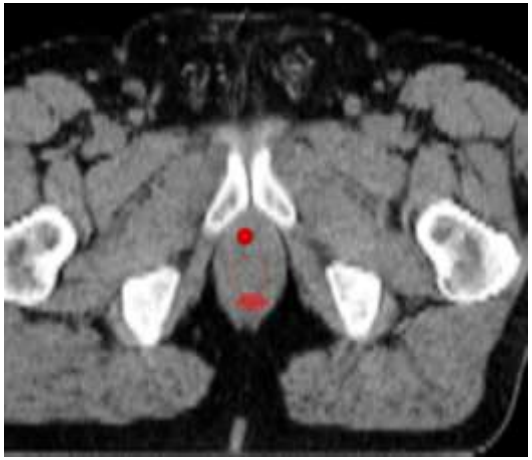
Dose level	Number of Voxels	Evaluated Voxels	Passed	Failed	Result
10 %	202.156	202.156 (100,0 %)	201.284 (99,6 %)	872 (0,4 %)	99,6 % (Green)
30 %	69.666	69.666 (100,0 %)	69.261 (99,4 %)	405 (0,6 %)	99,4 % (Green)
50 %	25.744	25.744 (100,0 %)	25.541 (99,2 %)	203 (0,8 %)	99,2 % (Green)
70 %	12.442	12.442 (100,0 %)	12.250 (98,5 %)	192 (1,5 %)	98,5 % (Green)
80 %	8.520	8.520 (100,0 %)	8.328 (97,7 %)	192 (2,3 %)	97,7 % (Green)
85 %	6.690	6.690 (100,0 %)	6.515 (97,4 %)	175 (2,6 %)	97,4 % (Green)
90 %	4.356	4.356 (100,0 %)	4.277 (98,2 %)	79 (1,8 %)	98,2 % (Green)
95 %	535	535 (100,0 %)	534 (99,8 %)	1 (0,2 %)	99,8 % (Green)
>=100 %	0	---	---	---	---

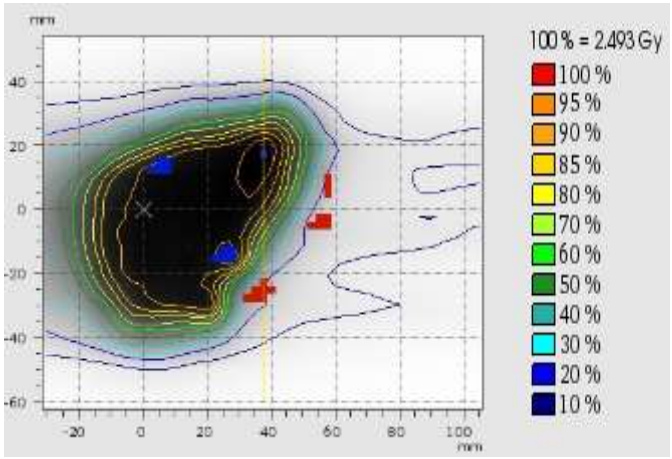


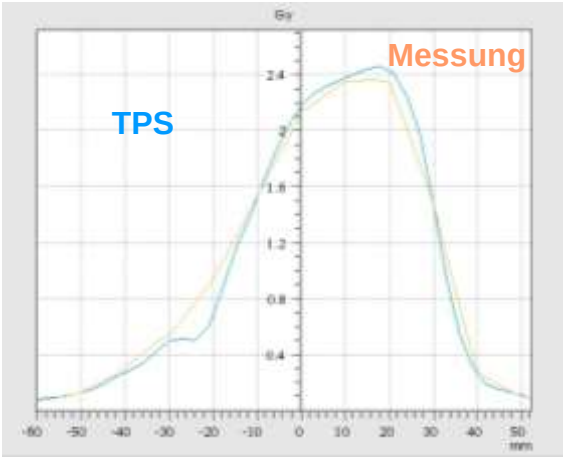
Auswertung (VeriSoft 5.1)

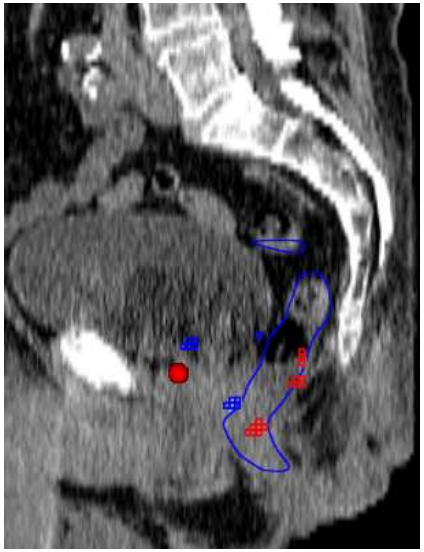






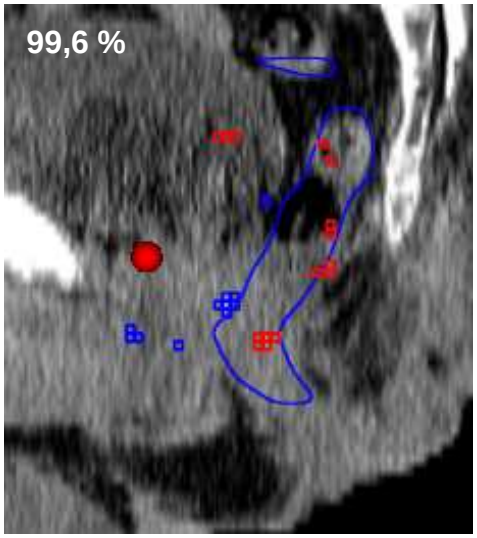


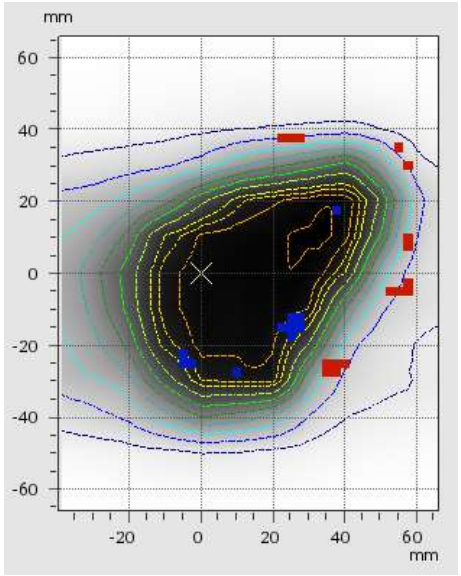




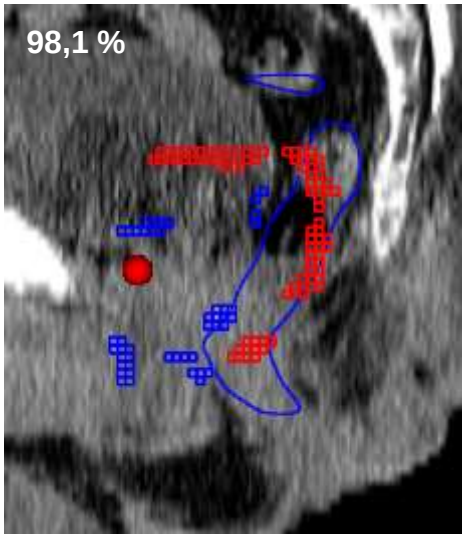
Auswertung (VeriSoft 5.1)

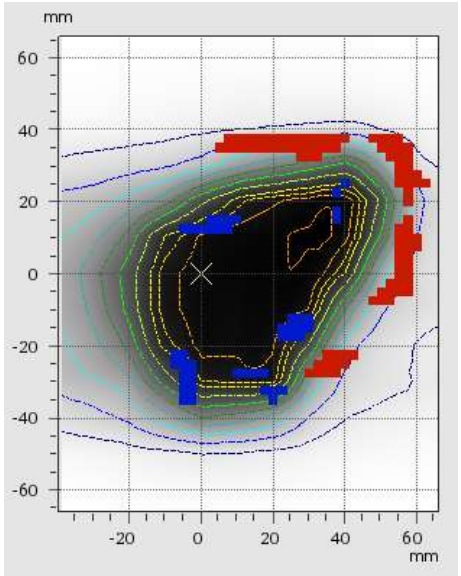
3mm, 3%,TH = 10%



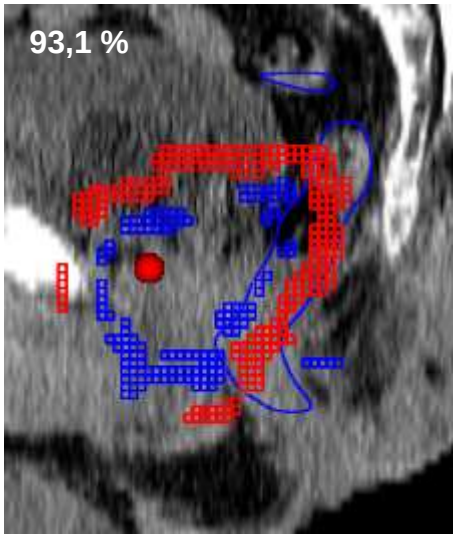


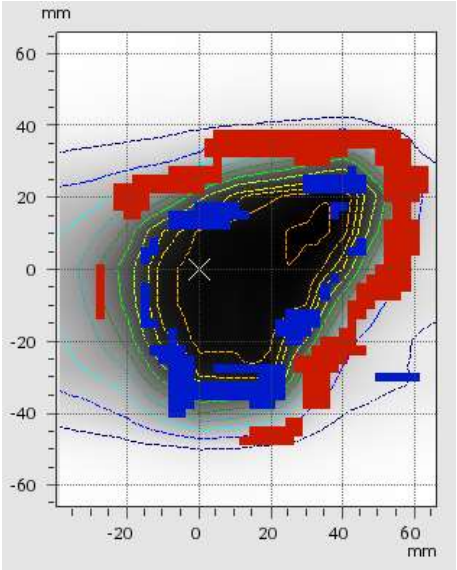
2mm, 3%,TH = 10%





1mm, 3%,TH = 10%





Bisherige Ergebnisse
9 VMAT Prostata Pläne

	ref. max. dose		ref. local dose
	γ (3%, 3mm)	γ (3%, 2mm)	γ (3%, 3mm)
1	98,2	94,9	92,4
2	99,5	98,0	96,5
3	98,8	95,0	94,8
4	98,9	96,3	95,5
5	99,5	97,8	94,6
6	99,6	98,2	96,7
7	99,6	98,1	96,6
8	99,4	97,9	97,5
9	99,3	97,3	96,1
Ø	99,2	97,0	95,6

Zusammenfassung / Ausblick

- Überdosierungen im „Niedrigdosisbereich“
- Woher kommen die Abweichungen?
- Interventions- bzw. Verifikationsschwelle?
- Messung der PDD‘s
- Vergleich 3DVH – Octavius Auswertung