

Correlation of error detection sensitivities for two VMAT-QA systems

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Verification Systems

2D-array



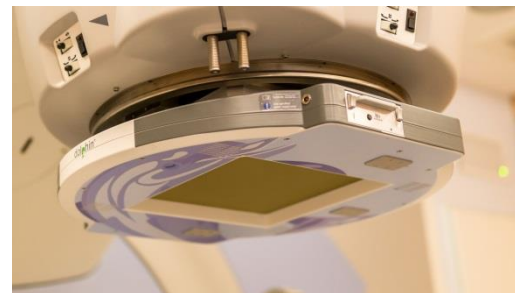
- **2D** dose distribution
- **γ -analysis**

IQM



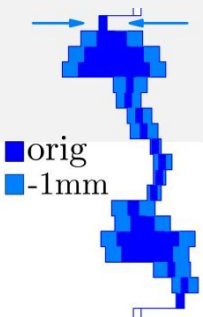
- **1D** signal/segment, realtime
- **linac-interface**

Dolphin

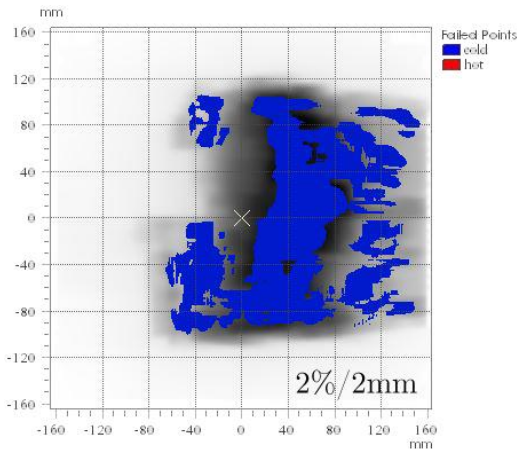


- **3D** dose reconstruction
- **γ - und DVH-analysis**

Implementing MLC-errors

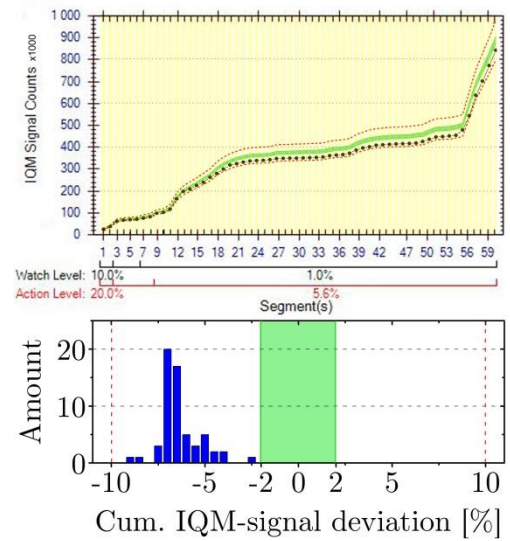


2D-array



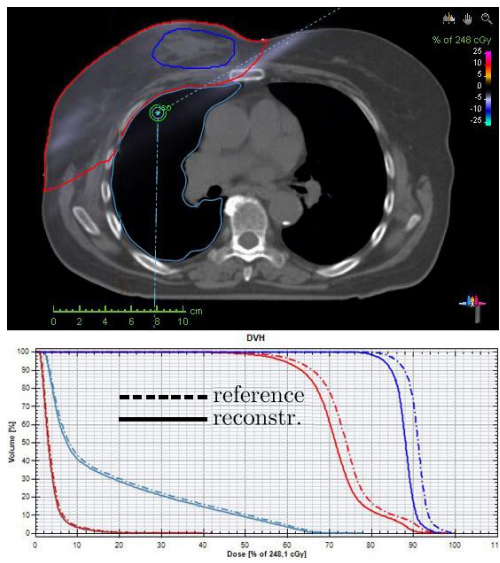
- $\gamma_{\text{mean}} = 0.78$
- $\gamma_{\text{pass rate}} = 67.9 \%$

IQM



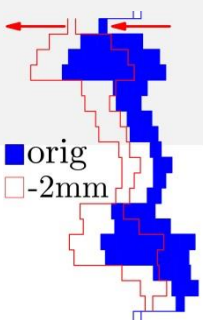
- $\Delta \text{Cum} = -5.27 \%$

Dolphin

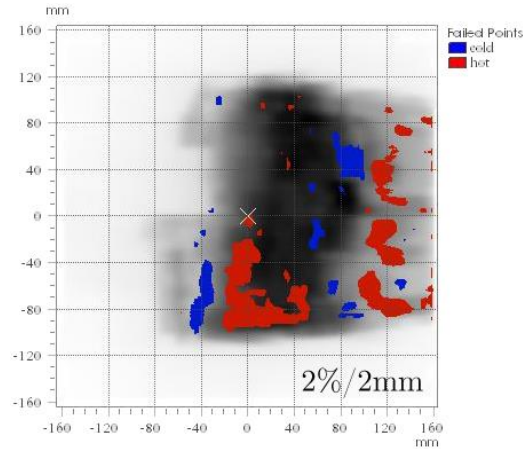


- $\Delta D_{\text{mean}}(\text{PTV}) = -3.4 \%$

Implementing MLC-errors

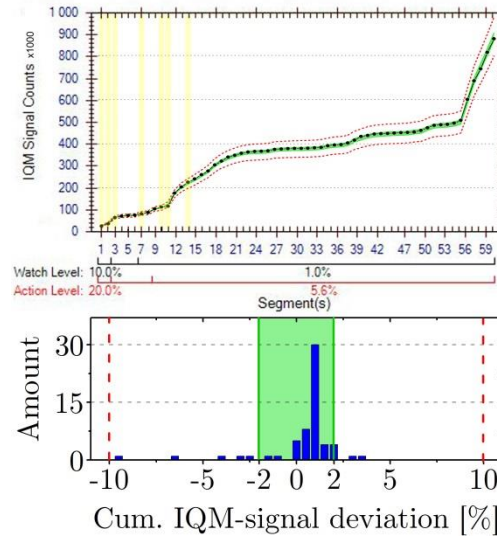


2D-array



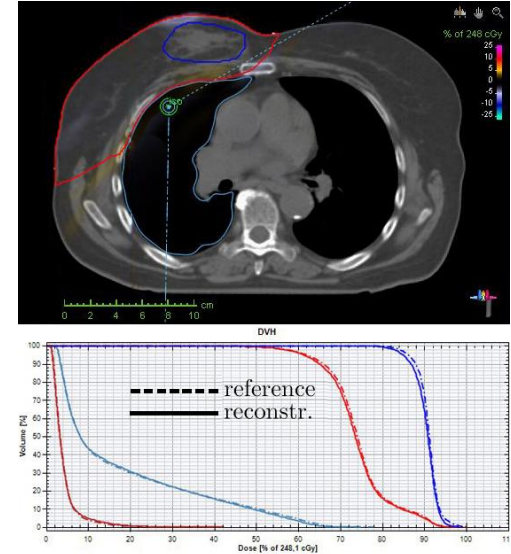
- $\gamma_{\text{mean}} = 0.47$
- $\gamma_{\text{pass rate}} = 88.7 \%$

IQM



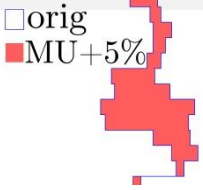
- $\Delta \text{Cum} = -1.23 \%$

Dolphin

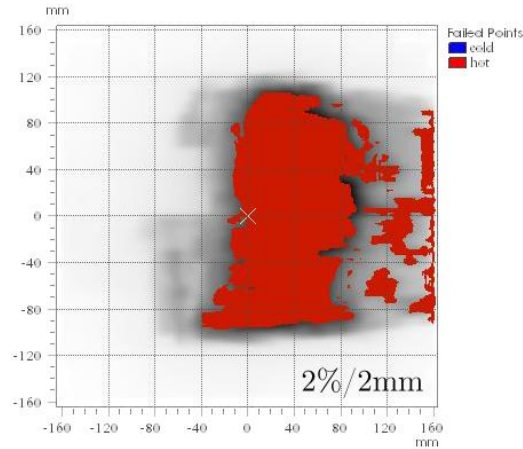


- $\Delta D_{\text{mean}}(\text{PTV}) = -0.7 \%$

Implementing MU-errors

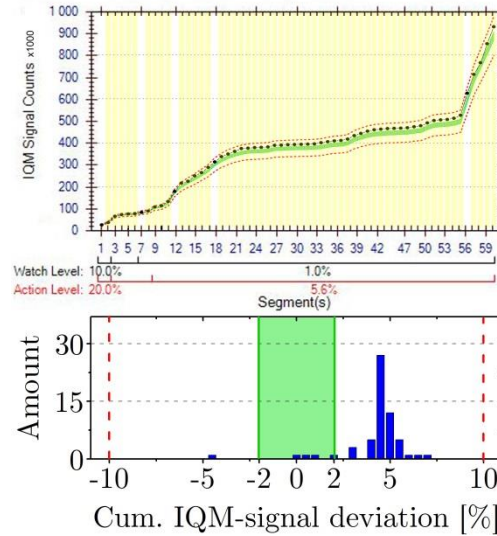


2D-array



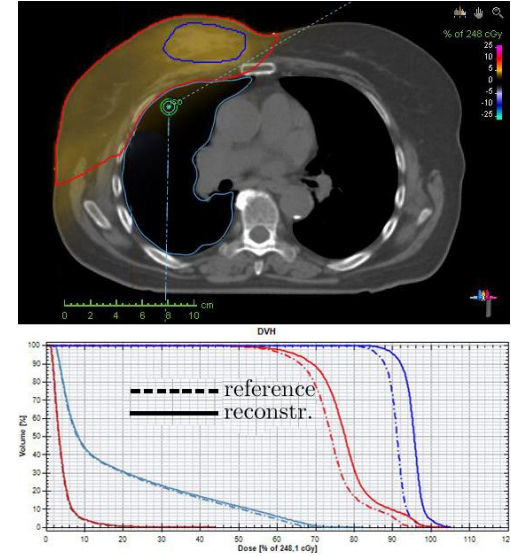
- $\gamma_{\text{mean}} = 0.85$
- $\gamma_{\text{pass rate}} = 64.3 \%$

IQM



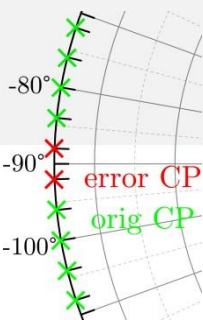
- $\Delta \text{Cum} = +4.60 \%$

Dolphin

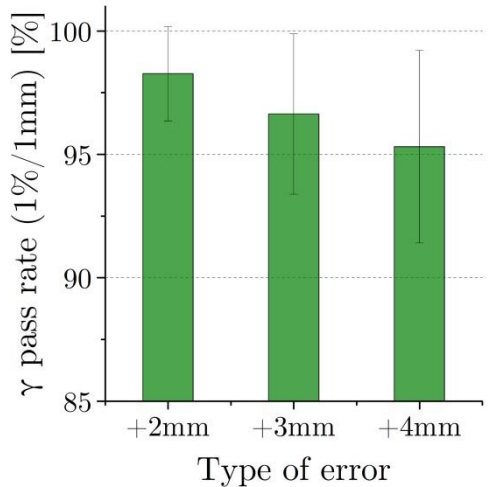


- $\Delta D_{\text{mean}}(\text{PTV}) = +4.8 \%$

Implementing MLC-errors at -90°

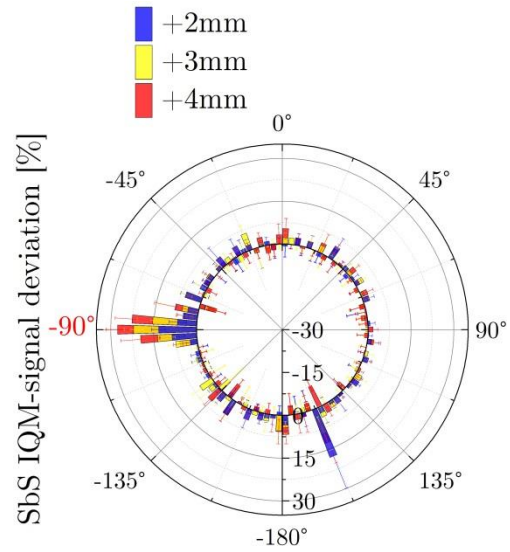


2D-array

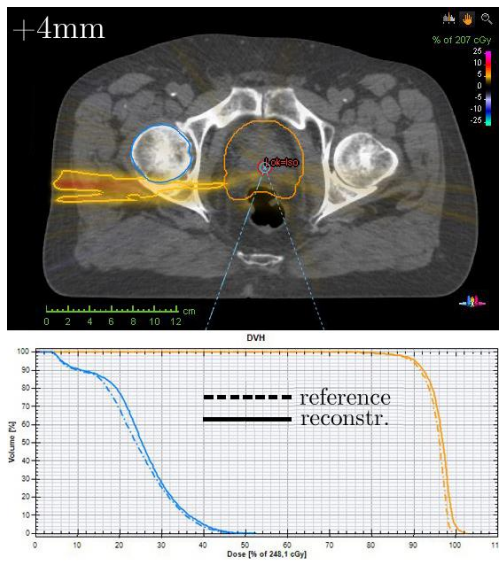


- Average over 17 VMAT-arcs

IQM



Dolphin



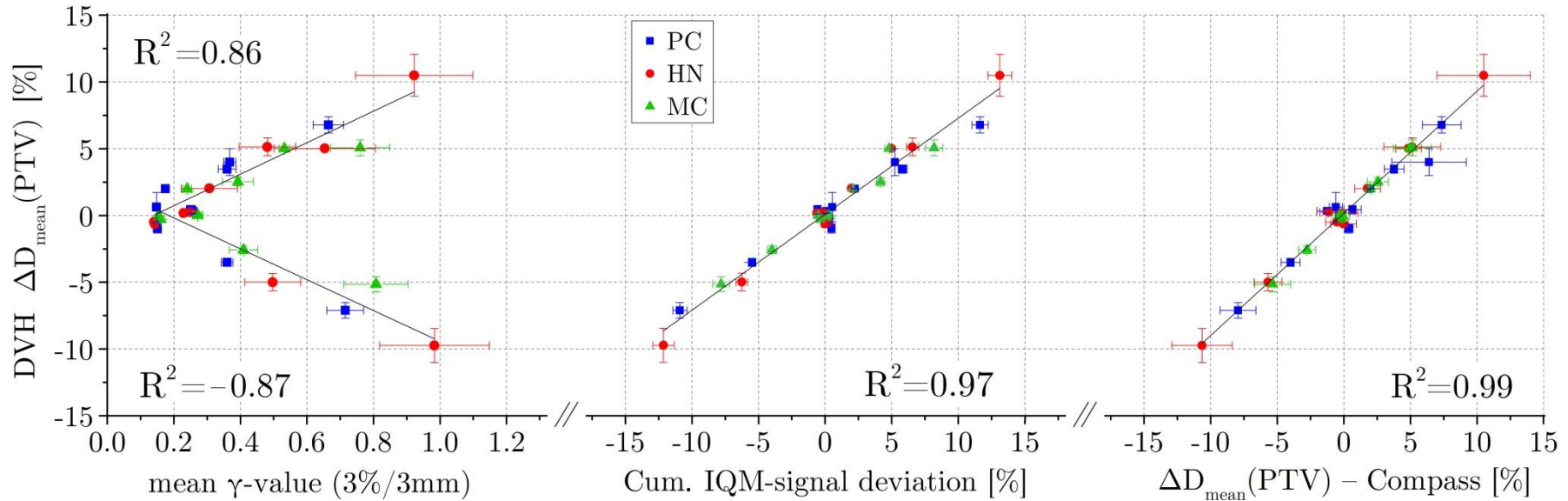
- $\Delta D_{\text{mean}}(\text{Femur r.}) = +5.1\%$

Correlations with DVH-deviations

2D-array







IQM

Dolphin



- Similar R^2 for ΔD_{mean} (OAR); but different slopes of linear fits

Experiences and differences

	2D-array	IQM	Dolphin
User-Interaction			
Amount of information			
Online/realtime	