

Tedavi Planlama Sistemi Doz Hesap Algoritmasının Farklı Yo□unluk ve Geometrideki Akciger Inhomojenite Ortamında Monte Carlo Yöntemi ile Verifikasyonu

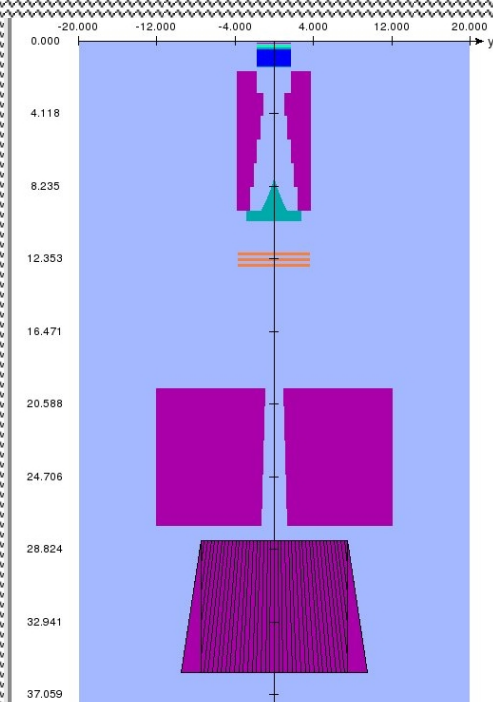
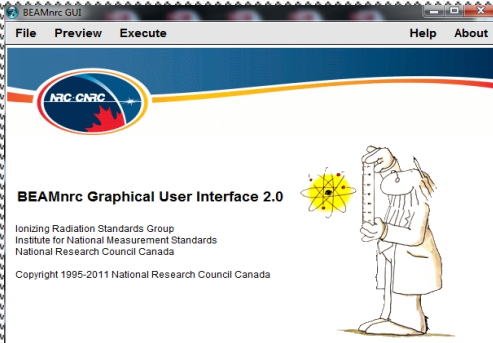
Boran M. GÜNGÖR

MNT Sağlık Hz. A.Ş.

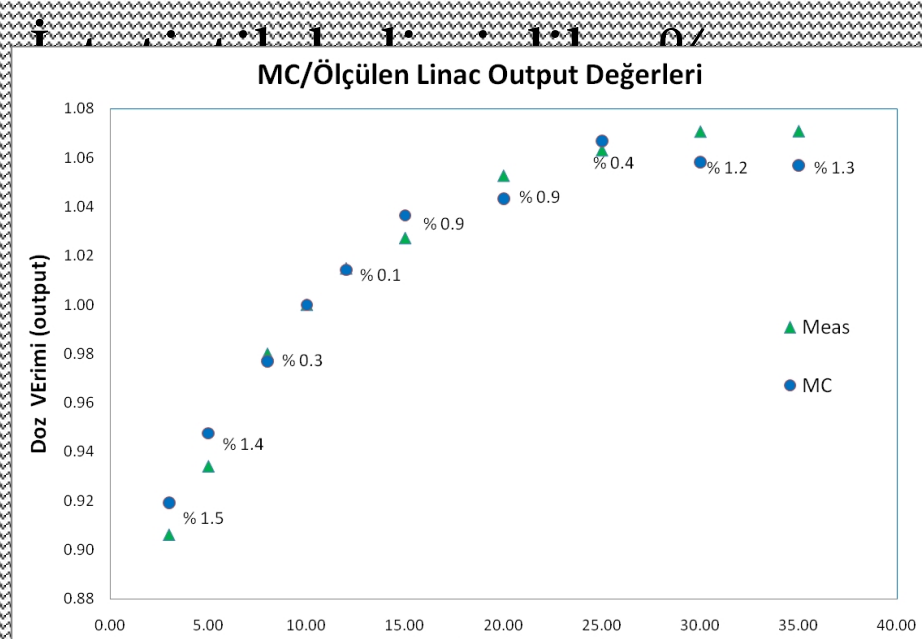
Balıkesir Devlet Hastanesi Radyasyon Onkolojisi Birimi

- TPS : İnhomojen (Farklı yoğunluk) ortamlarda doz hesaplama doğruluğu beklenir.
- Siemens ONCOR 6 MV Foton
 - Eclipse TPS-AAA (Convolution/superposition)
 - Sütun ve Dilim inhomojetine geometrileri
 - Elektronik Yoğunluk ($\rho_e=0.05-0.1-0.2-0.4-0.6$)
- TPS / Monte Carlo (MC) Simulasyon
 - PDD /Profil (BP)/Penumbra

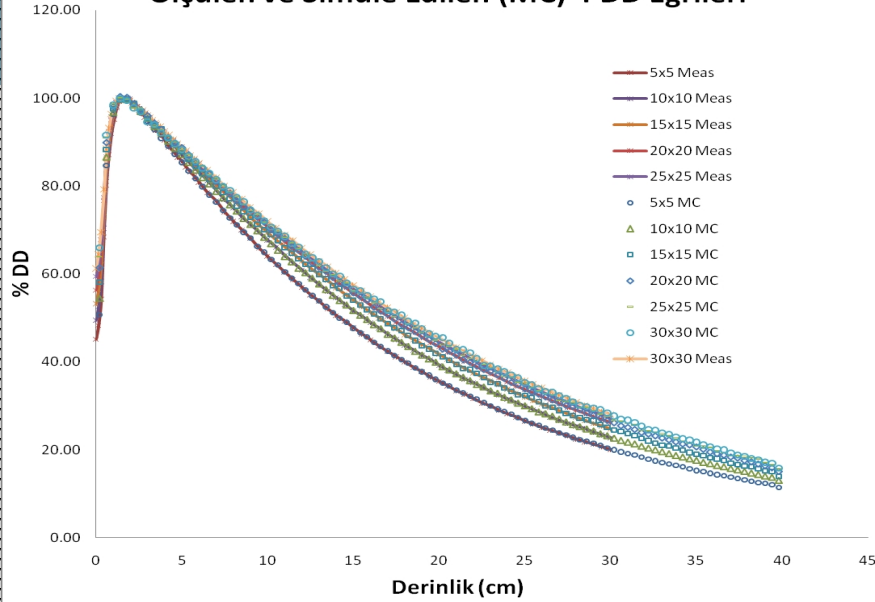
MC simülasyon



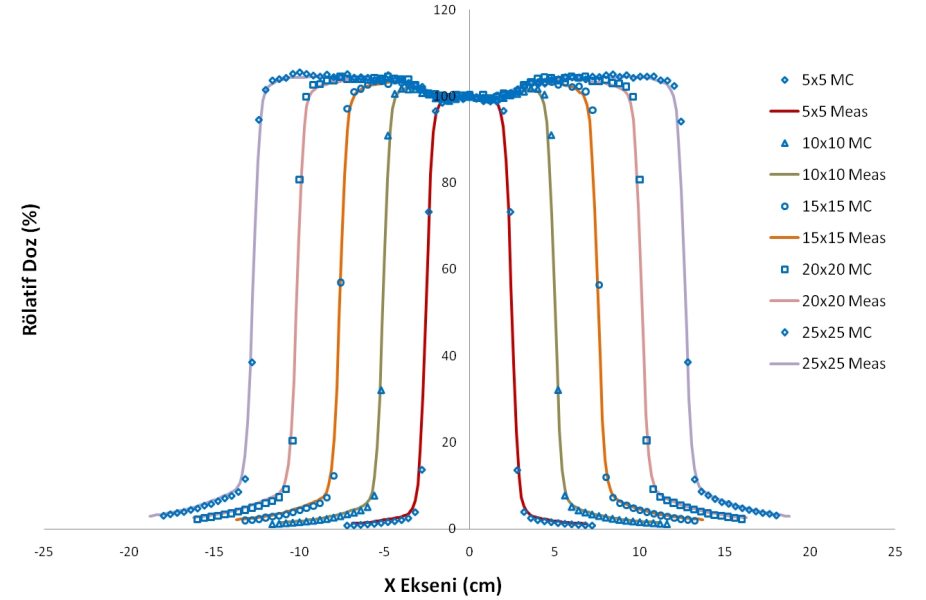
- BeamNRC /DosXYZ NRC MC Kodu
- Linak 6 MV Foton Demeti
- Su Fantomu PDD/Profil/Output



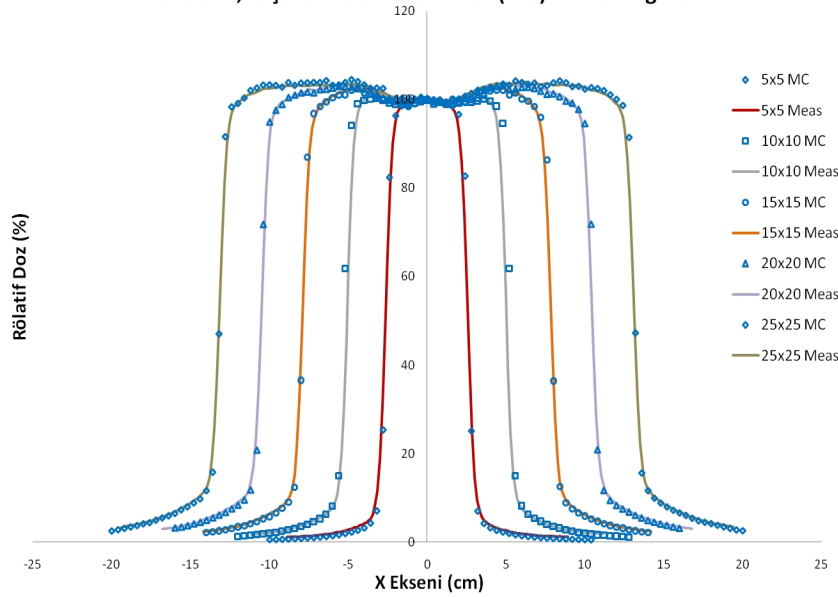
Ölçülen ve Simüle Edilen (MC) PDD Eğrileri



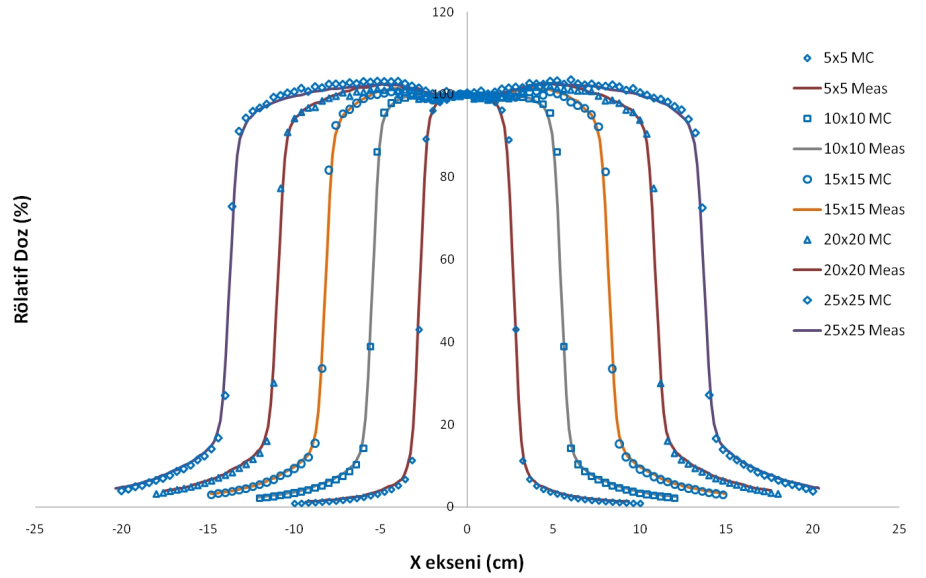
d=1.5 cm , Ölçülen ve Simüle Edilen (MC) X Profil Eğrileri



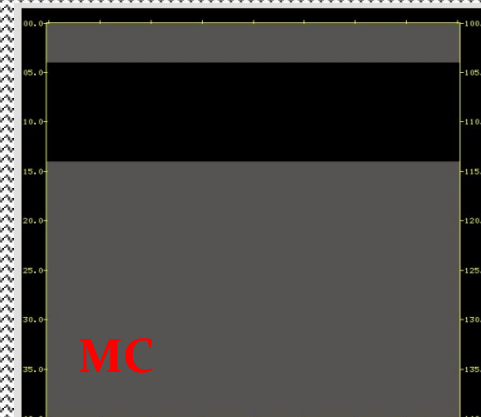
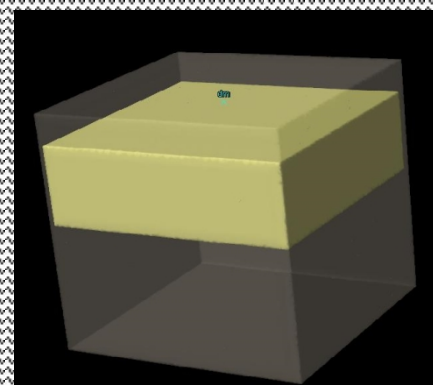
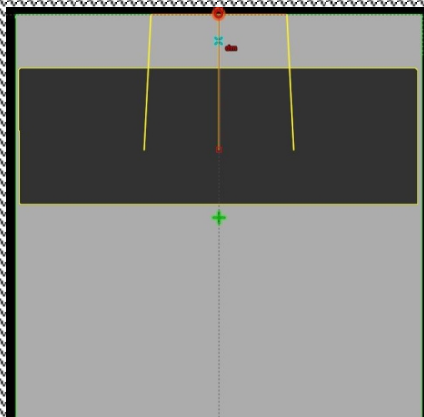
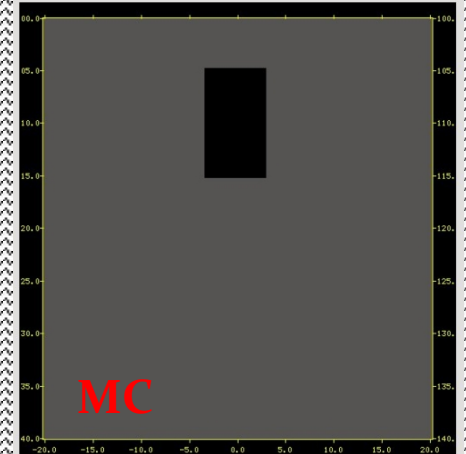
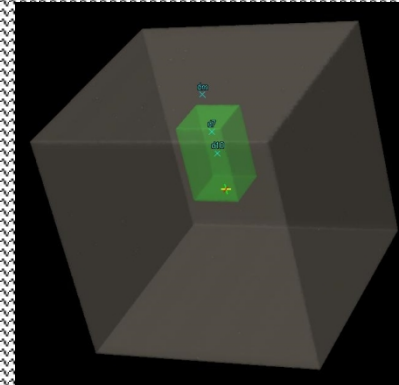
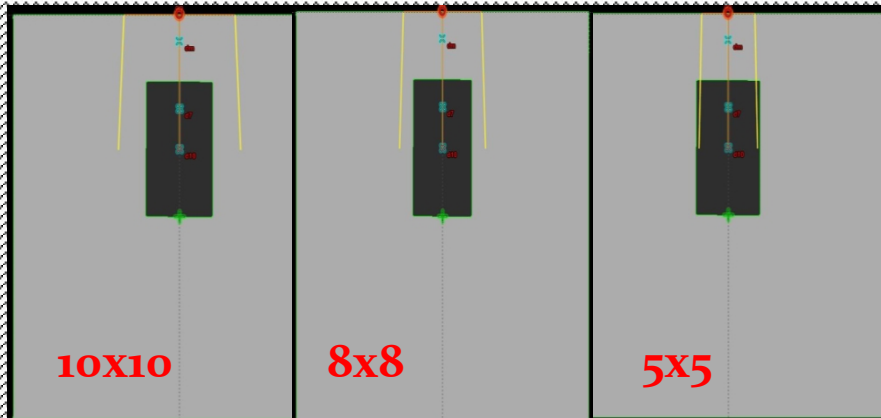
d=5 cm , Ölçülen ve Simüle Edilen (MC) Y Profil Eğrileri



d=10 cm , Ölçülen ve Simüle Edilen (MC) X Profil Eğrileri

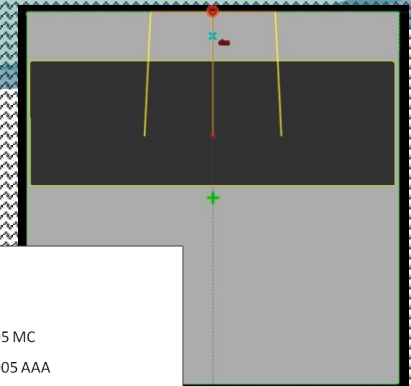


Inhomojenite Varyasyonlari

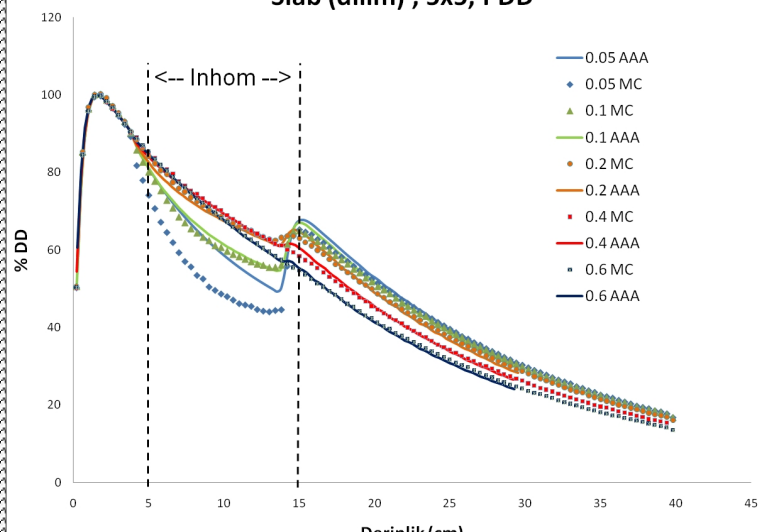


- Sütun [CAX, $d=5\text{cm}$, $6\times 6\times 10\text{cm}$], Dilim [$d=5\text{cm}$, kalınlık 10cm]
- p_e , 0.05-0.1-0.2-0.4-0.6

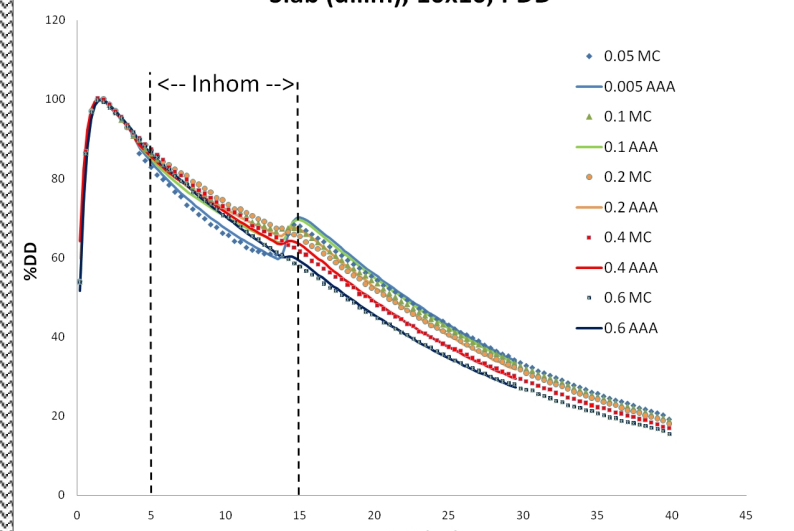
AAA vs. MC PDD[5x5-8x8-10x10], SSD100



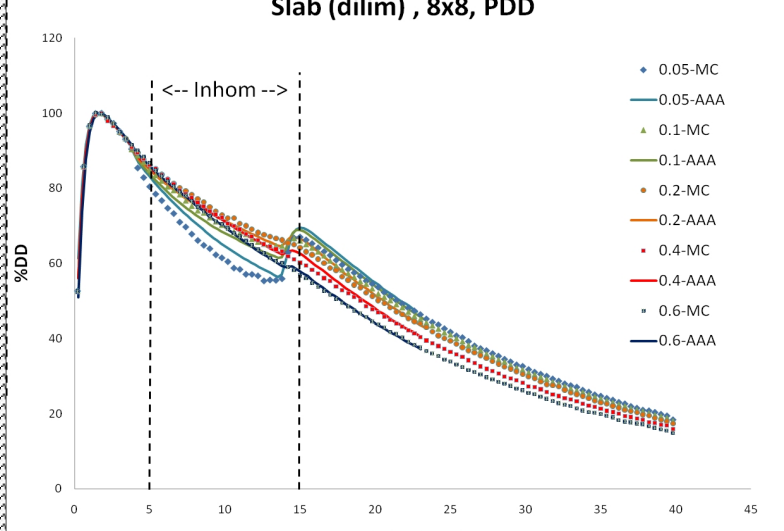
Slab (dilim) , 5x5, PDD



Slab (dilim), 10x10, PDD

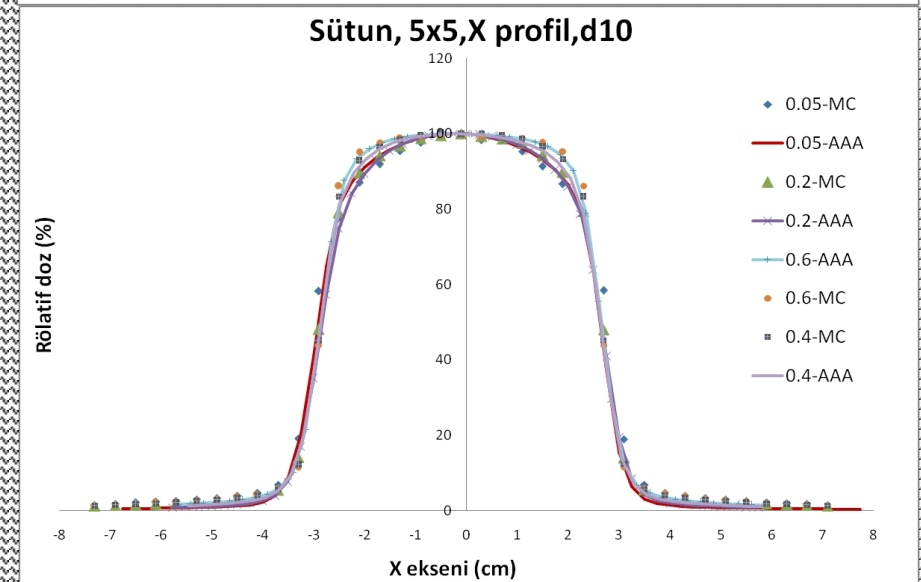
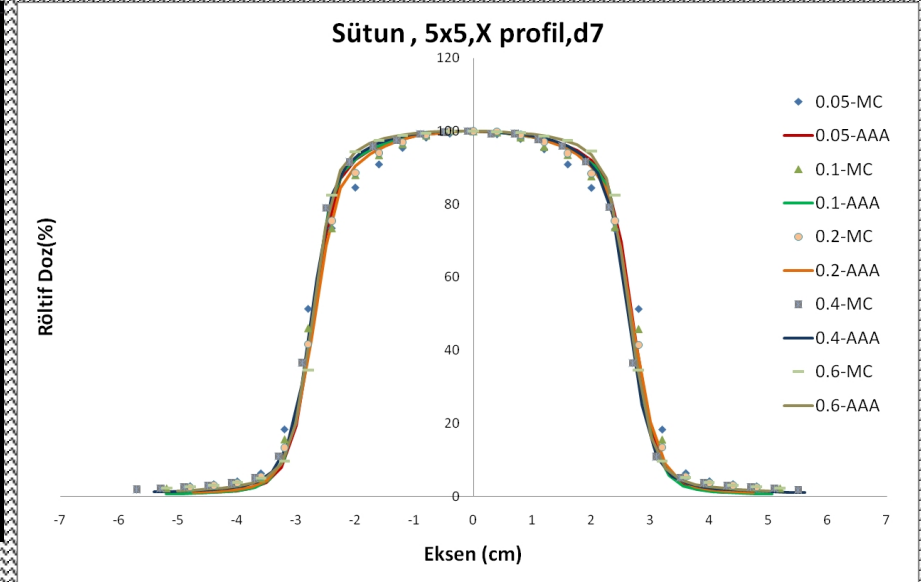
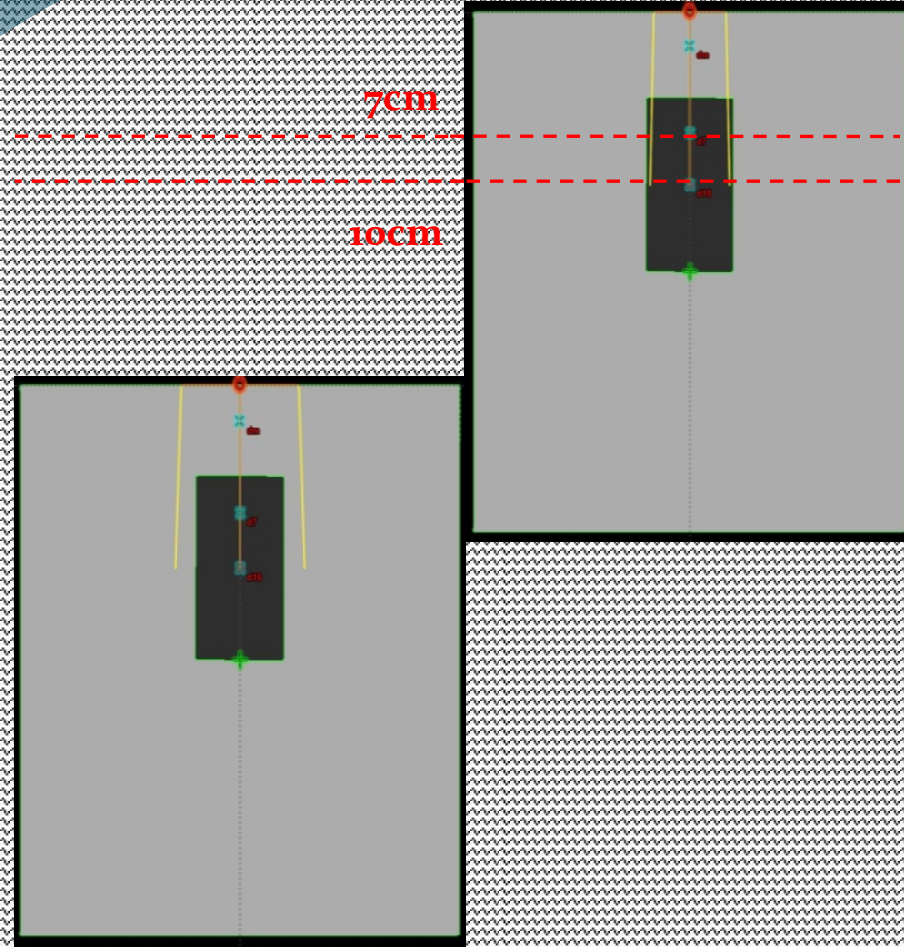


Slab (dilim) , 8x8, PDD



%DD [MC-AAA]	5x5		8x8		10x10	
pe	d=7cm (%)	d=10cm (%)	d=7cm (%)	d=10cm (%)	d=7cm (%)	d=10cm (%)
0.05	-16	-19	-4.7	-6	-1.1	-2.1
0.1	-3.6	-2.1	2.7	2.8	2.7	2.9
0.2	1.6	1	2	1.6	1.8	2.0
0.4	0.5	0.3	0.6	0.4	1.6	1.3
0.6	0.2	0.2	0.1	0.2	0.3	0.1

AAA vs. MC [5x5-8x8-10x10] [d=7,10cm][BP X(MLC)]



[MC-AAA] (%)	8x8		10x10	
pe	BP7	BP10	BP7	BP10
0.05	4.4	5	3	2.5
0.1	3.5	3.6	3.5	4
0.2	2.6	3.8	2.1	4.5
0.4	2.2	3.8	1.7	2.9
0.6	1.4	3.1	1.6	3.3

- Penumbra [D%20-D%80] *Earki*;

[MC-AAA]	5x5		8x8		10x10	
pe	d7	d10	d7	d10	d7	d10
0.05	3.5mm	2mm	<0.5mm	<1mm	<0.5mm	<1mm
0.1	2.8mm	<1mm	<0.5mm	<0.5mm	1.2mm	<0.5mm
0.2	<1mm	<0.5mm	<0.5mm	<0.5mm	<0.5mm	<0.5mm
0.4	<0.5mm	<0.5mm	<0.5mm	<1mm	<0.5mm	<1mm
0.6	<0.5mm	<0.5mm	<1mm	<1mm	<0.5mm	<0.5mm

SONUÇ

- Heterojenite artışı ($\rho_e \searrow$), Alan $\searrow$;
 - [MC-AAA] $\nearrow$
- Akciğer ρ_e seviyelerinde (0.2-0.5)
 - [MC-AAA] $\searrow$
- CT Kalibr. Eğrisi $\Rightarrow$ “Density Scaling” $\Rightarrow$ Dose Calc.

TEŞEKKÜRLER...

