

News from simulations

Simone Bianco

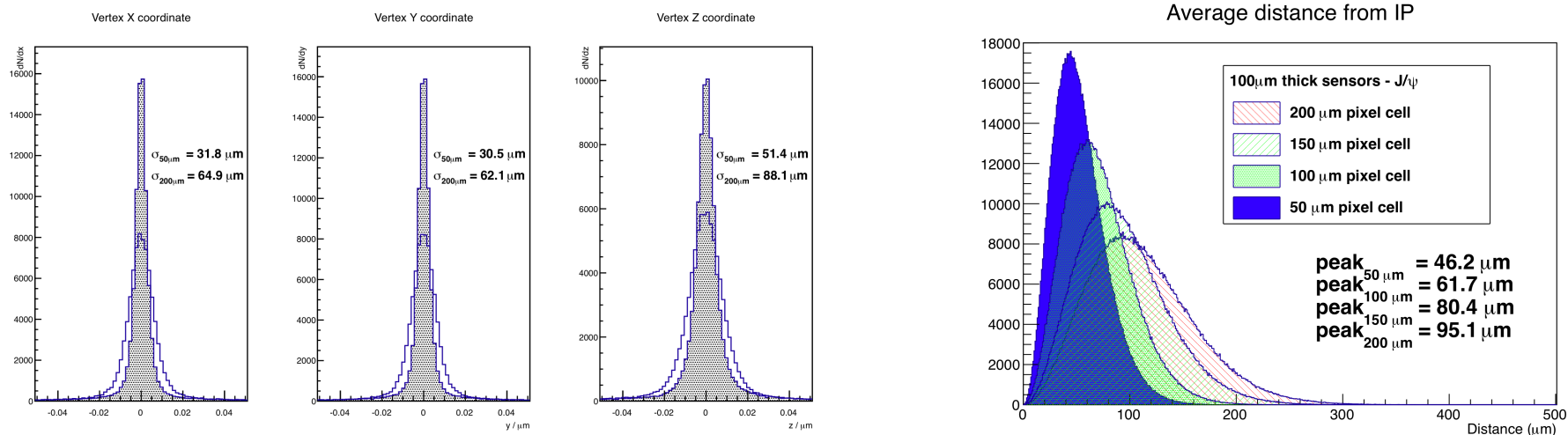
Vertex Resolution Vs Pixel Cell Size

➔ $\bar{p}p \rightarrow \psi(2S) \rightarrow J/\psi \pi^+ \pi^- \rightarrow \mu^+ \mu^- \pi^+ \pi^-$

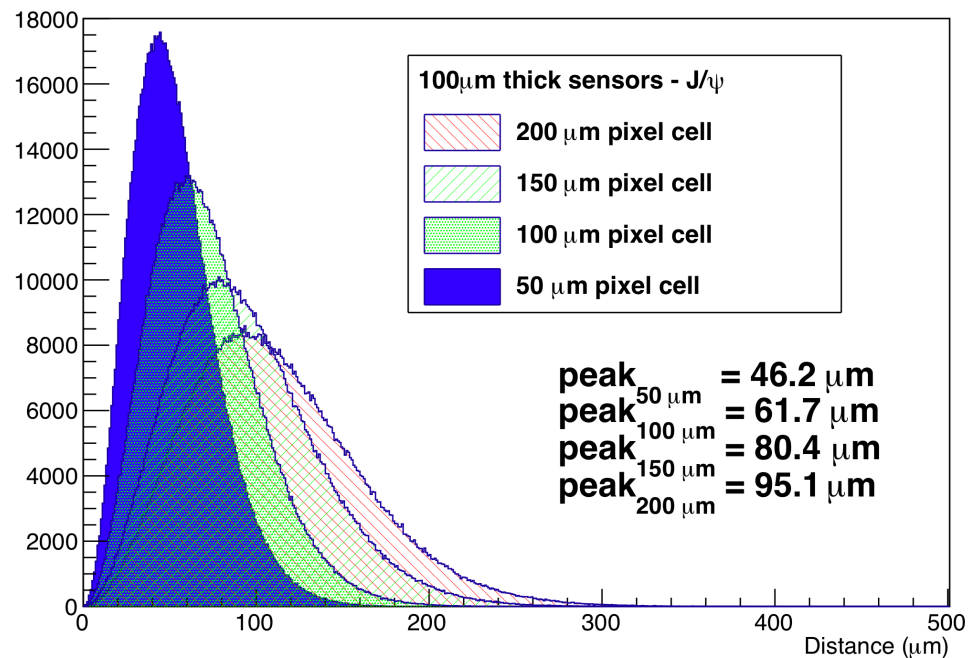
➔ Four 500 MeV/c pions smeared along the polar angle range

100 μm and 200 μm thick sensors

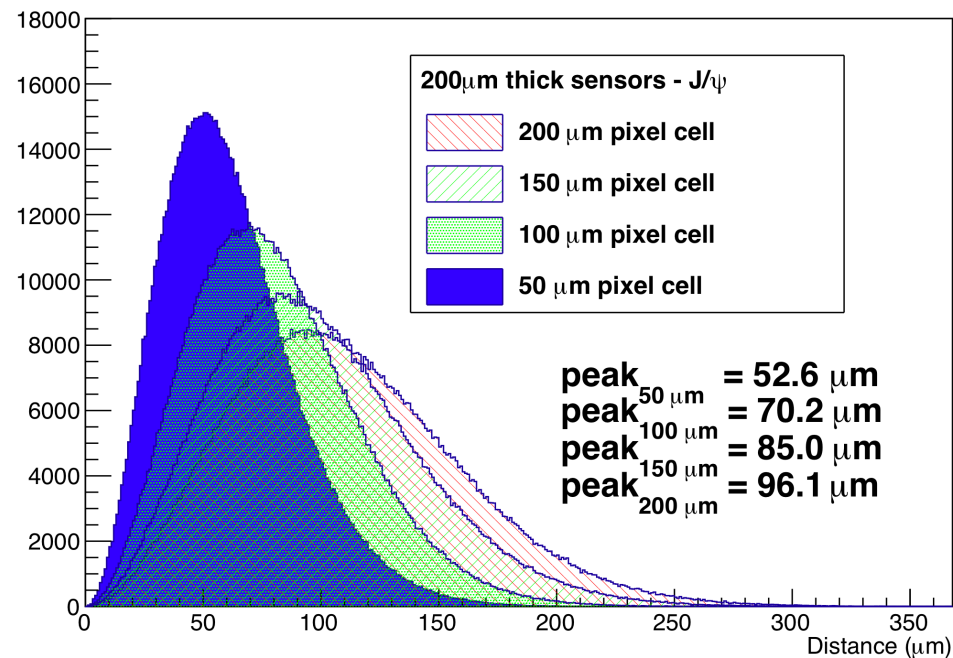
Different pixel cell sizes: 50 x 50, 100 x 100, 150 x 150, 200 x 200



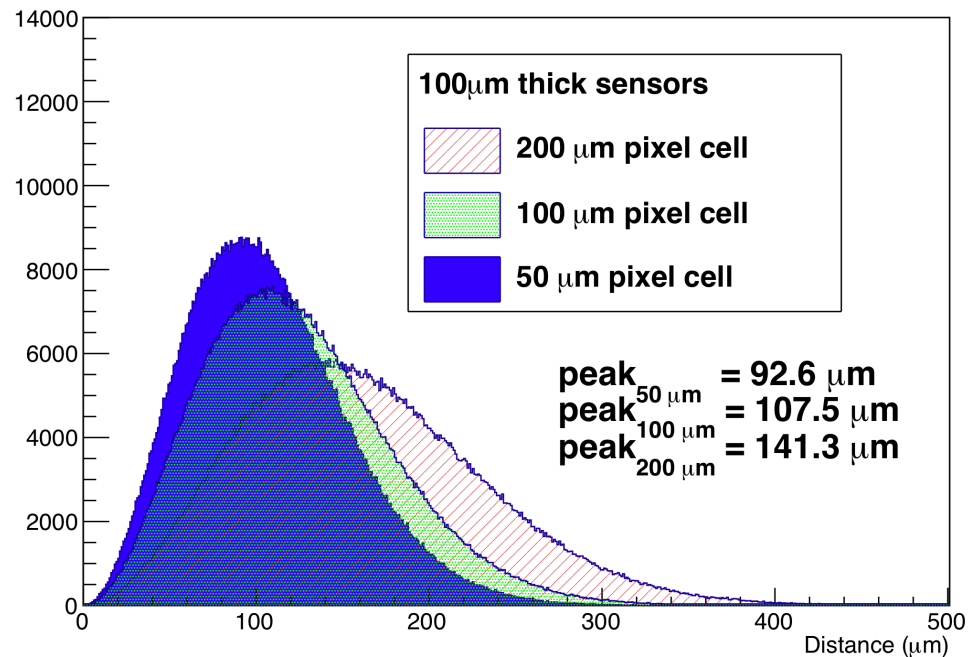
Average distance from IP



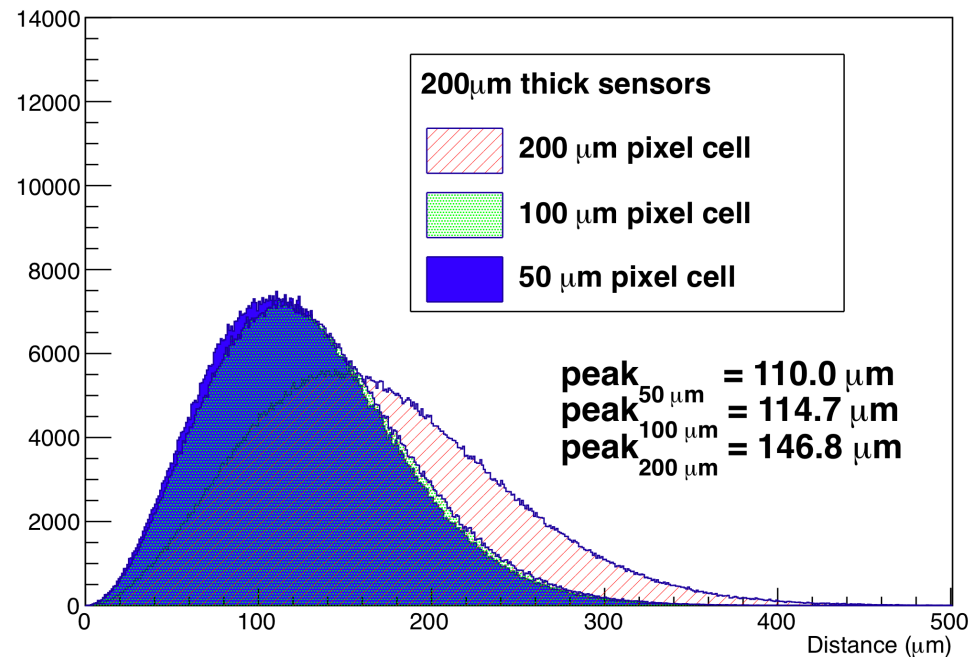
Average distance from IP



Average distance from IP



Average distance from IP



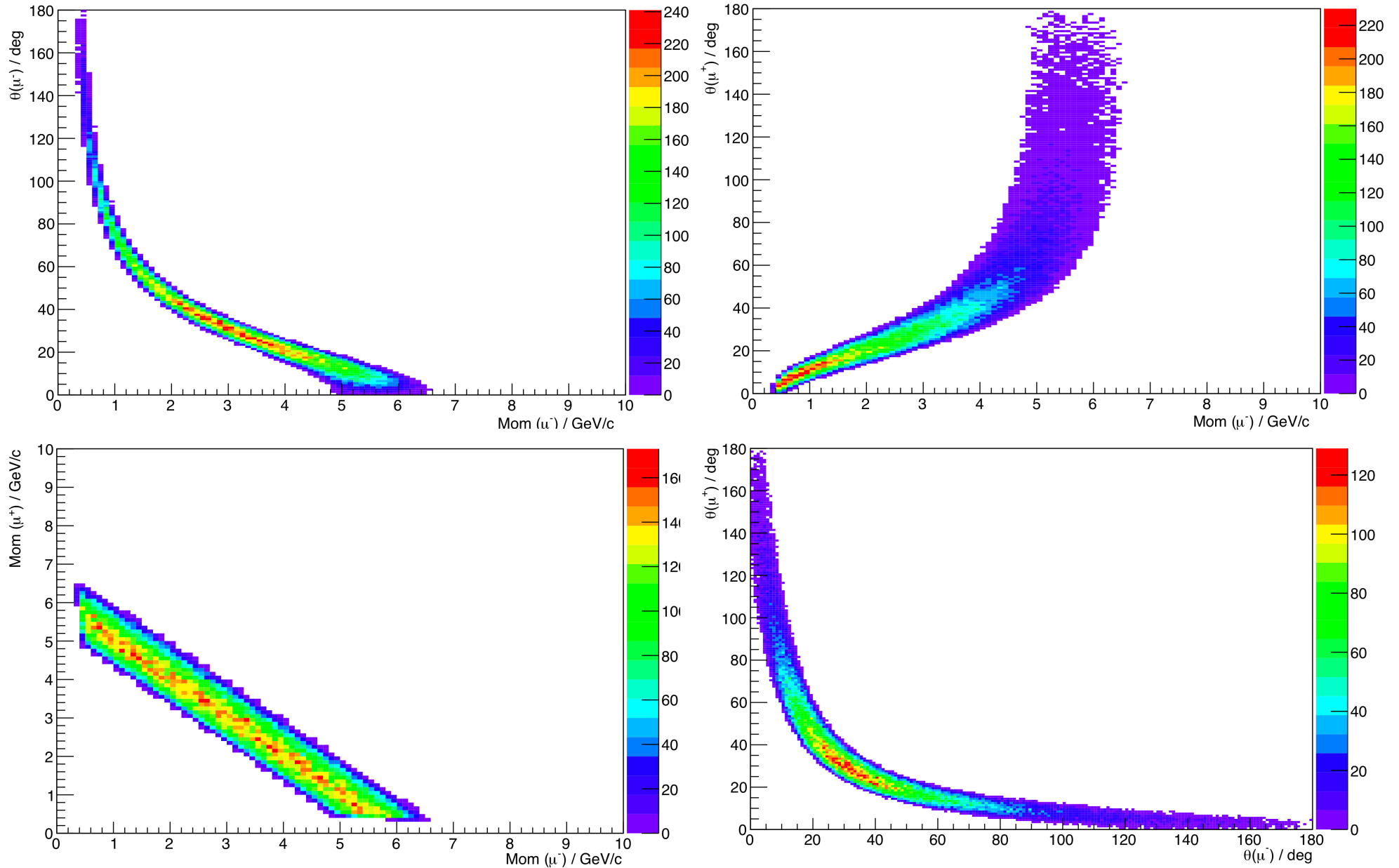
Channel	Sens. Thickness	# Barrel layers	Pixel cell size	Res X	Res Y	Res Z	D
	μm		$\mu\text{m} \times \mu\text{m}$	μm	μm	μm	μm
J/Psi	100	4	50x50	26	26	45	46.2
J/Psi	100	4	100x100	38	36	57	61.7
J/Psi	100	4	150x150	50	48	75	80.4
J/Psi	100	4	200x200	60	57	89	95.1
J/Psi	200	4	50x50	31	29	52	52.6
J/Psi	200	4	100x100	45	42	62	70.2
J/Psi	200	4	150x150	54	52	76	85
J/Psi	200	4	200x200	63	60	84	96.1
Four π	100	4	50x50	81	62	55	92.6
Four π	100	4	100x100	93	77	60	107.5
Four π	100	4	200x200	118	98	87	141.3
Four π	200	4	50x50	94	77	64	110
Four π	200	4	100x100	94	81	68	114.7
Four π	200	4	200x200	121	107	87	146.8
J/Psi	200	3 (1 st removed)	100x100	44	42	68	71.6
Four π	200	3 (1 st removed)	100x100	127	117	96	157.1
J/Psi	200	3 (2 nd removed)	100x100	44	42	67	71.2
Four π	200	3 (2 nd removed)	100x100	119	85	76	129

Add. Material: 1mm of carbon before barrel 1, barrel2, disk1, disk2

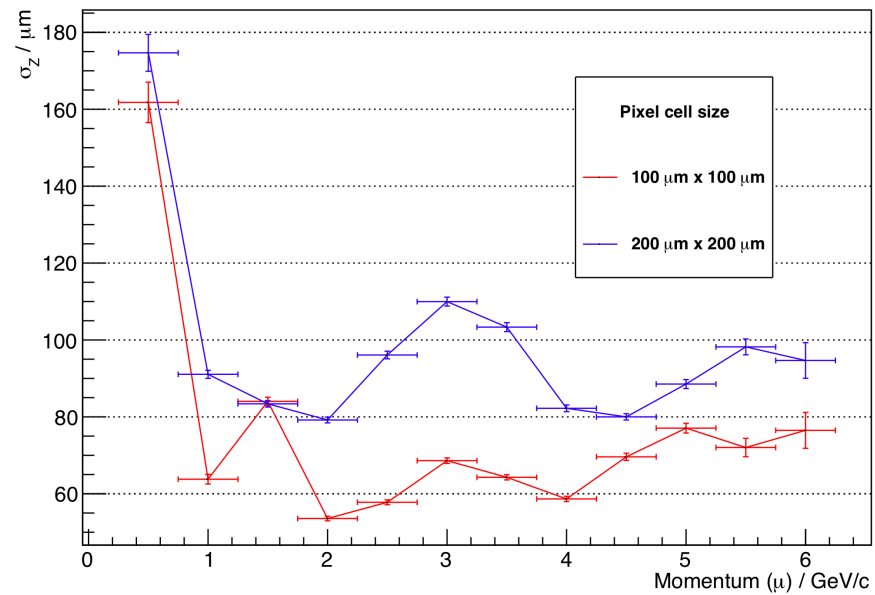
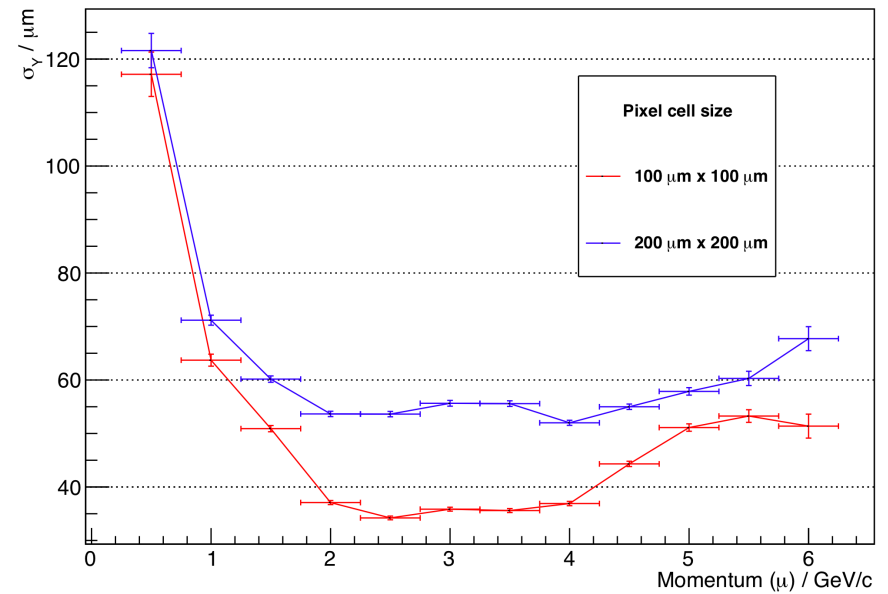
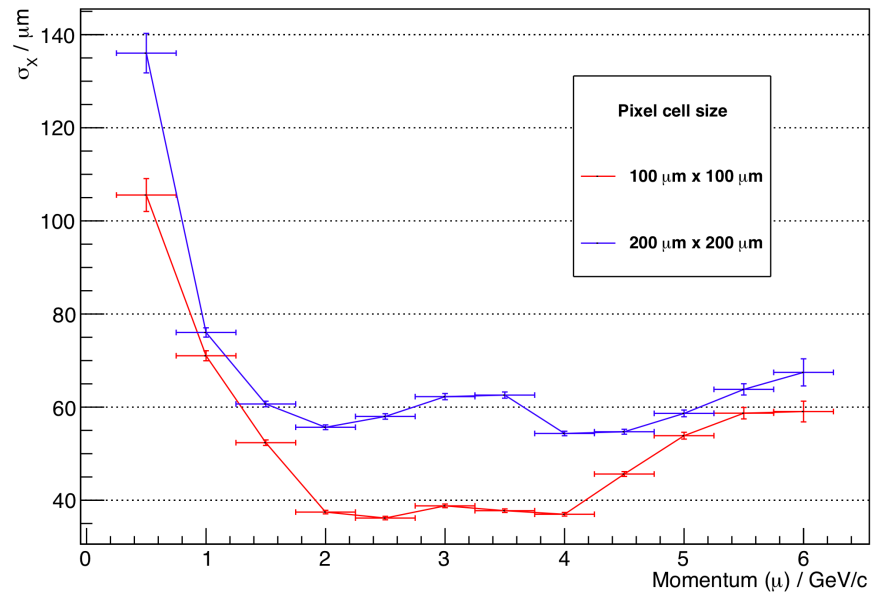
Four π	200	4	100x100	100	84	69	117.9
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Vertex Resolution Vs Momentum

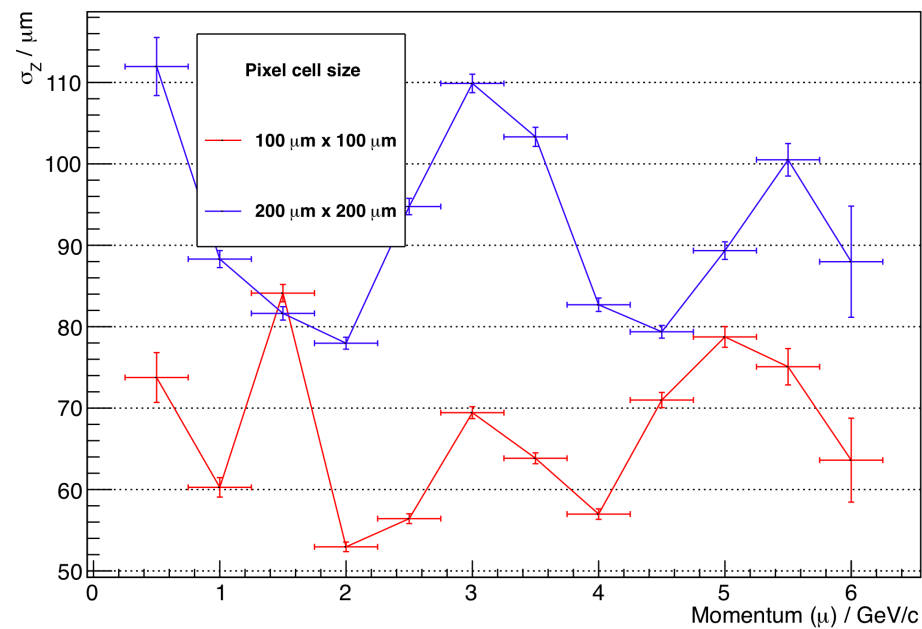
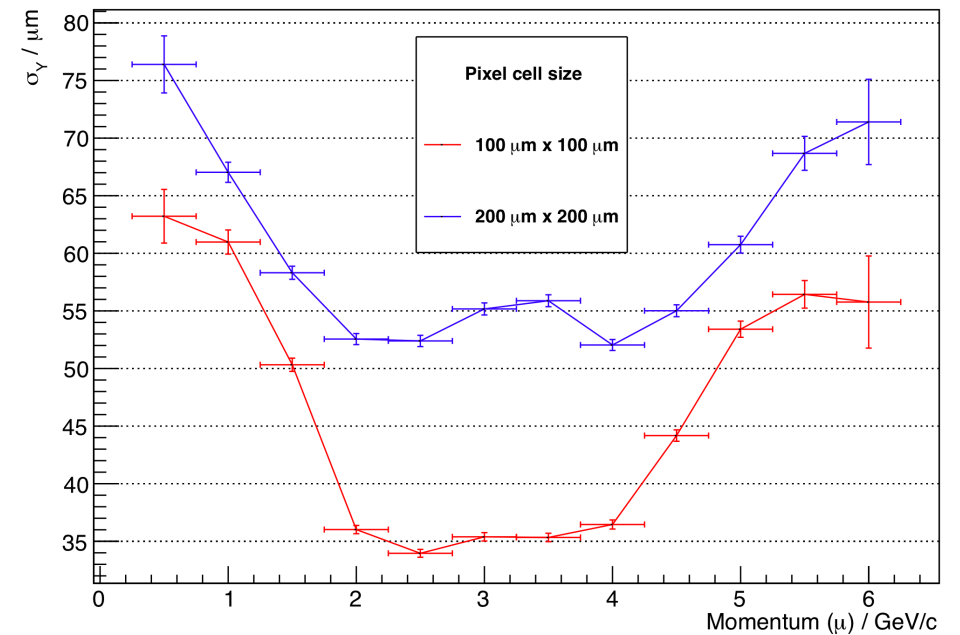
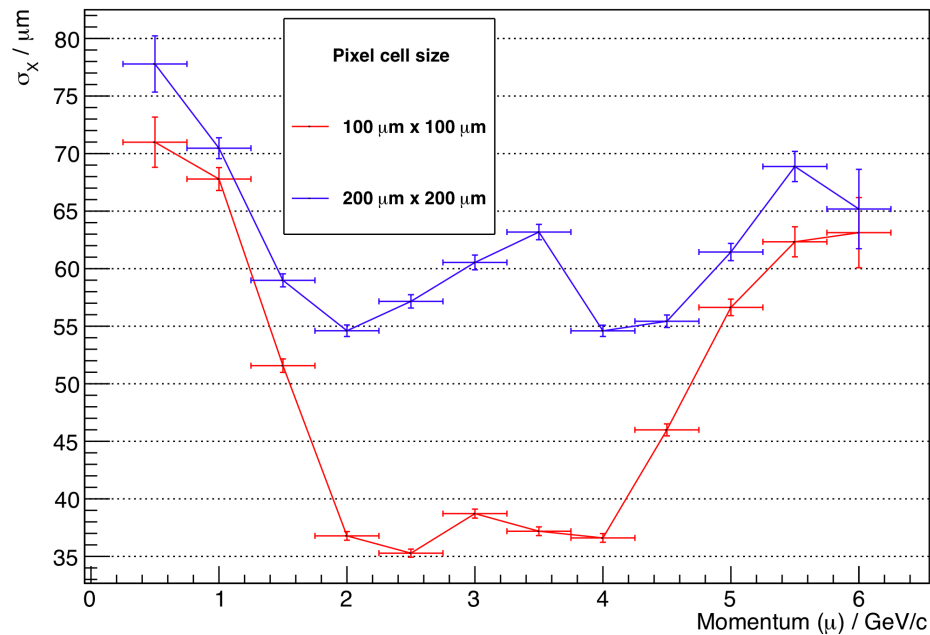
$$\bar{p}p \rightarrow \psi(2S) \rightarrow J/\psi \pi^+ \pi^- \rightarrow \mu^+ \mu^- \pi^+ \pi^-$$



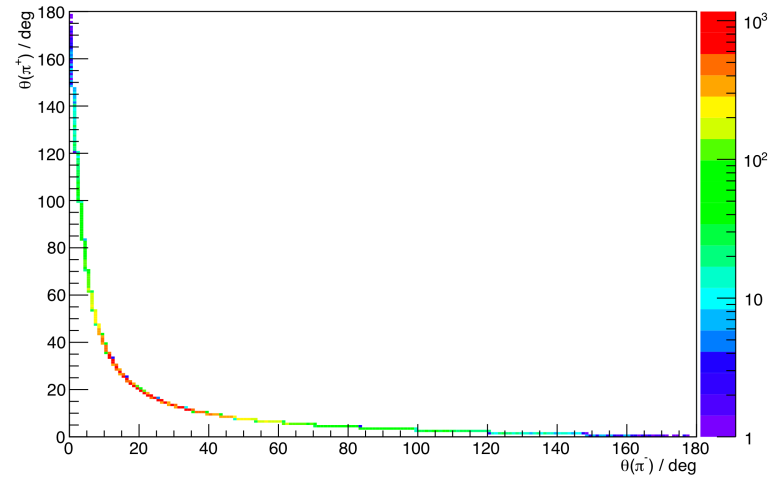
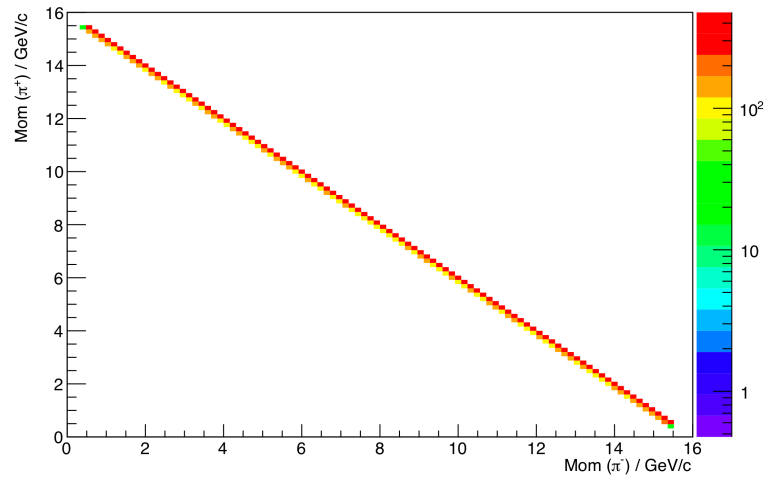
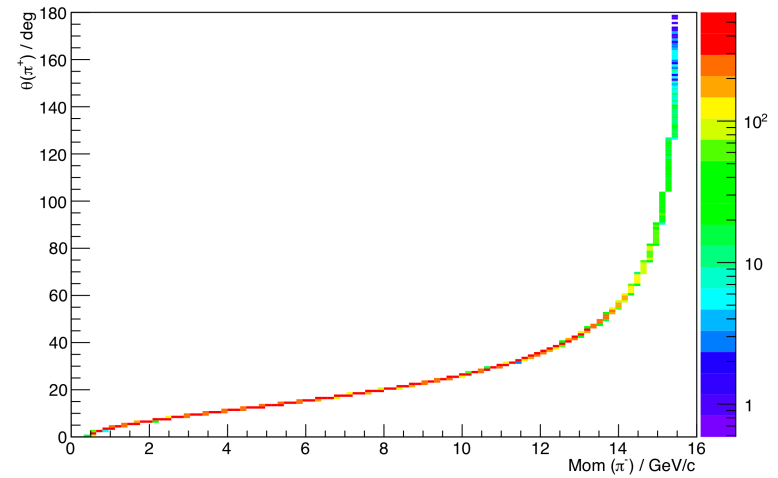
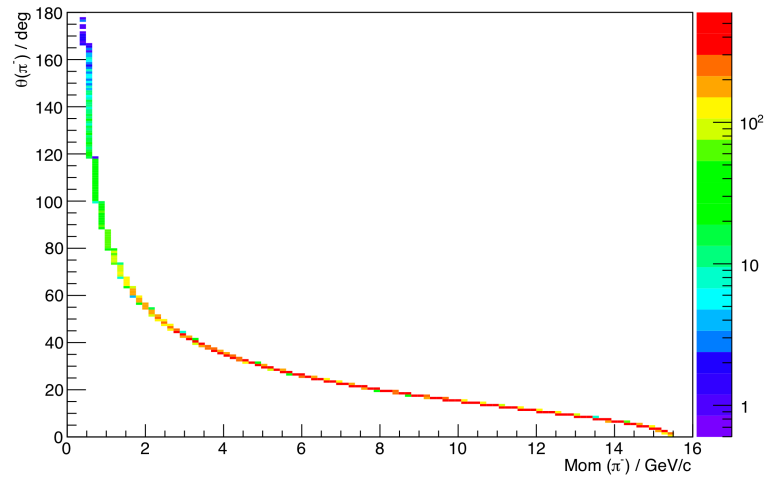
J/ψ vertices



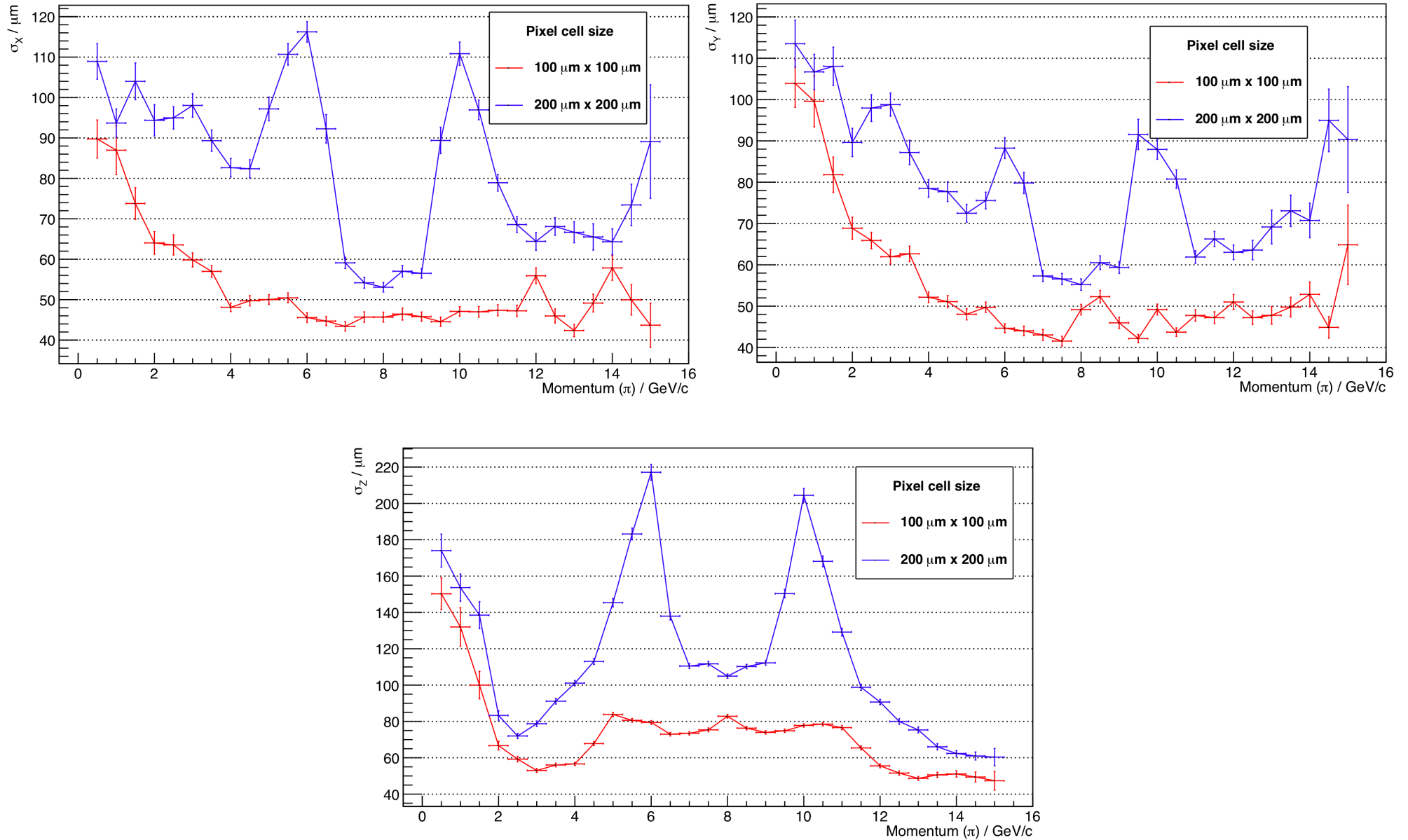
J/ψ vertices – MC momentum



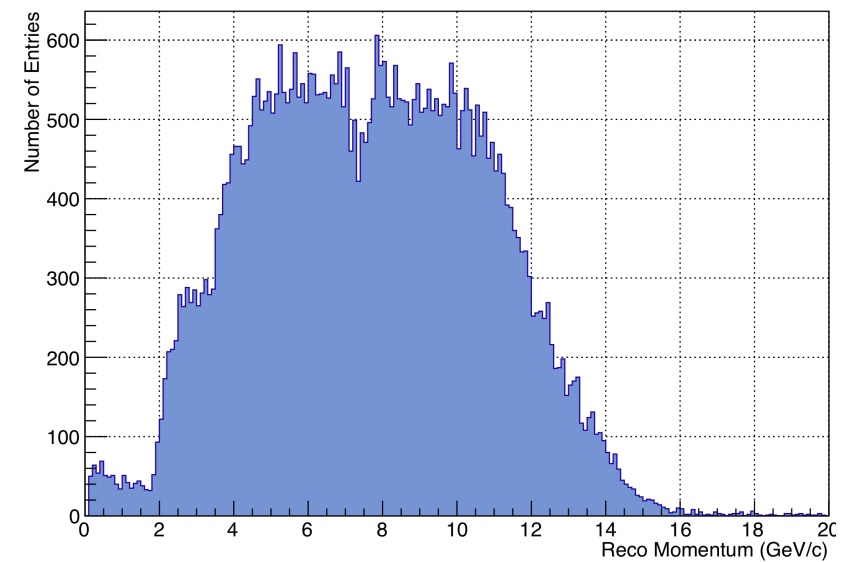
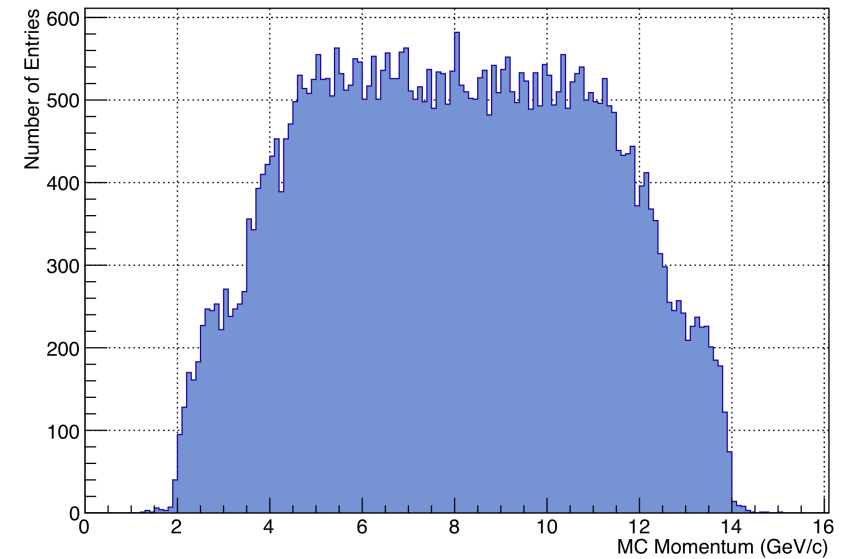
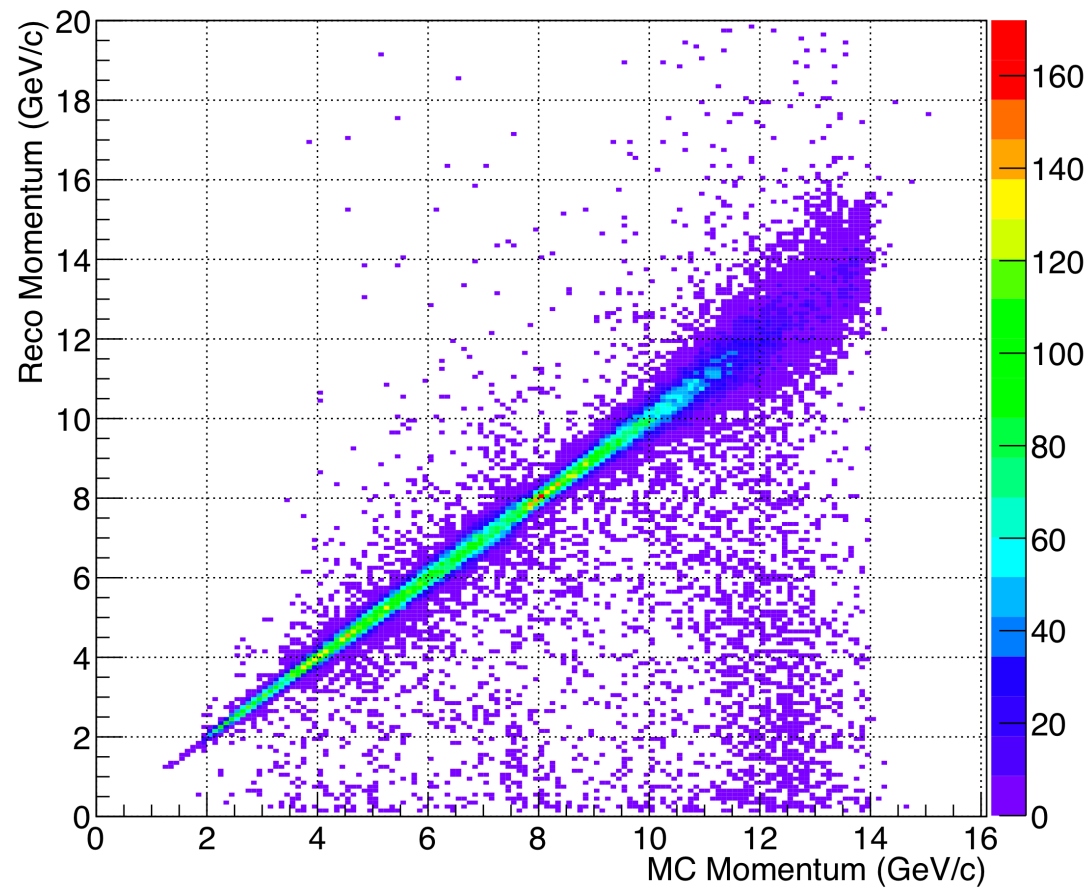
$\bar{p}$ (@15 GeV/c) $p \rightarrow \pi^+\pi^-$ vertices



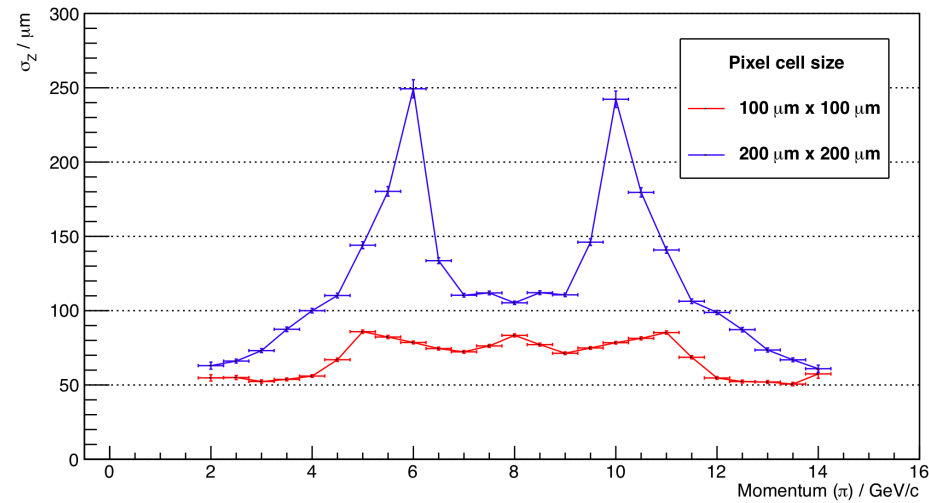
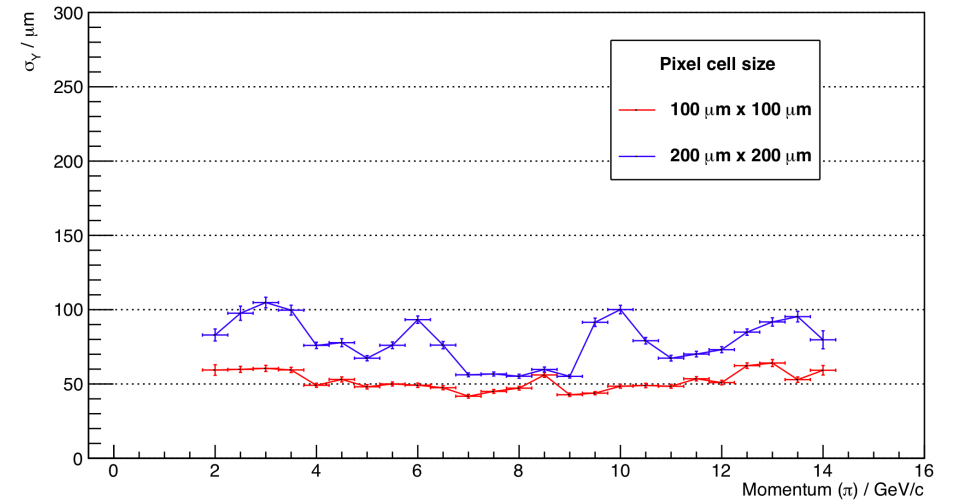
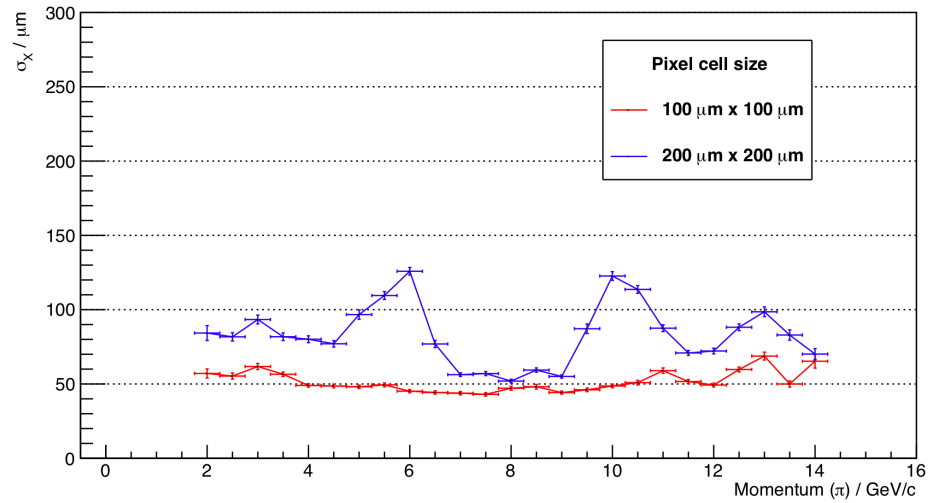
$p\bar{p} \rightarrow \pi^+\pi^-$ vertices



$p\bar{p} \rightarrow \pi^+\pi^-$ vertices



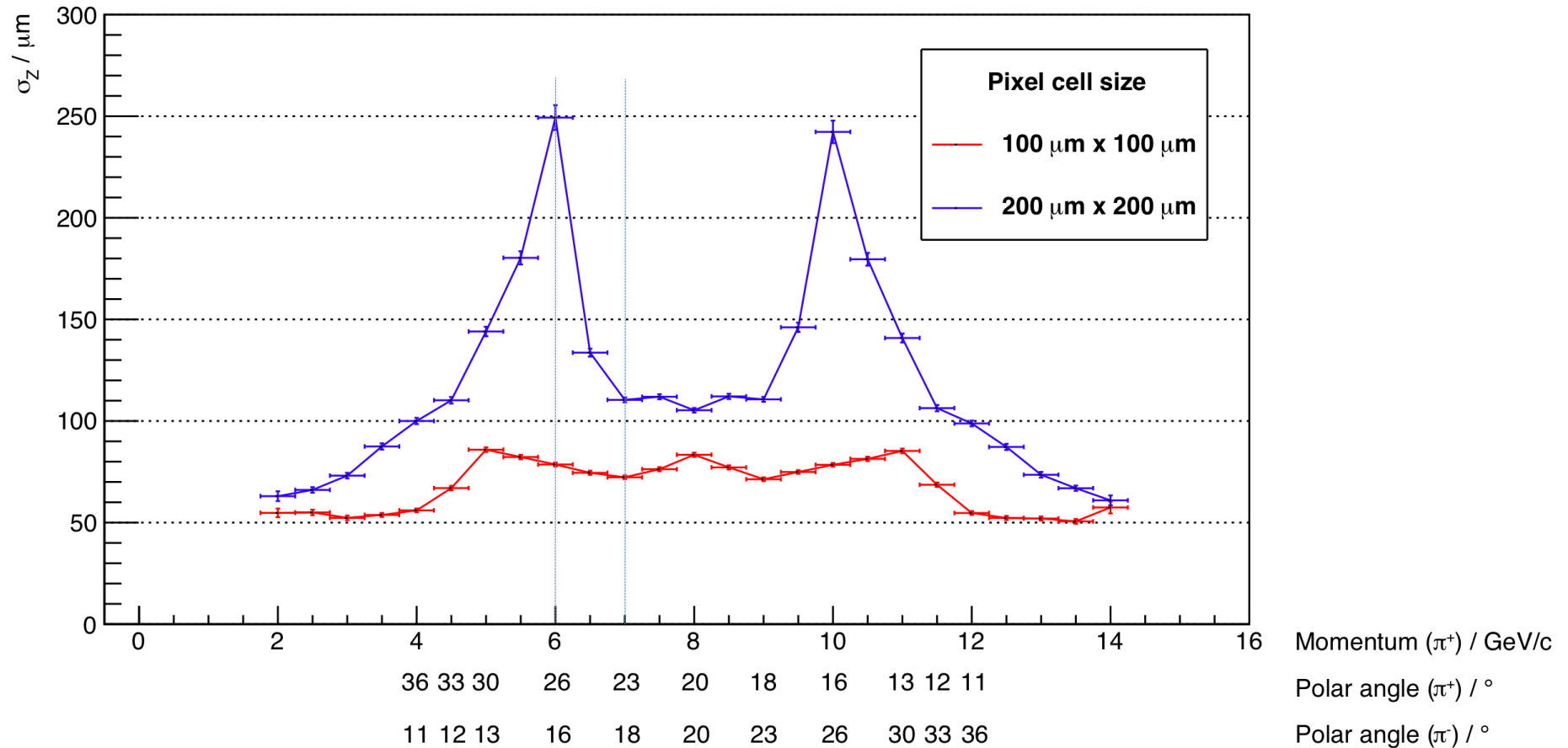
$\text{pbar } \text{p} \rightarrow \pi^+ \pi^-$ vertices (MC mom)



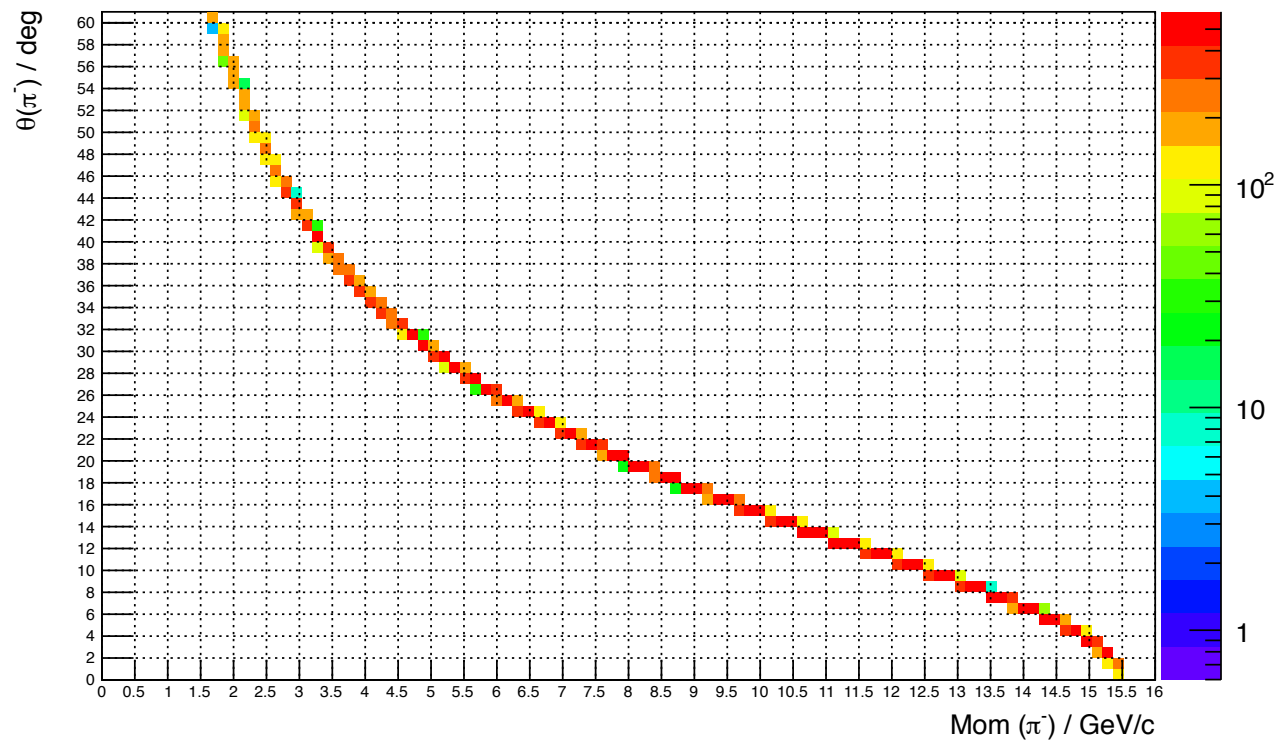
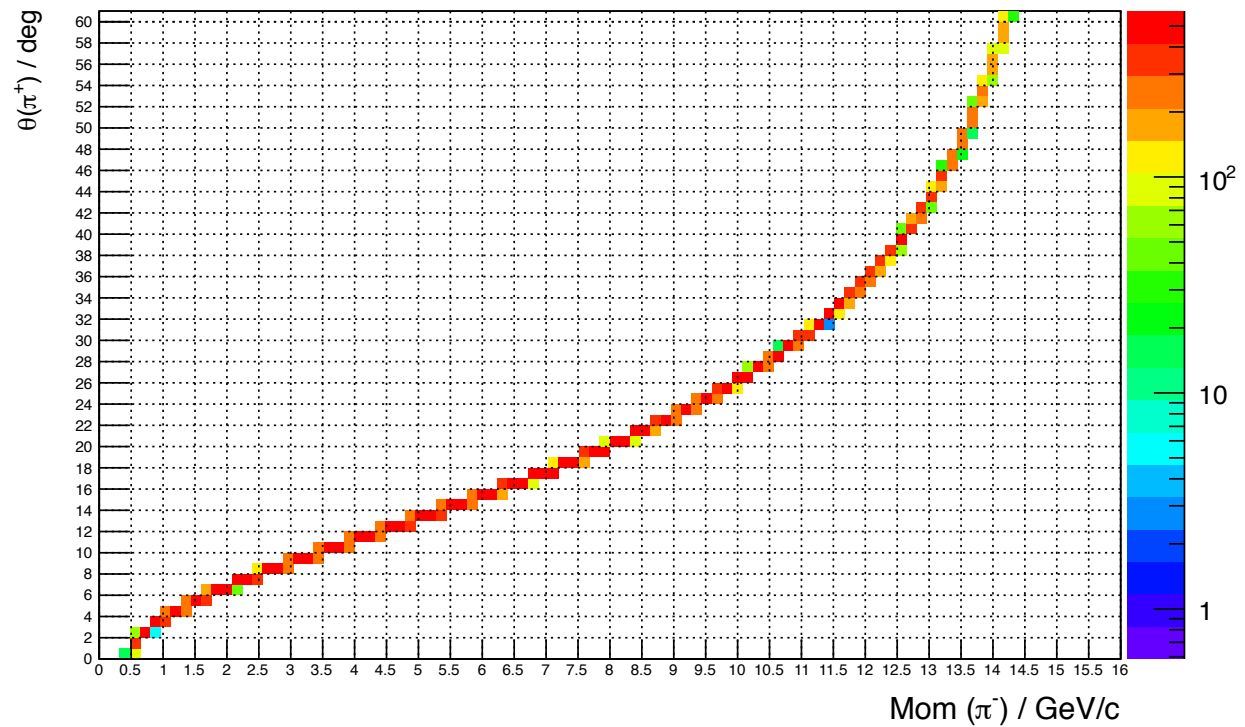
Thanks for you attention
and Merry Christmas



$p\bar{p} \rightarrow \pi^+\pi^-$ vertices (MC mom)



Contribution of the fwd strip wheel with two hits starts at $\theta=25^\circ$
 Below $\sim 17^\circ$ tracks do not see the first two pixel disks



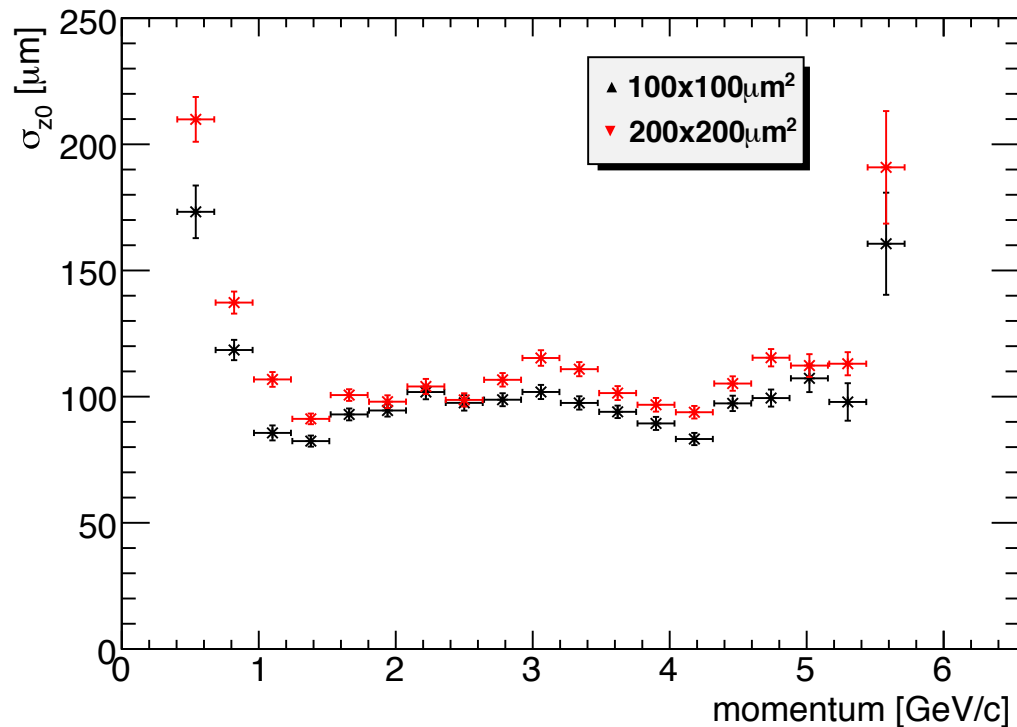
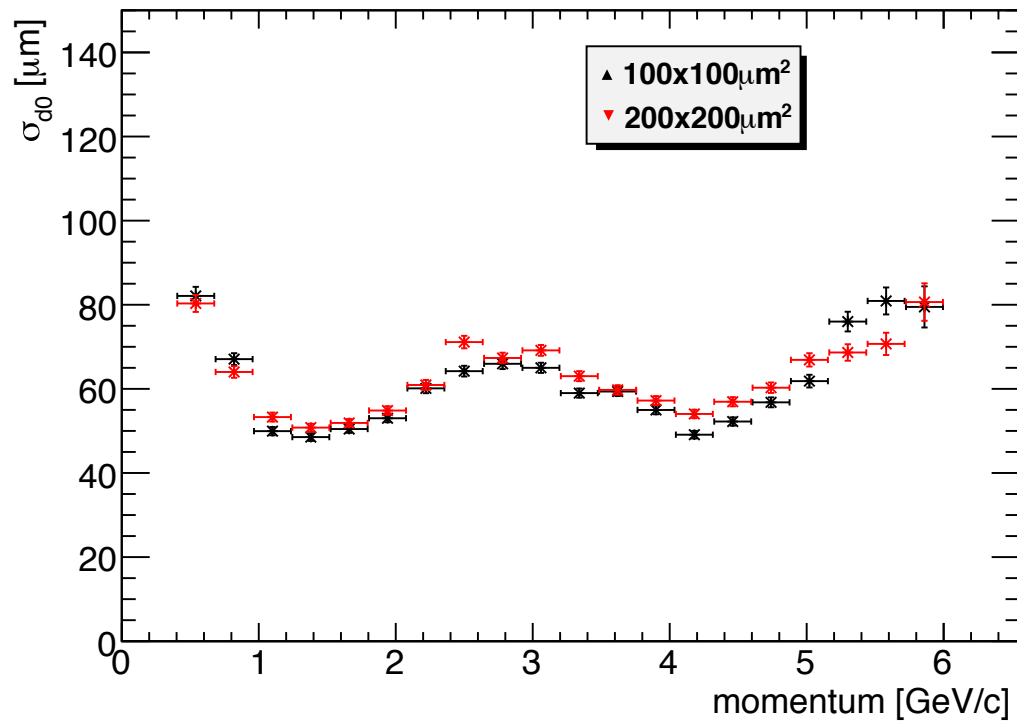


Figure 5.14: Momentum dependence of the vertex resolution transverse (left) and along (right) the beam axis for the leptonic J/ψ decay. Shown are only the resolutions for $100 \times 100 \mu\text{m}^2$ large pixels (black) and $200 \times 200 \mu\text{m}^2$ large pixels (red), respectively. Other variation have been omitted in the figure, which are within the errors identical to the black symbols.

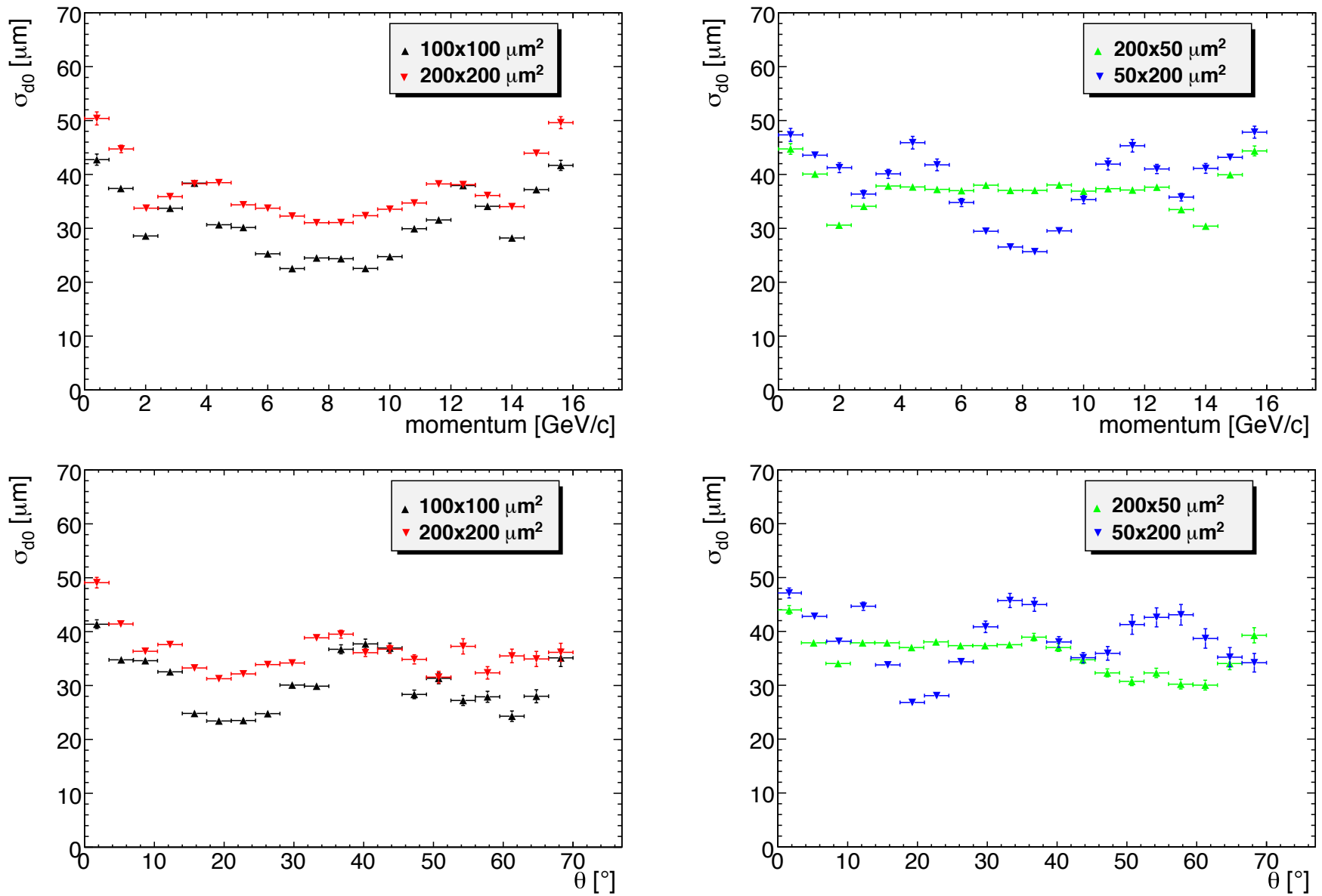


Figure 5.12: Vertex resolution $\sigma(d_0)$ perpendicular to the beam axis for different pixel cell sizes in the hit reconstruction for two-pion vertices from the reaction $\bar{p}p \rightarrow \pi^+\pi^-$ at highest PANDA beam momentum (see text for details).

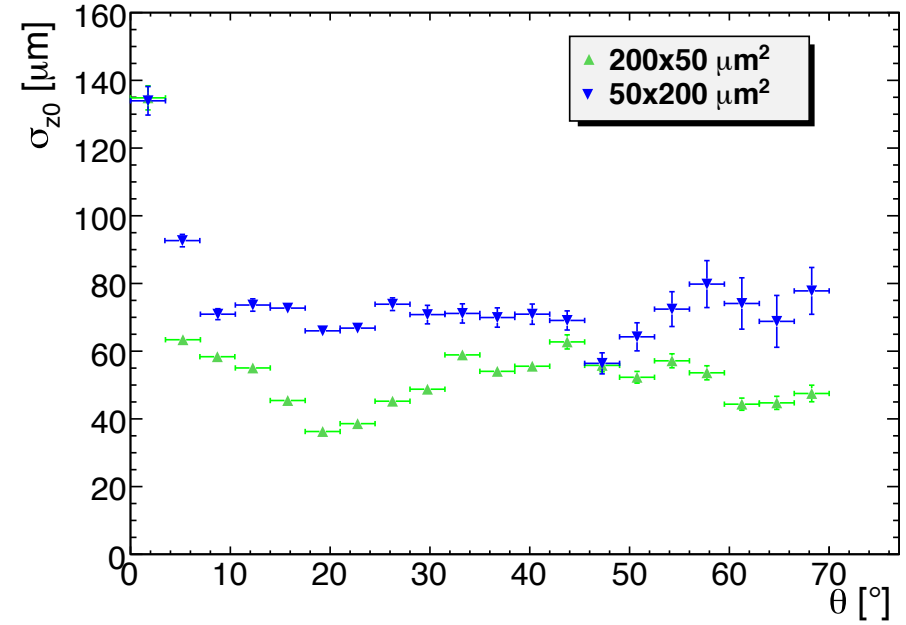
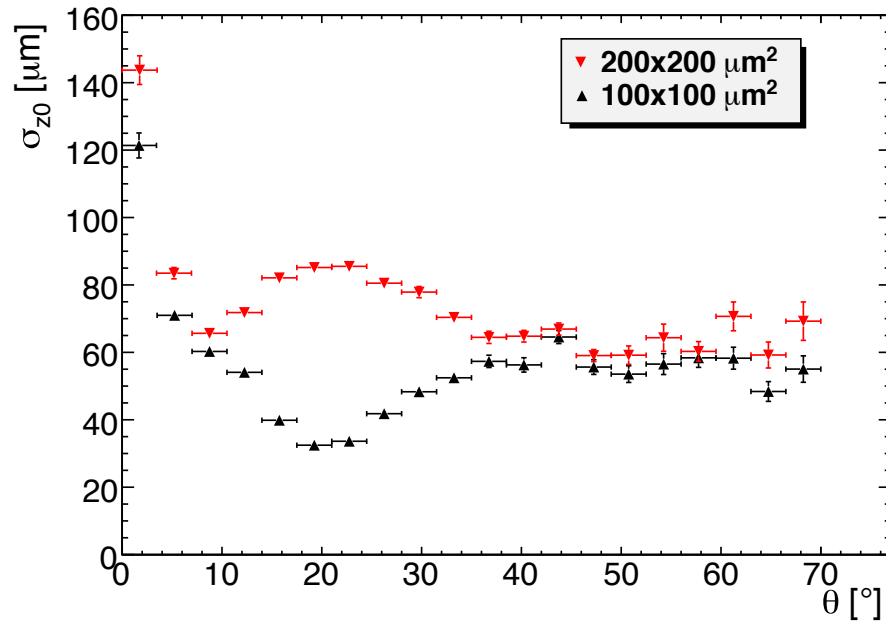
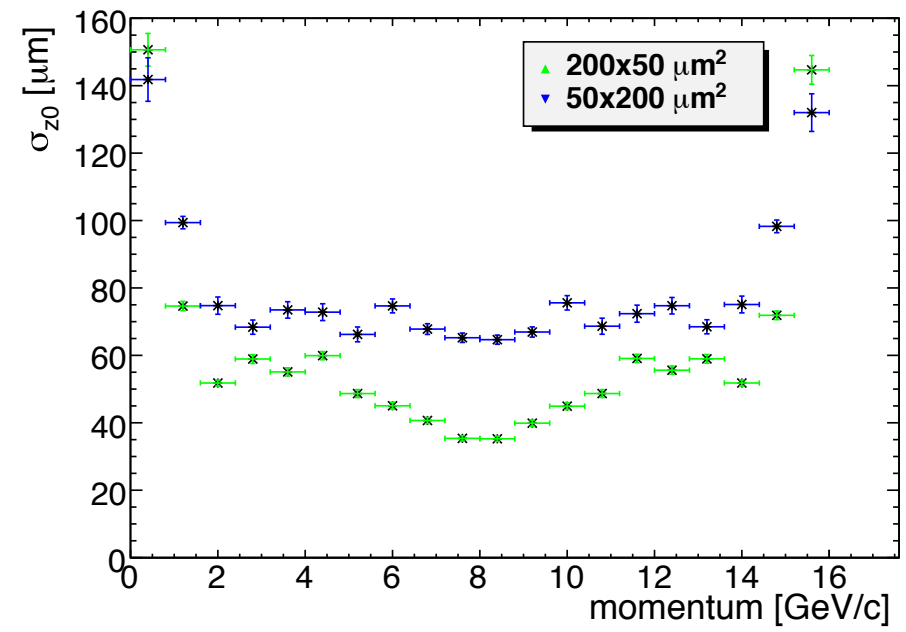
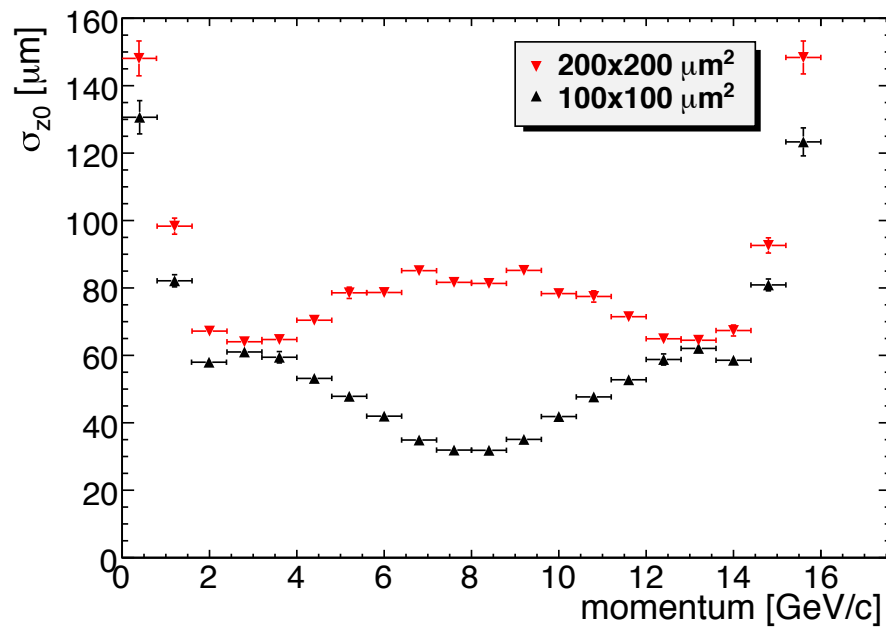


Figure 5.13: Vertex resolution $\sigma(z_0)$ in beam direction for different pixel cell sizes for the reaction $\bar{p}p \rightarrow \pi^+\pi^-$.