



Particle therapy masterclass @ Sofia 2024




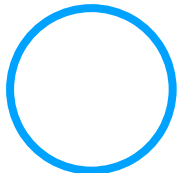
Vladimira Georgieva, Dilyana Todorova



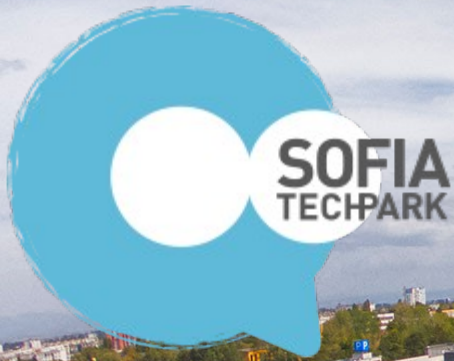
Sofia Tech Park



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VENUE



LECTURES



VISIT



Bulgarian EuroHPC supercomputer Discoverer is a Petascale supercomputer capable of executing 4.5 PetaFlops Rmax and 6 PetaFlops Rpeak.



 **DISCOVERER**
Sofia Petascale Supercomputer



Atos
BullSequana



**Explore
Endeavor
Elevate**



Atos
BullSequana



PARTICIPANTS

National High School of Science and Mathematics – Sofia

Sofia High School of Mathematics – Sofia

English Language School - Sofia

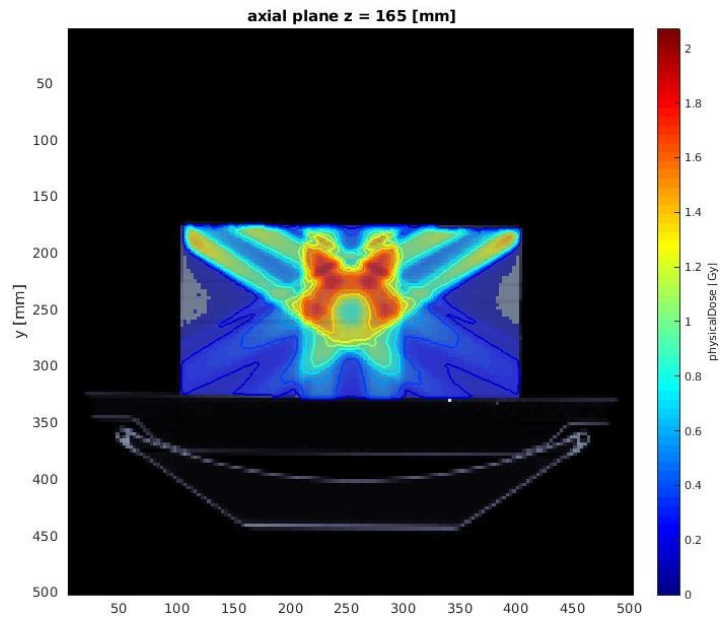
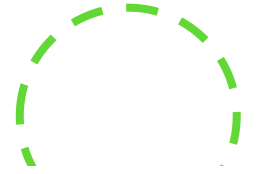
9th French Language School– Sofia

High School „Hristo Botoev“ – Aitos

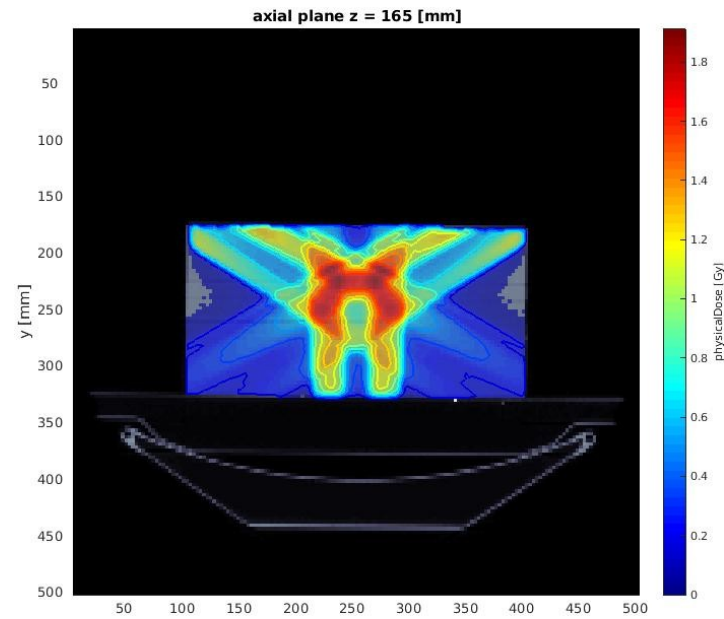
1 SU “H. M. Pashov” - Sliven



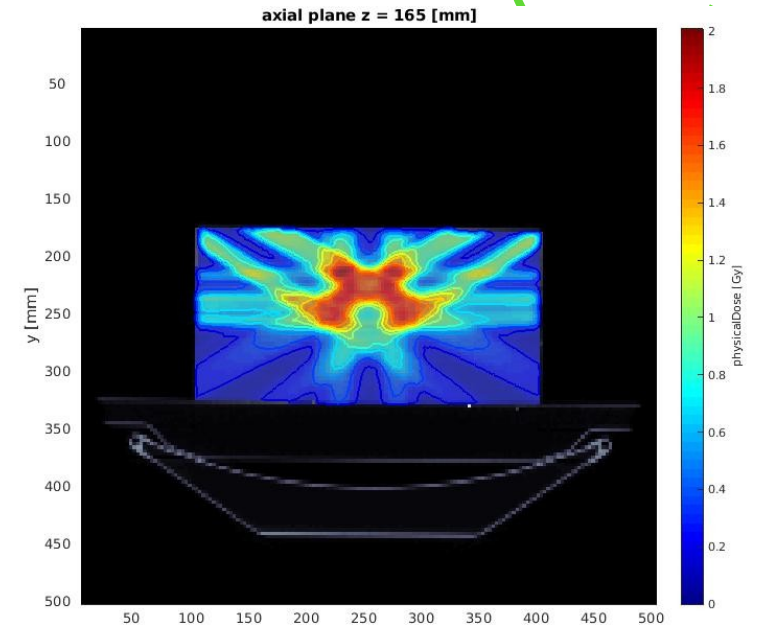
C PHANTOM - PHOTONS



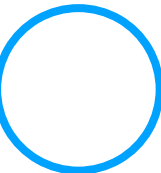
Angles 0 60 300



Angles 60 180 300



Angles 0 60 90 270 300

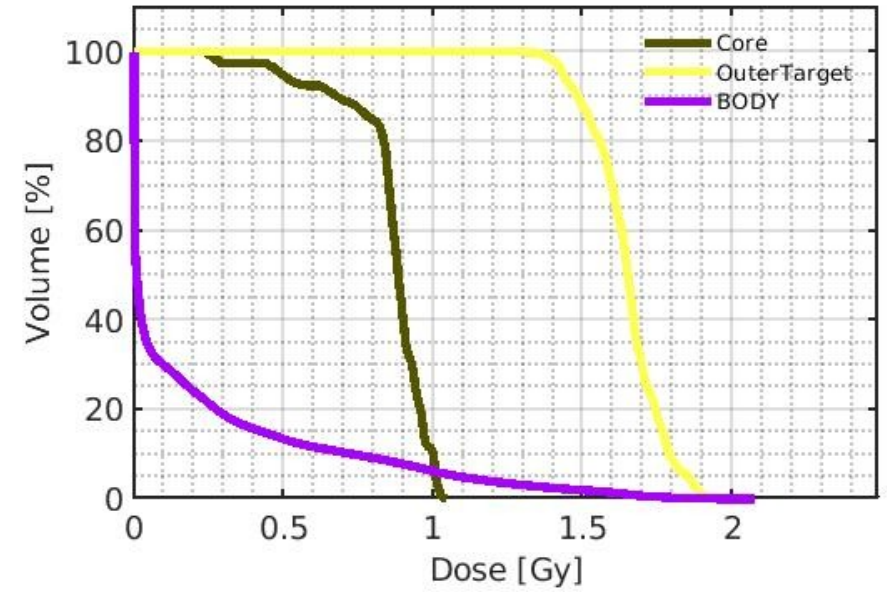
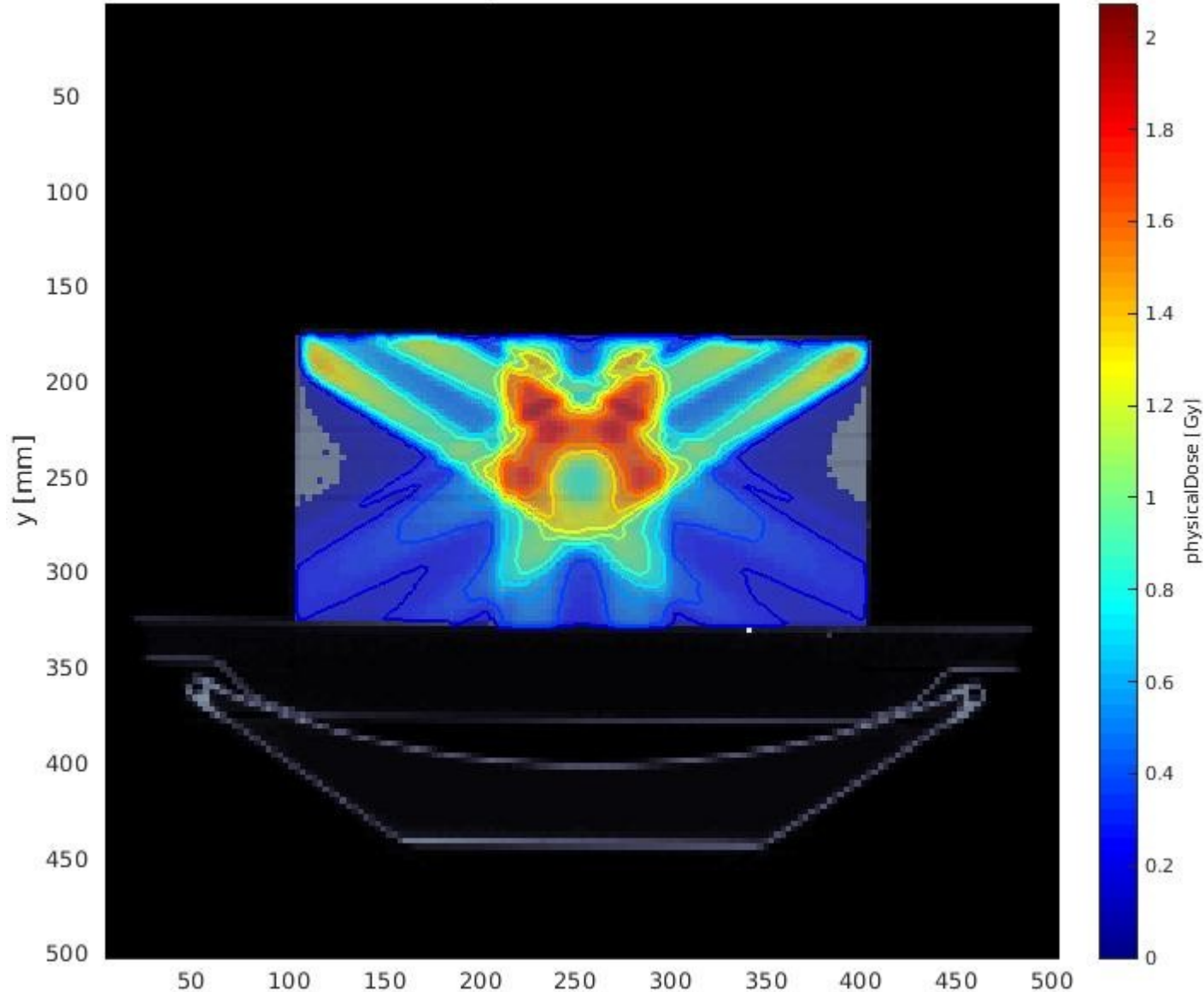


C PHANTOM – PHOTONS

Angles 0 60 300



axial plane z = 165 [mm]

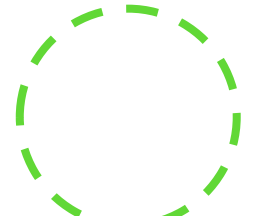


	max	min	mean	std
Core	1.0459	0.2372	0.8567	0.1486
OuterTarget	1.9397	1.2967	1.6462	0.1157
BODY	2.0736	0	0.1876	0.3705

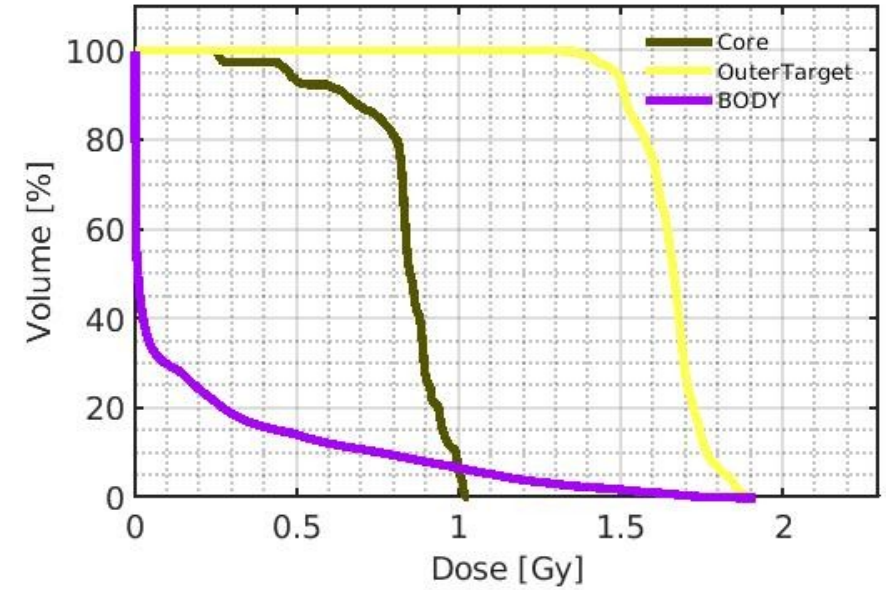
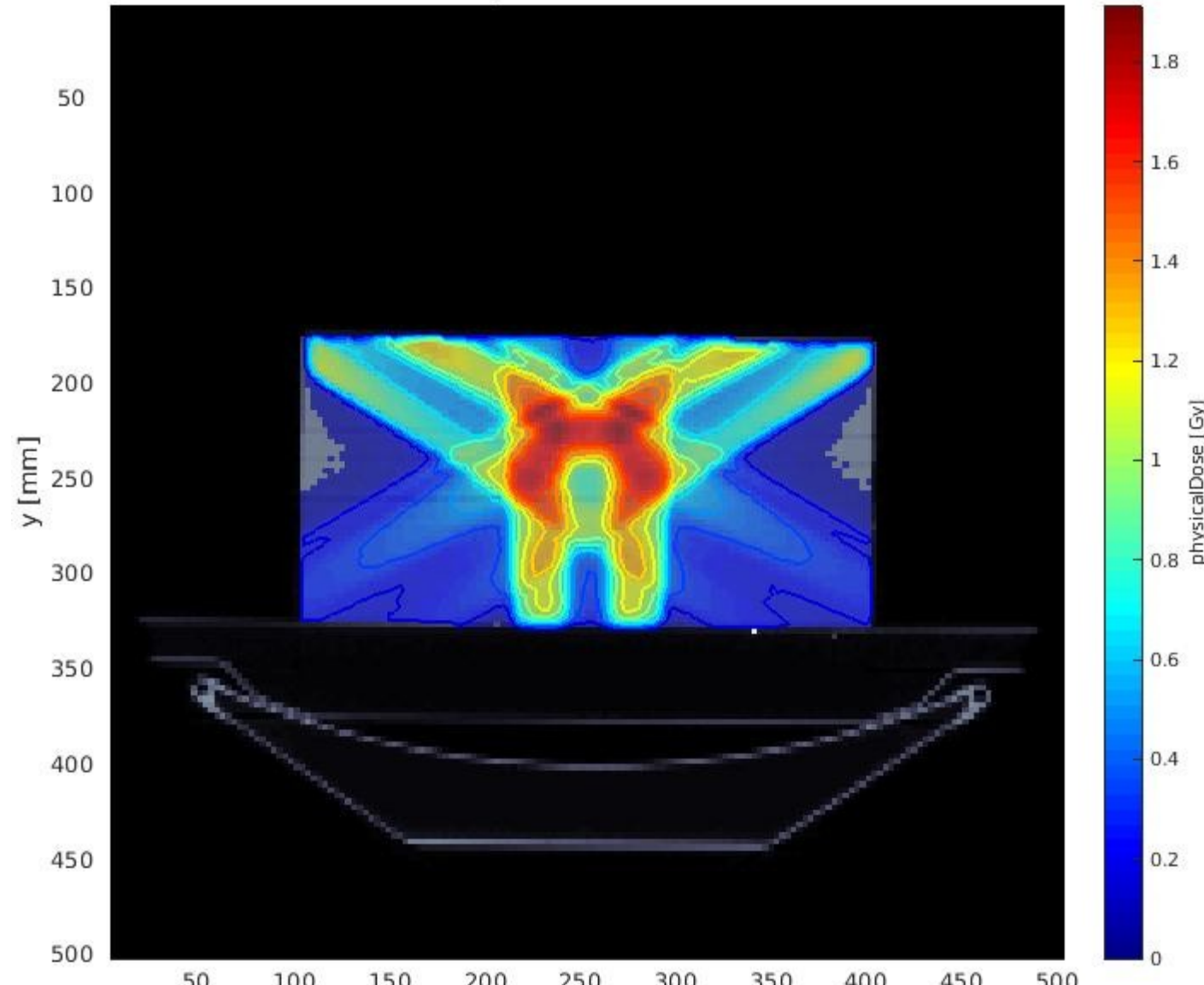


C PHANTOM – PHOTONS

Angles 60 180 300



axial plane z = 165 [mm]

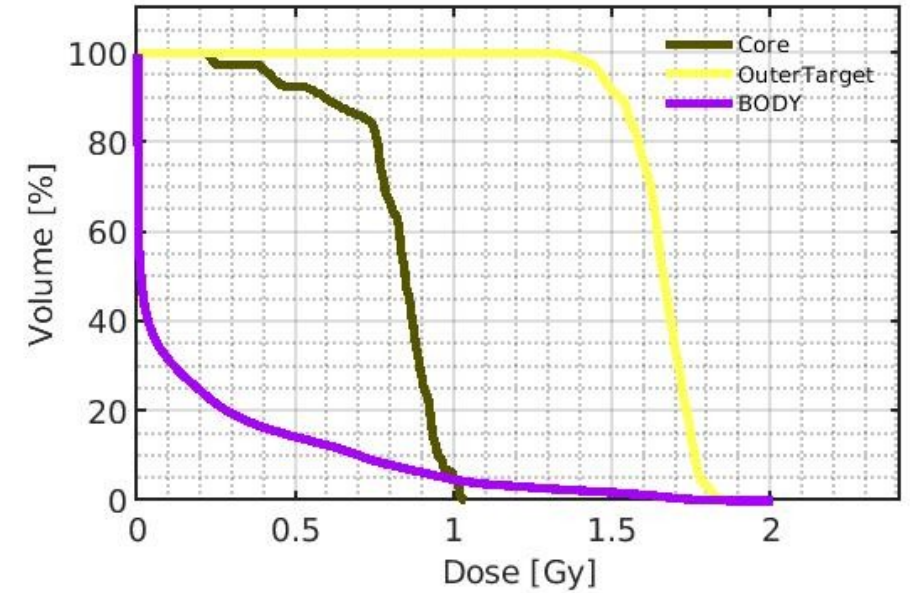
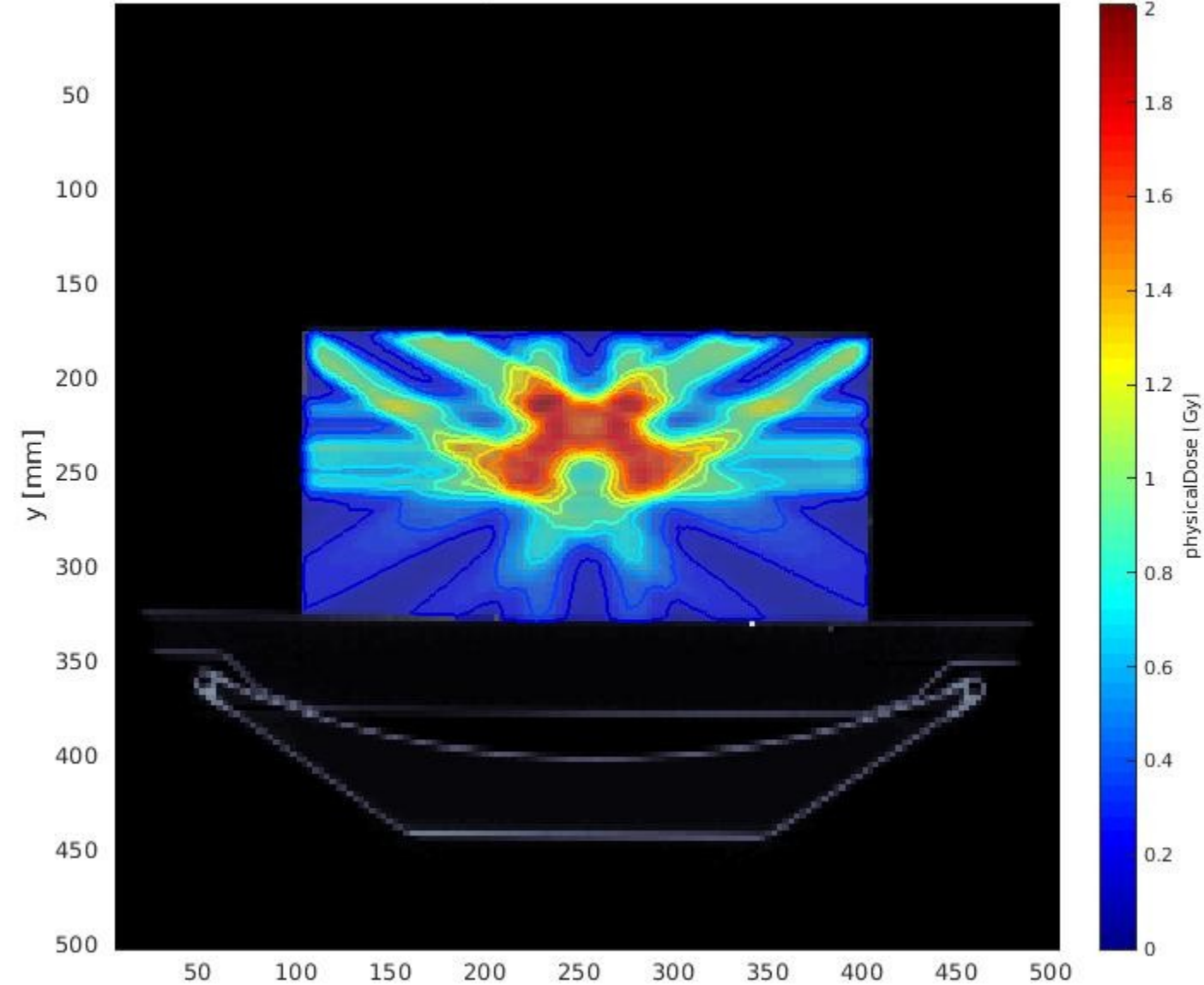


	max	min	mean	std
Core	1.0310	0.2492	0.8308	0.1489
OuterTarget	1.9141	1.2809	1.6513	0.0991
BODY	1.9141	0	0.1903	0.3725

C PHANTOM – PHOTONS

Angles 0 60 90 270 300

axial plane z = 165 [mm]

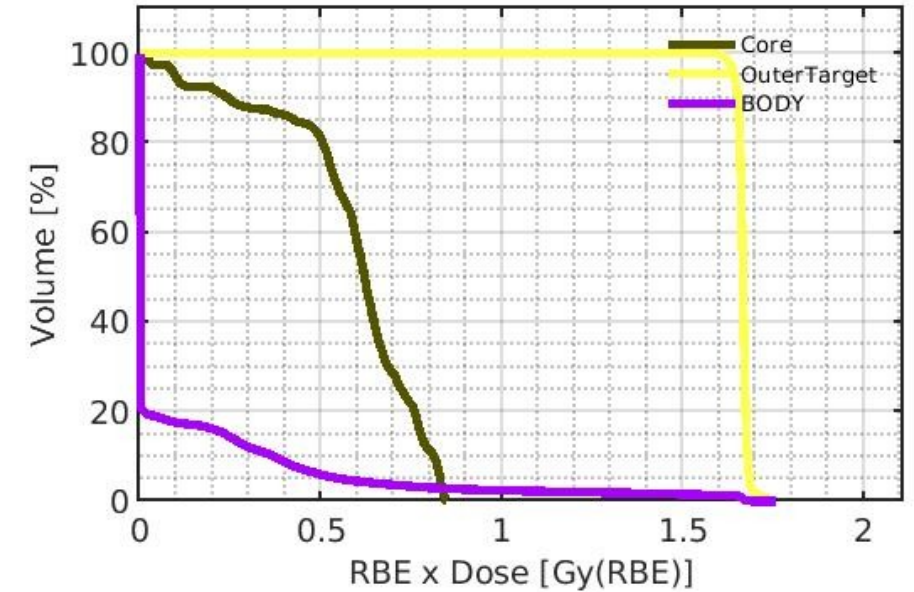
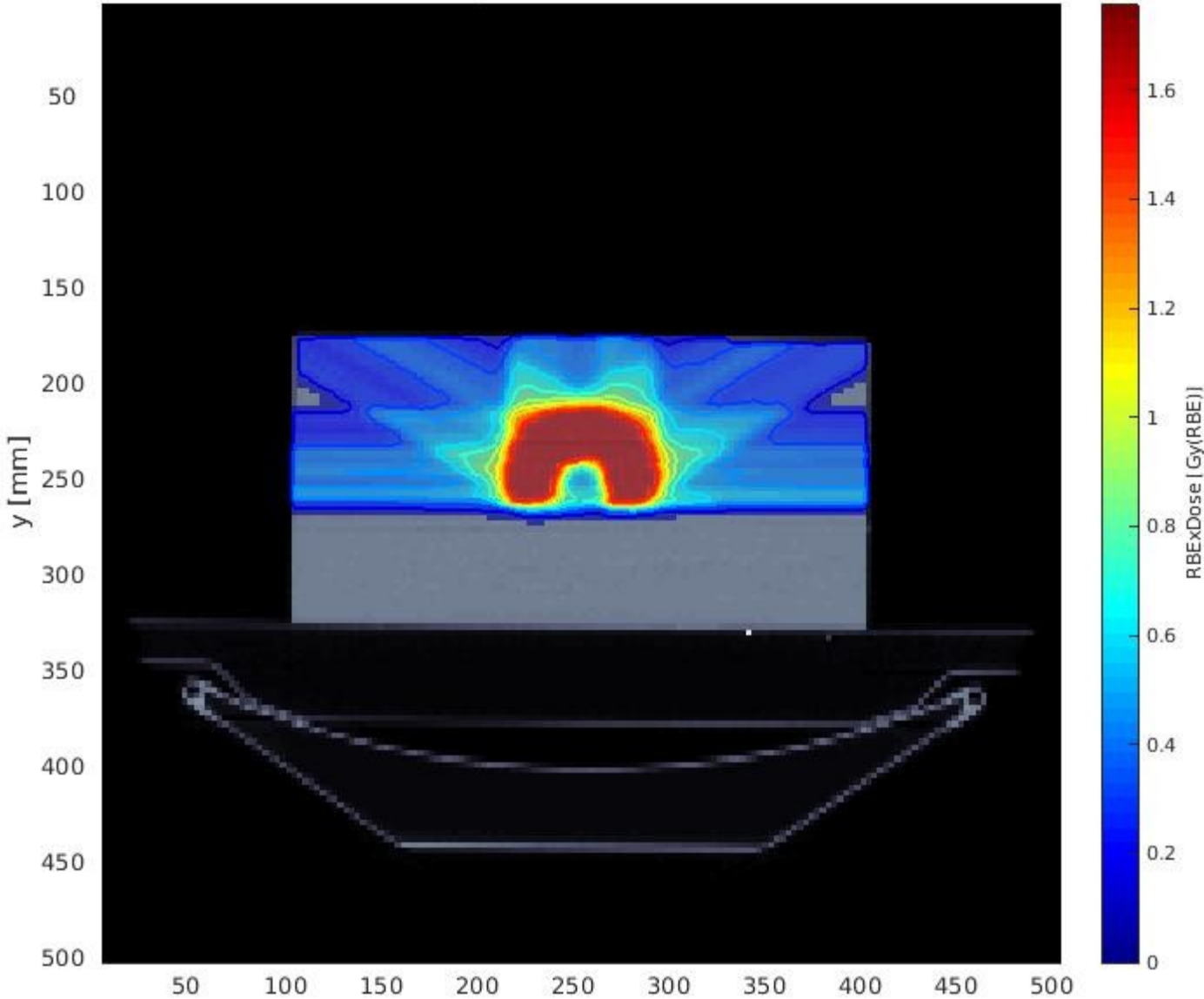


	max	min	mean	std
Core	1.0383	0.2179	0.8095	0.1609
OuterTarget	1.8711	1.2360	1.6528	0.0943
BODY	2.0103	0	0.1860	0.3540

C PHANTOM – PROTONS

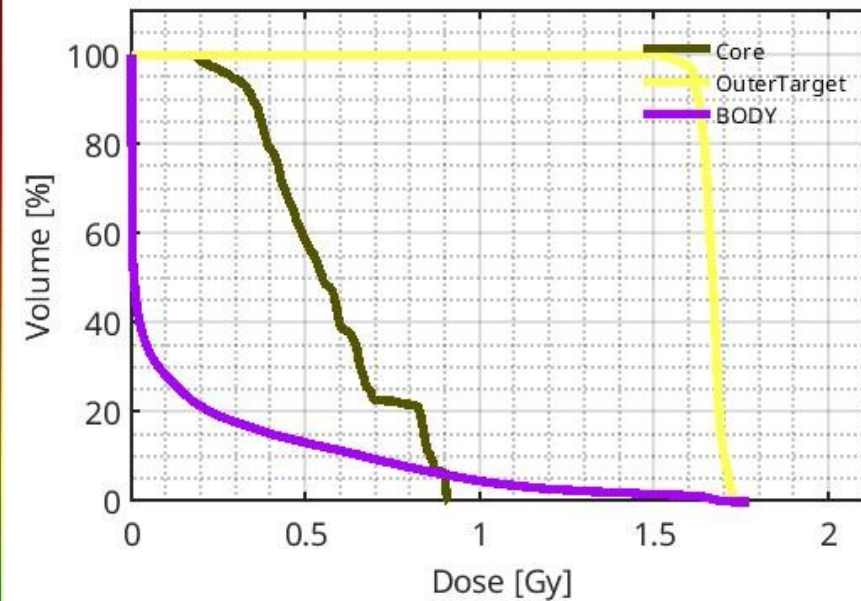
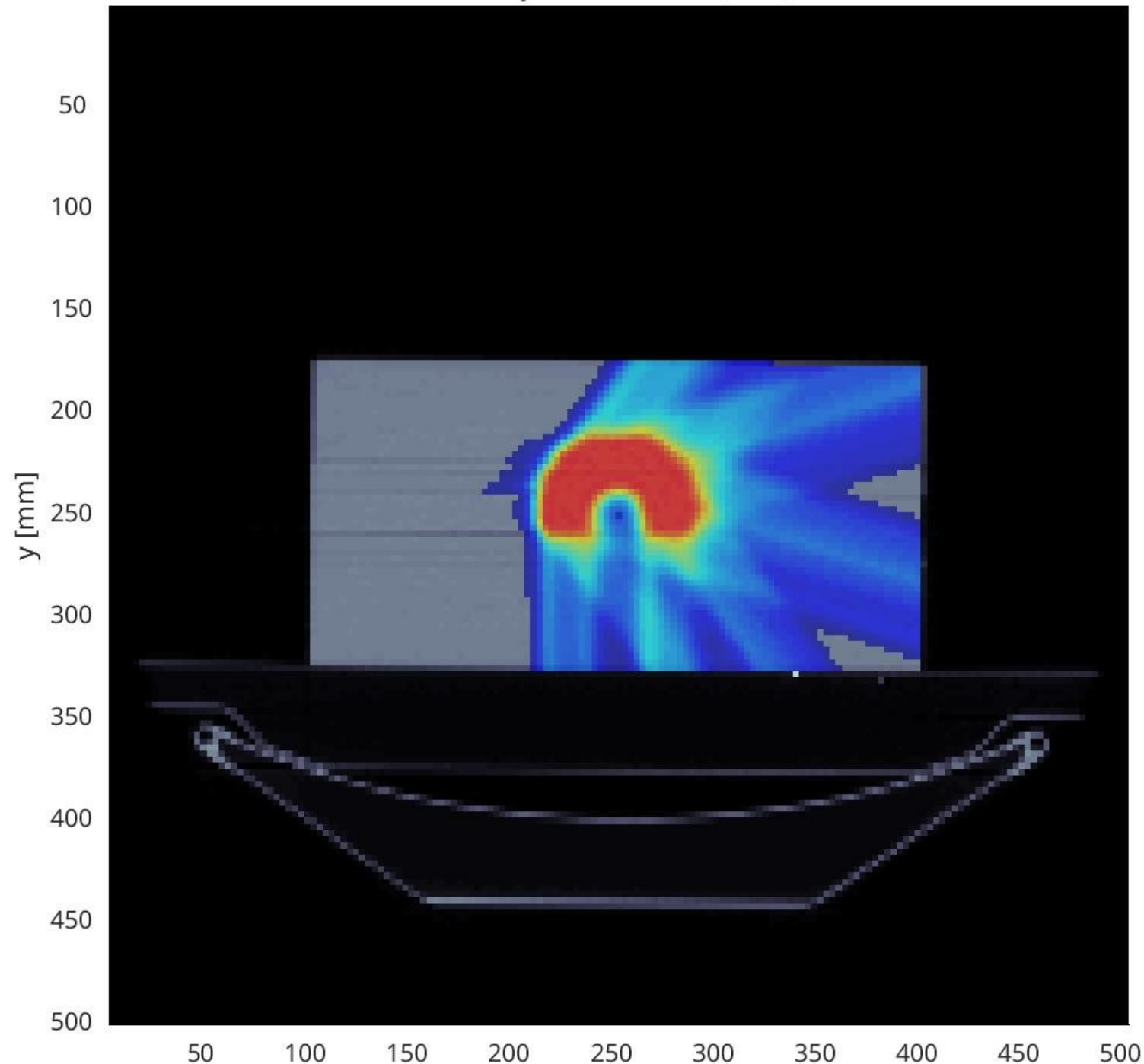
Angles 0 60 90 270 300

axial plane z = 165 [mm]



	max	min	mean	std
Core	0.8496	0.0153	0.5857	0.2001
OuterTarget	1.7588	1.5510	1.6652	0.0150
BODY	1.7588	0	0.0979	0.2737

axial plane z = 162.5 [mm]



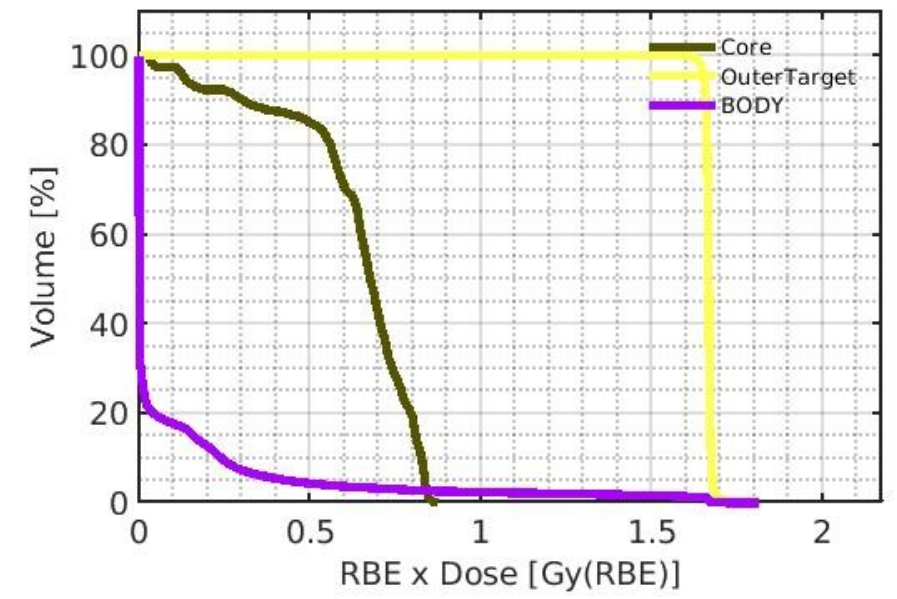
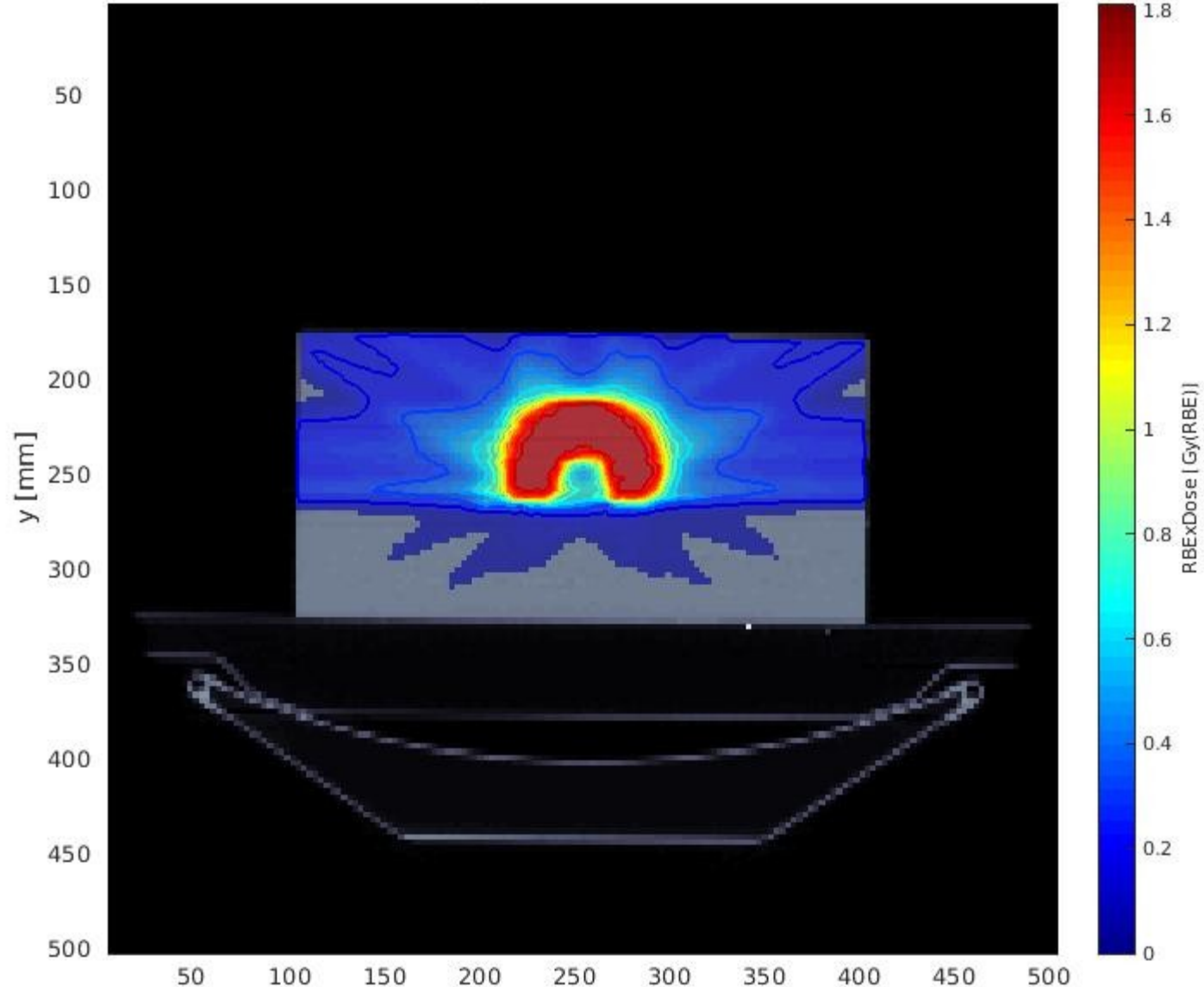
	max	min	mean	std
Core	0.9105	0.1719	0.5712	0.1916
OuterTarget	1.7700	1.4675	1.6638	0.0314
BODY	1.7700	0	0.1708	0.3440

Angles 36 72 108 144 180

C PHANTOM — CARBON

Angles 0 60 90 270 300

axial plane z = 165 [mm]

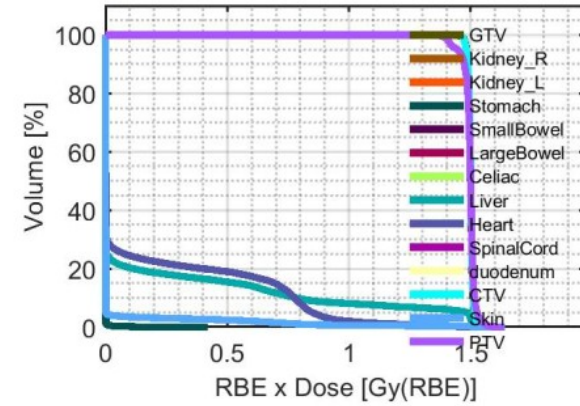
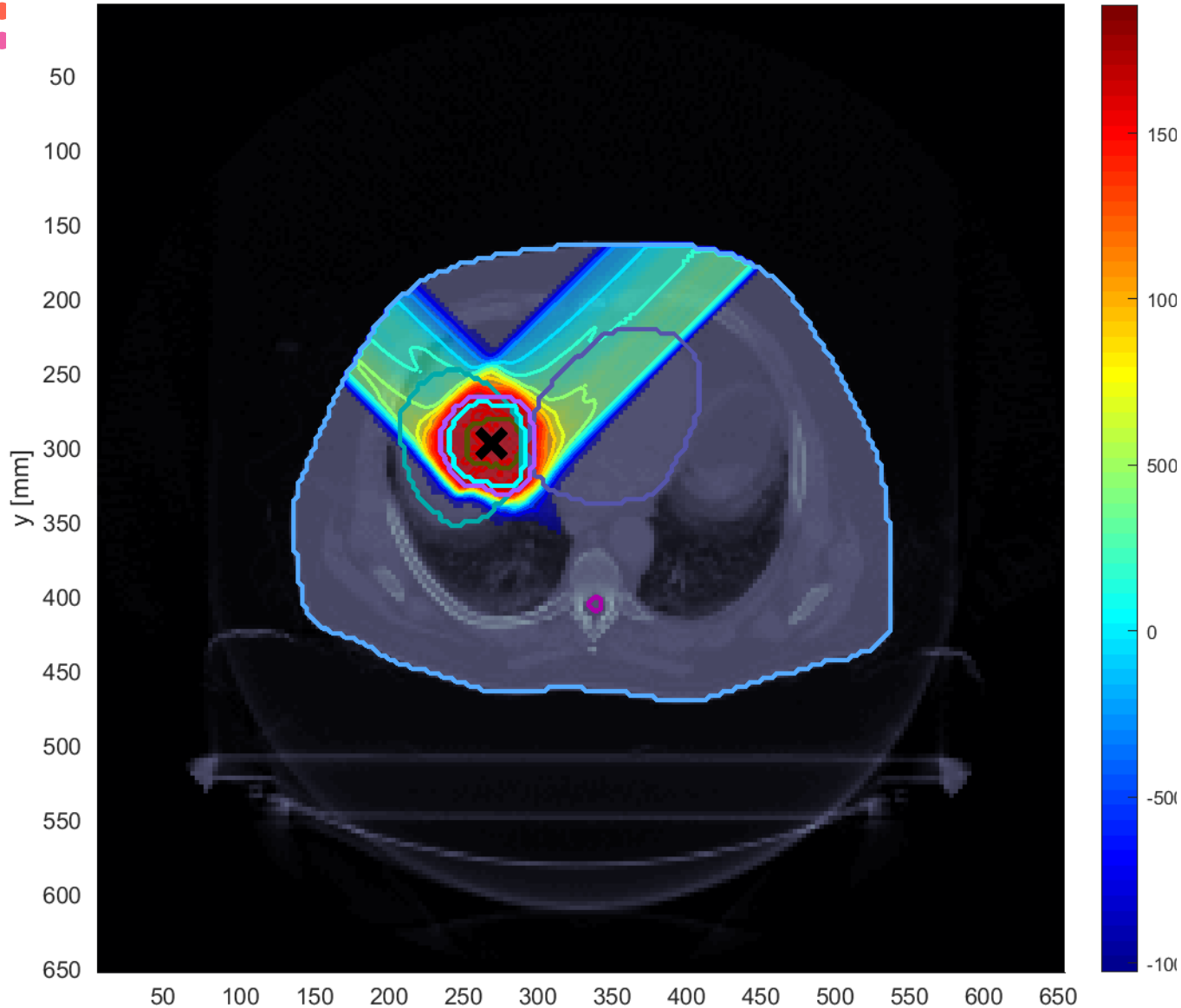


	max	min	mean	std
Core	0.8752	0.0227	0.6337	0.1959
OuterTarget	1.7252	1.5498	1.6661	0.0097
BODY	1.8127	0	0.0857	0.2612

LIVER CASE

Angles -45 45
(protons)

axial plane z = 317.5 [mm]



	max	min	mean	
GTV	1.5518	1.4439	1.4990	^
Kidney_R	0	0	0	
Kidney_L	0	0	0	
Stomach	0.4201	0	5.6325e-04	
SmallBowel	0	0	0	
LargeBowel	0	0	0	
Celiac	0	0	0	
Liver	1.5786	0	0.1821	
Heart	1.5103	0	0.1701	
SpinalCord	0	0	0	
duodenum	0	0	0	v




CONCLUSION

We tried different cases and only few are reported.

A good treatment plan is an optimization task

Computations are time consuming, especially in complex cases and smaller bixels

The beam geometry and type of radiation (photons, protons, ions) are very important for the treatment plan



A decorative graphic featuring a large pink arc that curves across the top and right sides of the page. In the top left, there is a dashed orange circle. In the top right, there is a dashed green circle. A solid cyan circle is positioned on the right side, partially overlapping the pink arc. In the bottom right, there is a solid blue circle. A small yellow dot is located in the bottom left area.

Thank you
for your
attention