SoLID SIDIS DISCUSSION

Tianbo Liu and Zhiwen Zhao

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SoLID SIDIS Impact

Asymmetries

- Statistical uncertainties
- Systematic uncertainties

TMD extraction

- Statistical uncertainties
- Systematic uncertainties
- Theoretical uncertainties, model dependence

e.g.

$$f(x, \boldsymbol{k}_\perp^2, Q) = f(x, Q)\frac{1}{\pi\langle k_\perp^2\rangle}\exp\left(-\frac{\boldsymbol{k}_\perp^2}{\langle k_\perp^2\rangle}\right),$$

$$D(z, \boldsymbol{p}_\perp^2, Q) = D(z, Q)\frac{1}{\pi\langle p_\perp^2\rangle}\exp\left(-\frac{\boldsymbol{p}_\perp^2}{\langle p_\perp^2\rangle}\right)$$

$$F\sim \quad f(x, Q)D(z, Q)\frac{1}{\pi\langle P_{h\perp}^2\rangle}\exp\left(-\frac{\boldsymbol{P}_{h\perp}^2}{\langle P_{h\perp}^2\rangle}\right) \qquad \langle P_{h\perp}^2\rangle = \langle p_\perp^2\rangle + z^2\langle k_\perp^2\rangle$$

Generator

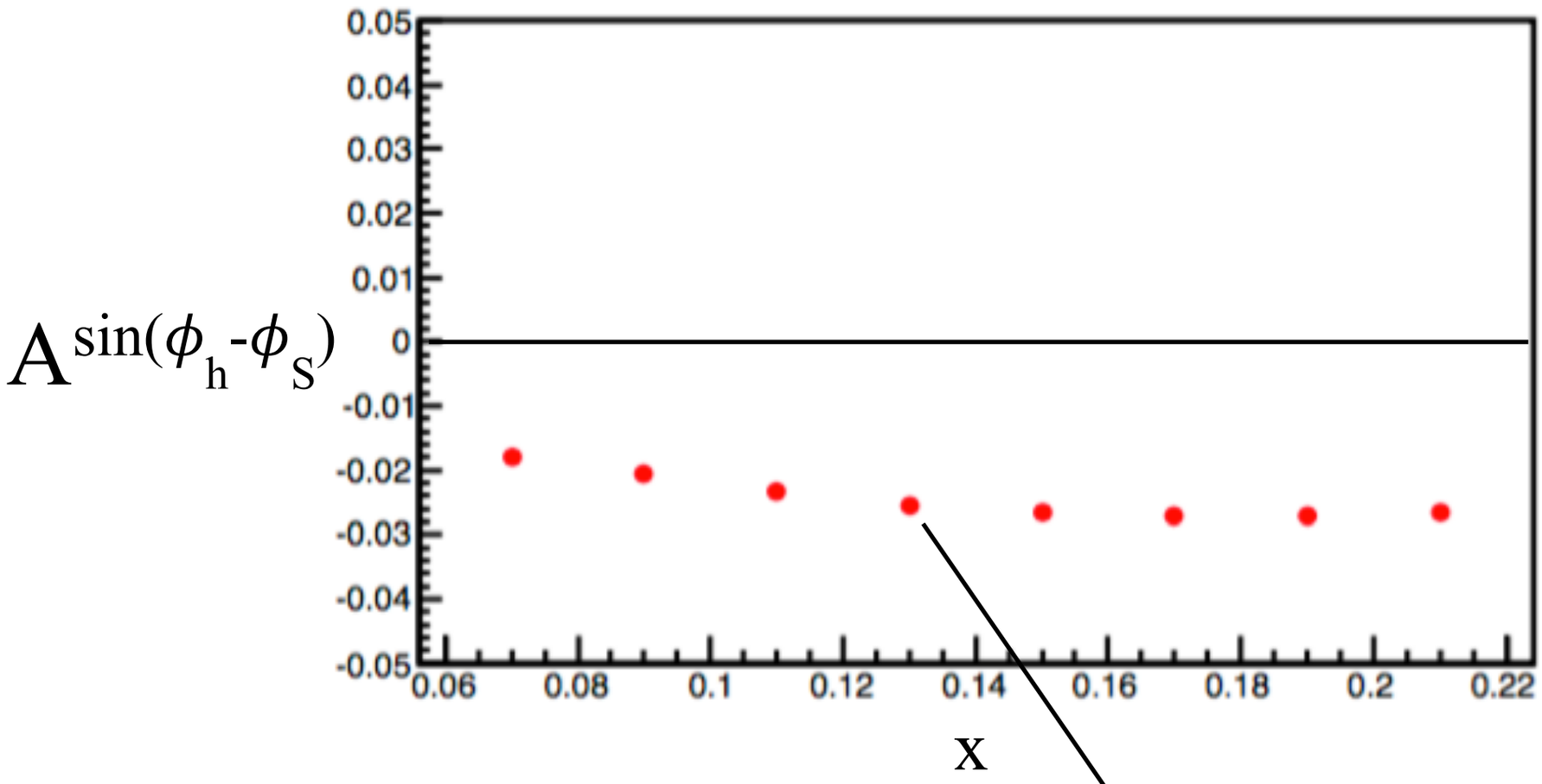
TMD parametrizations

Anselmino et al. 2013 a/b: Transversity, Collins
Anselmino et al. 2009: Sivers
Anselmino et al. 2014: unpolarized f1, D1
Bacchetta et al. 2011: unpolarized f1, D1, Sivers
Barone et al. 2015: unpolarized, Boer-Mulders, Collins
Pretzelosity (almost zero with big errors in current para.)
Longi-transversity, Trans-helicity (no para. included)

Evolution

DGLAP *vs* TMD evolution

Asymmetry: example



^{3}He

transverse polarized

π^+

Q^2: [1, 2]

z:[0.40,0.45]

P_T:[0.2,0.4]

A=-0.02552±0.00014±0.00077
(stat.) (^{3}He polarization)

Systematic uncertainties

Sources	Type	Collins π^+	Collins π^-	Sivers π^+	Sivers π^-
Raw asymmetry	absolute	1.1 E-3	1.1 E-3	1.1 E-3	1.1 E-3
Background Subtraction	relative	1.0%	1.0%	1.0%	1.0%
Detection resolution	relative	negligible	negligible	negligible	negligible
Nuclear Effects	relative	4% +1.2%	4% + 1.2%	5% + 1.2%	5% + 1.2%
Diffractive Vector Meson	relative	3%	2%	3%	2%
Radiative Correction	relative	2%	2%	2%	2%
^{3}He Polarization	relative	3% +0.5%	3% + 0.5%	3% +0.5%	3% + 0.5%
Total	relative	6.4%	6.0%	7.0 %	6.7%
	absolute	1.1E-3	1.1 E-3	1.1 E-3	1.1 E-3

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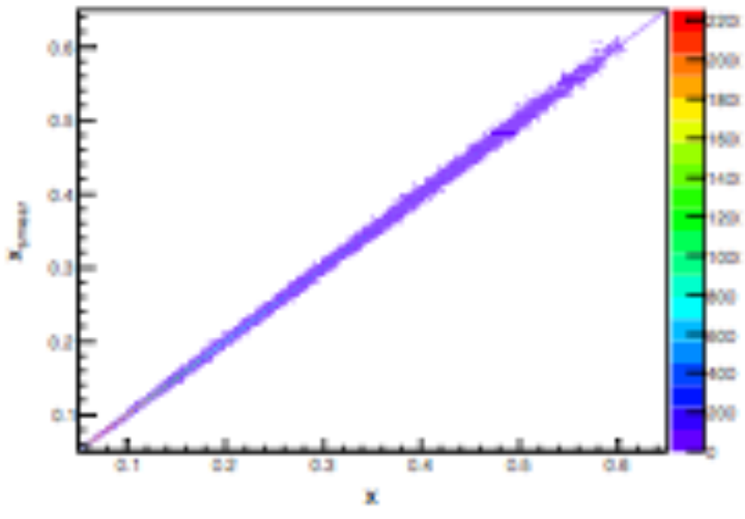
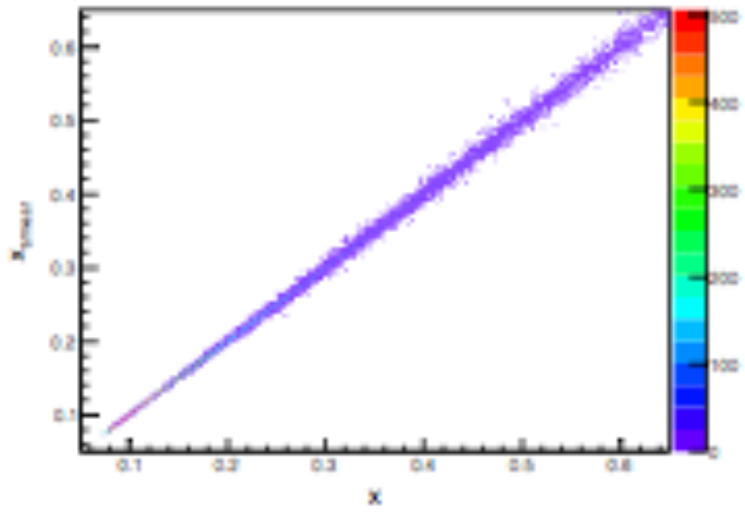
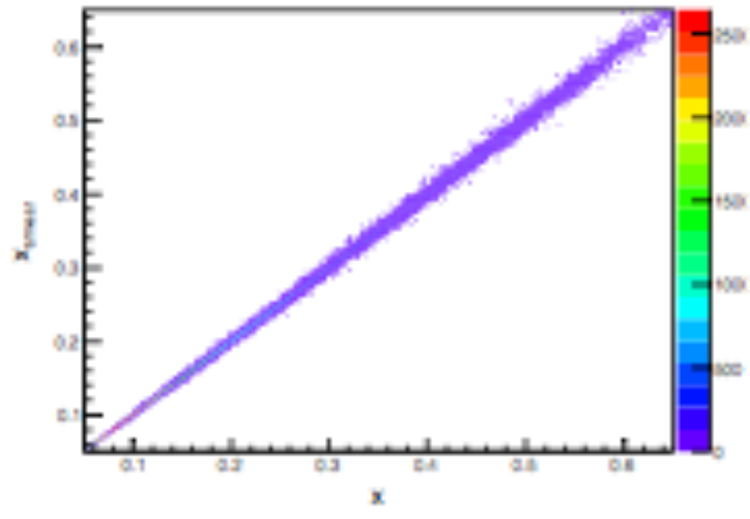
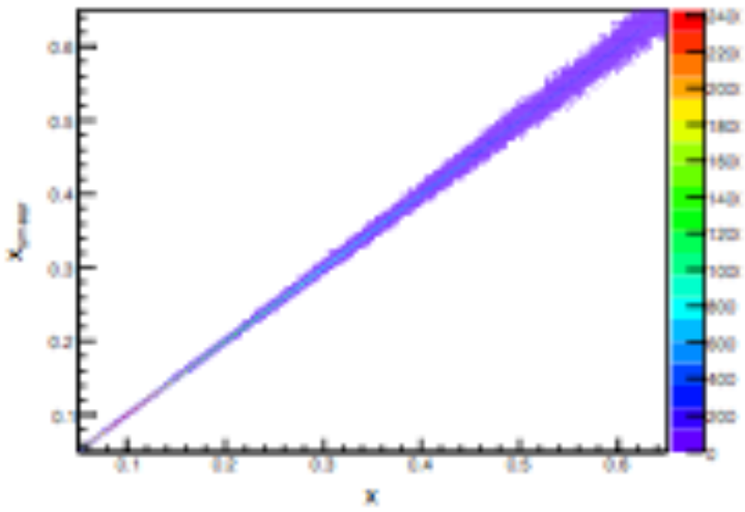
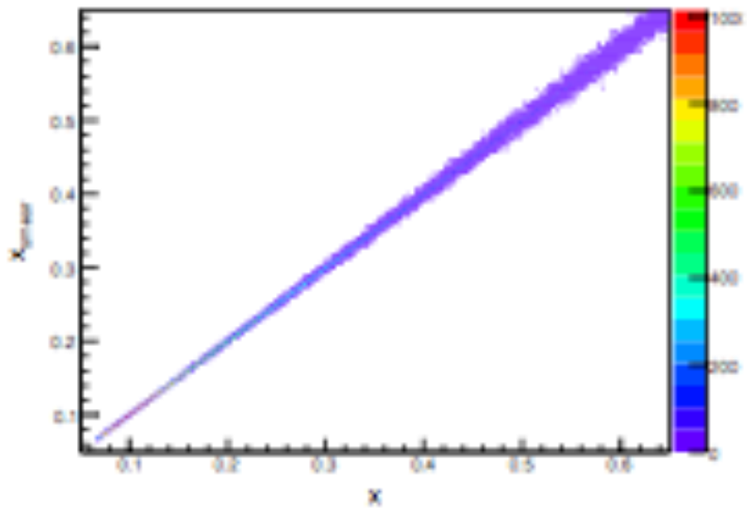
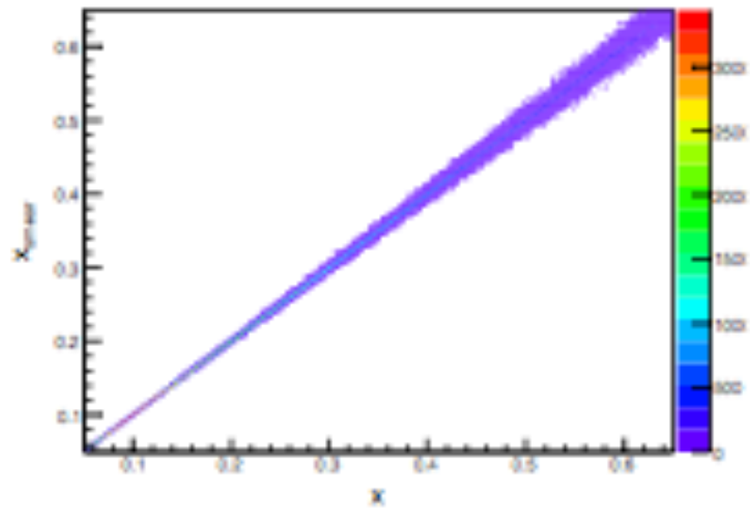
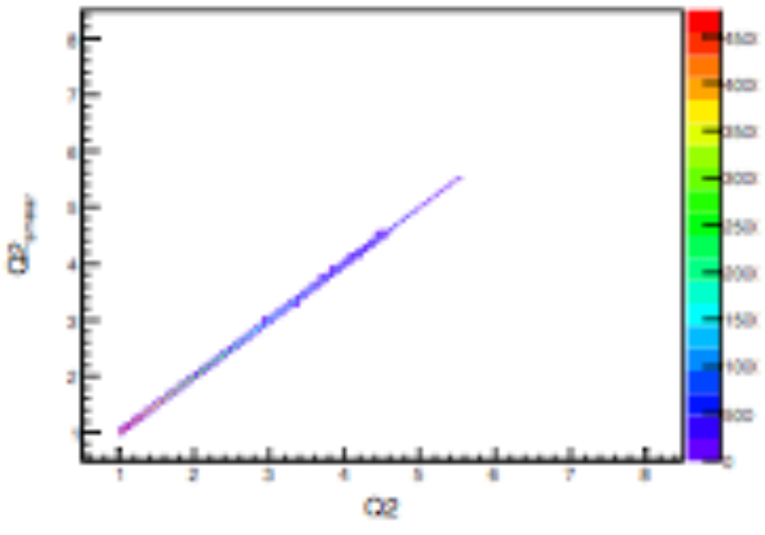
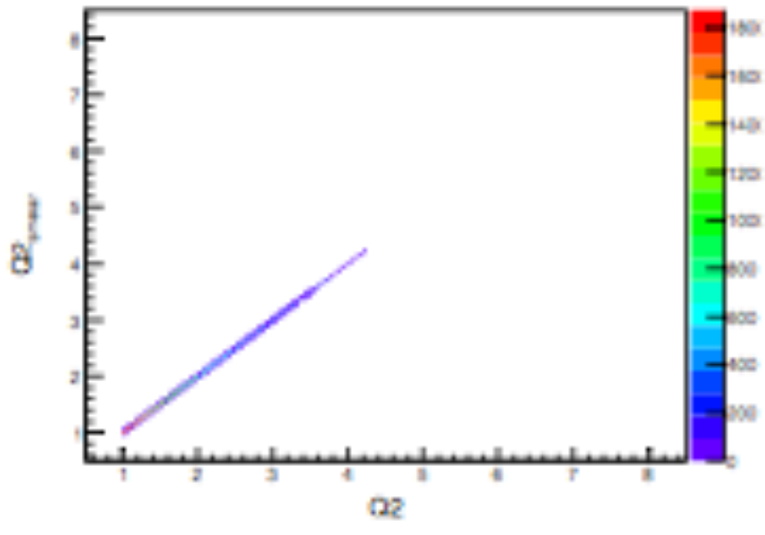
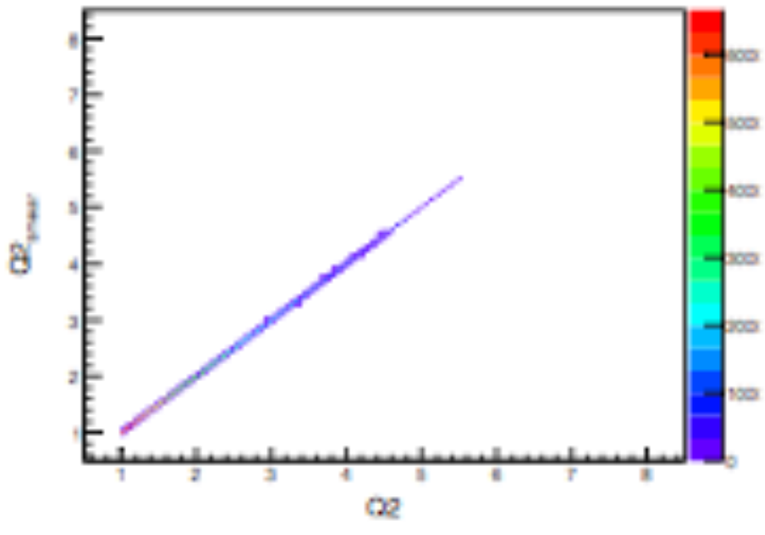
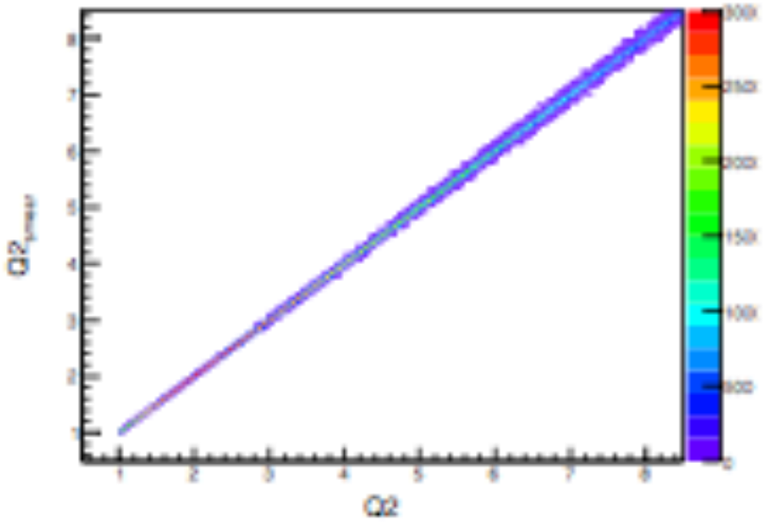
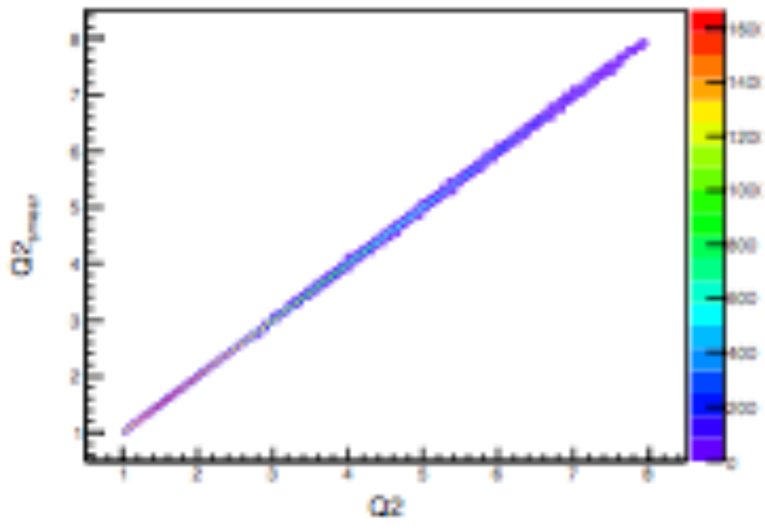
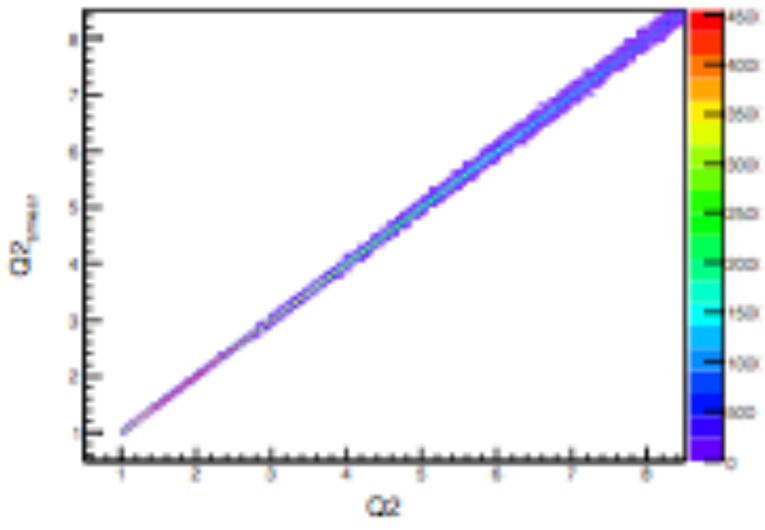
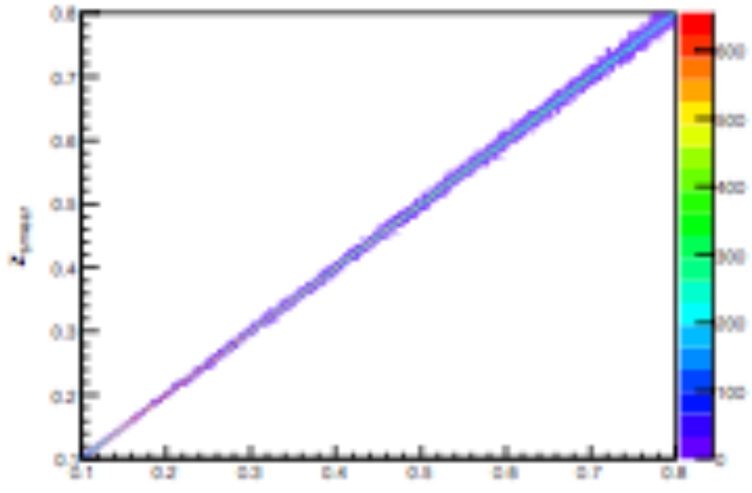
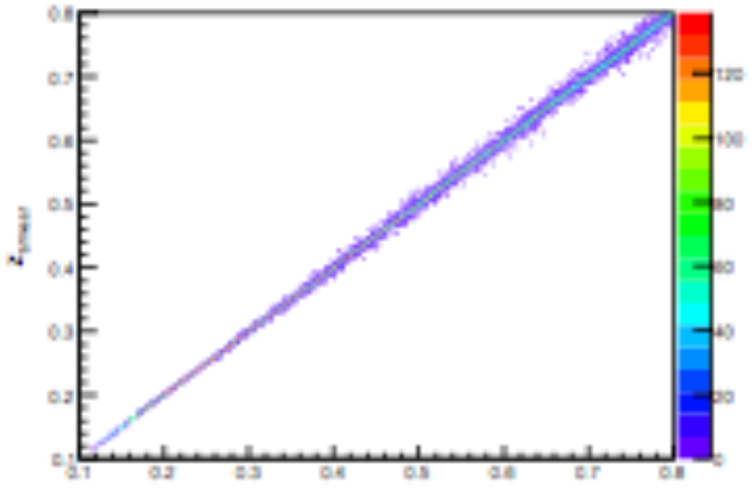
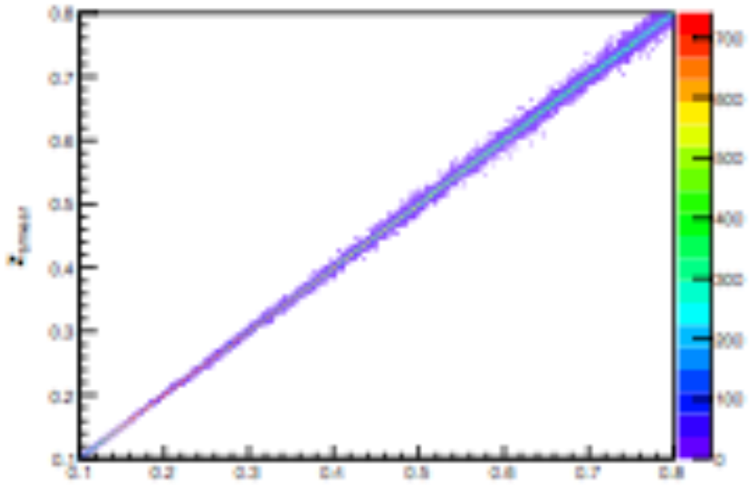
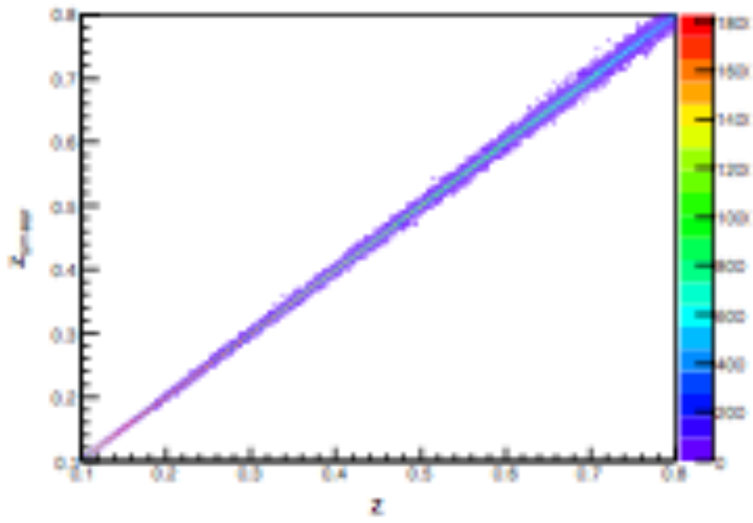
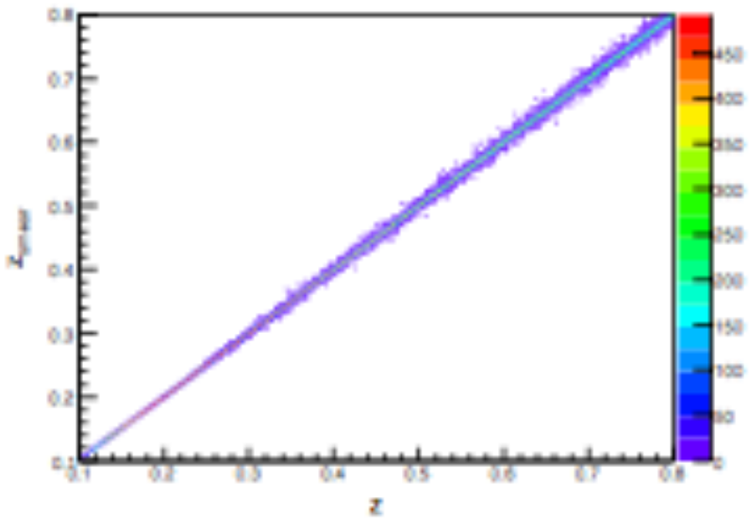
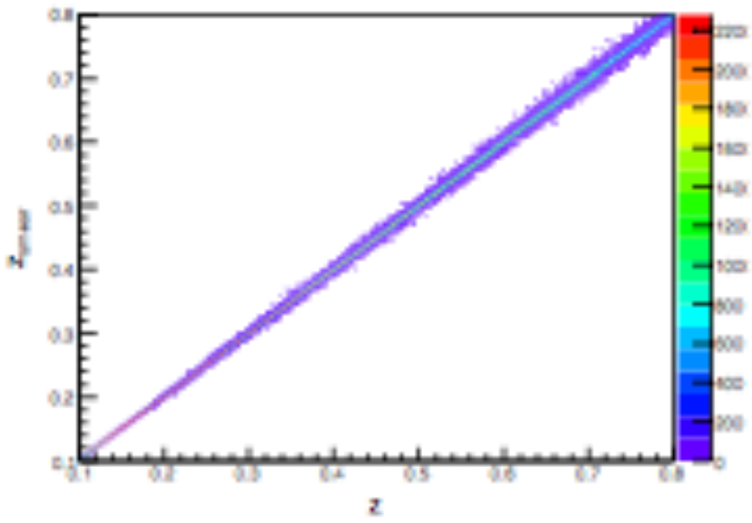
Resolution: x

	11 GeV	8.8 GeV	8.8 & 11 GeV
FA:			
LA:			

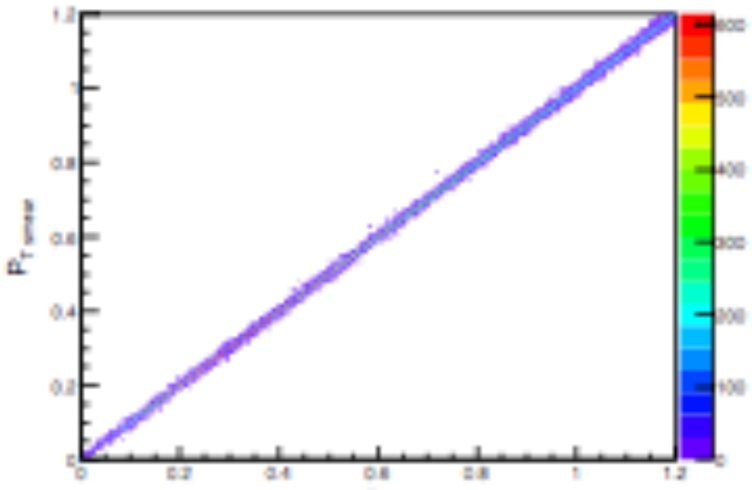
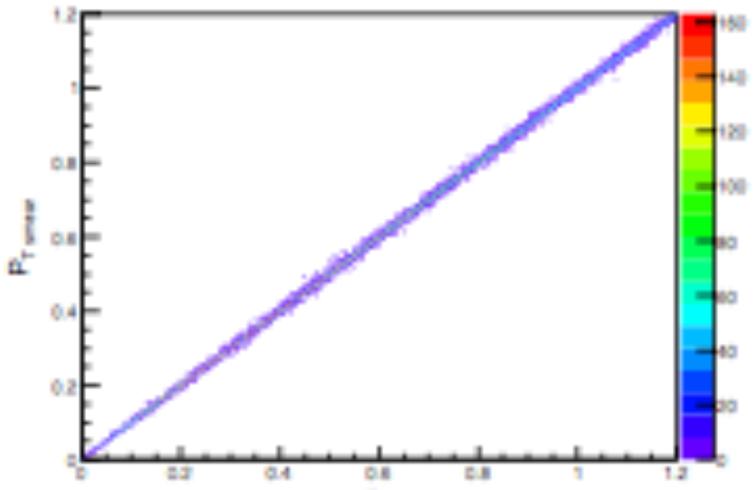
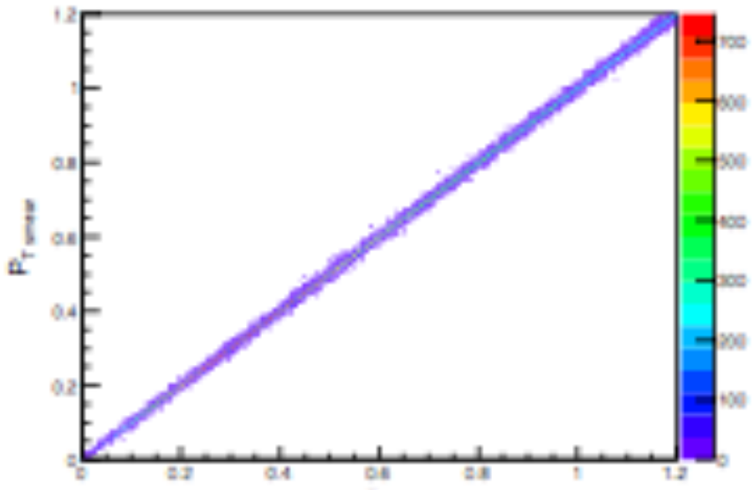
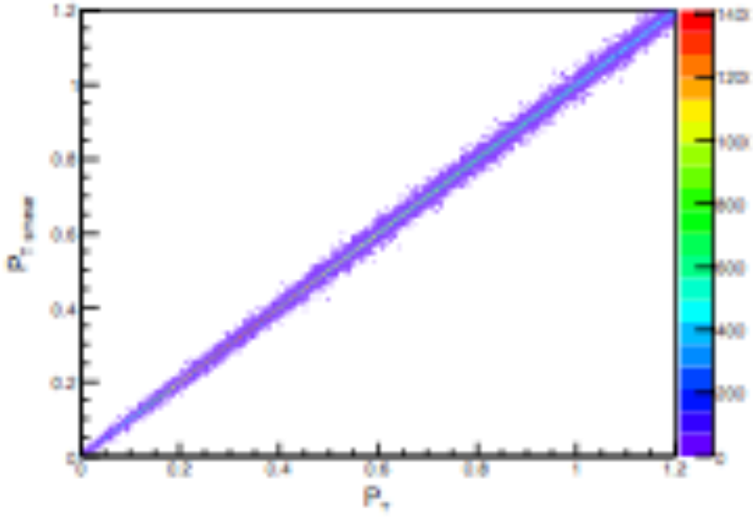
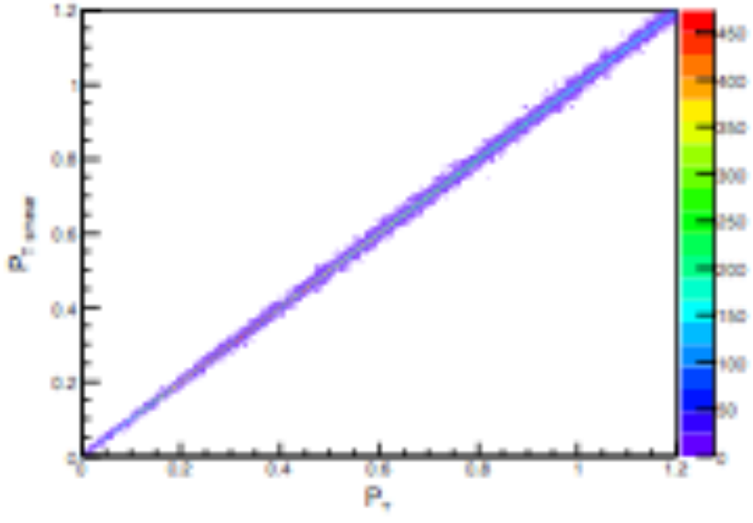
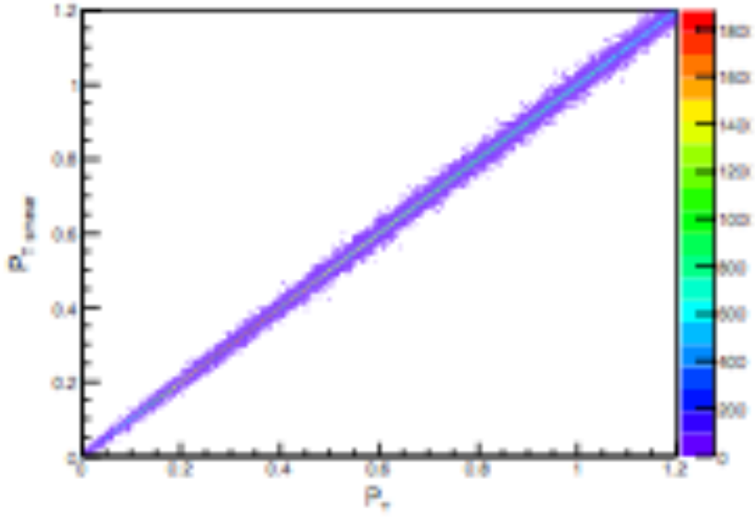
Resolution: Q^2

	11 GeV	8.8 GeV	8.8 & 11 GeV
FA:			
LA:			

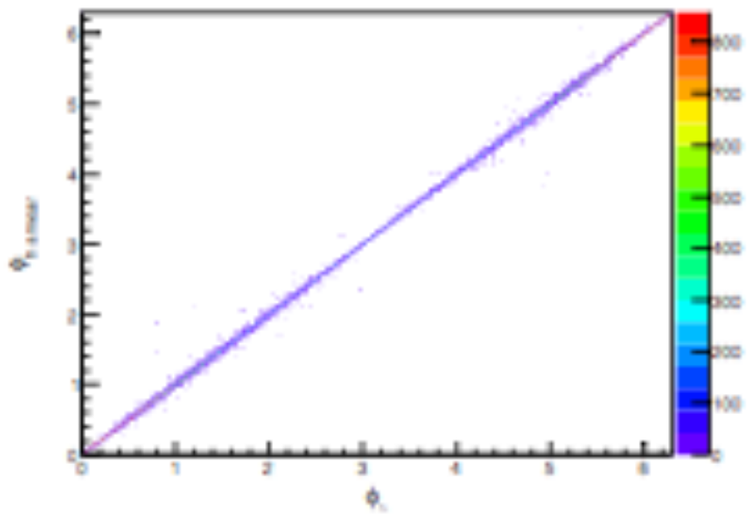
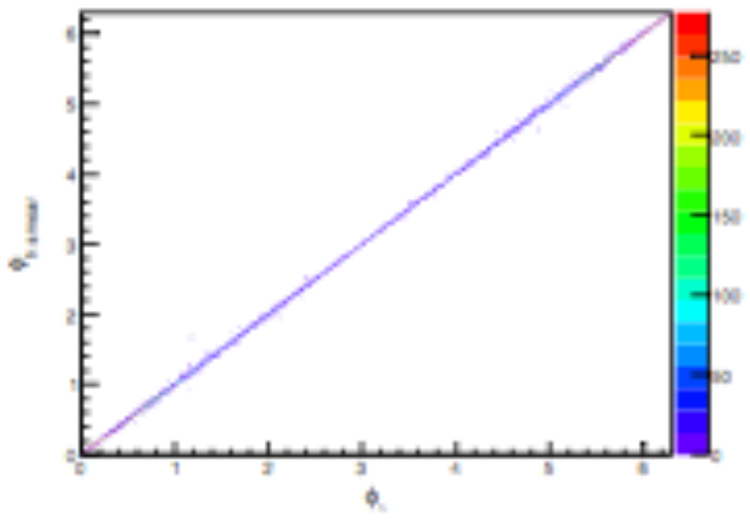
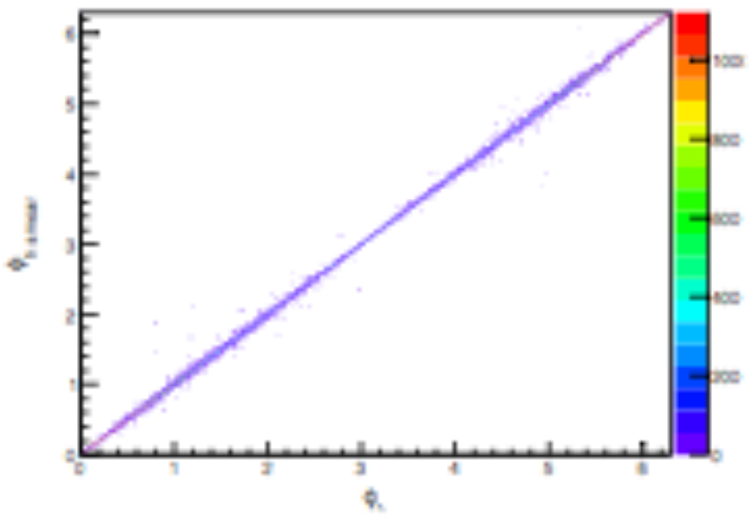
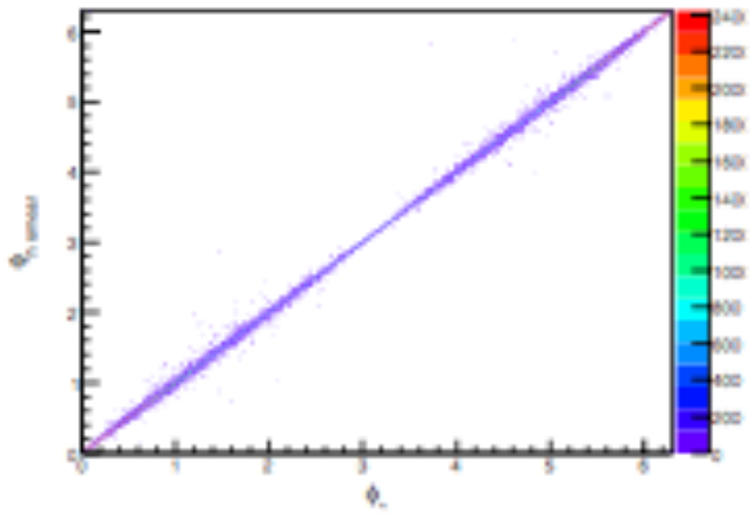
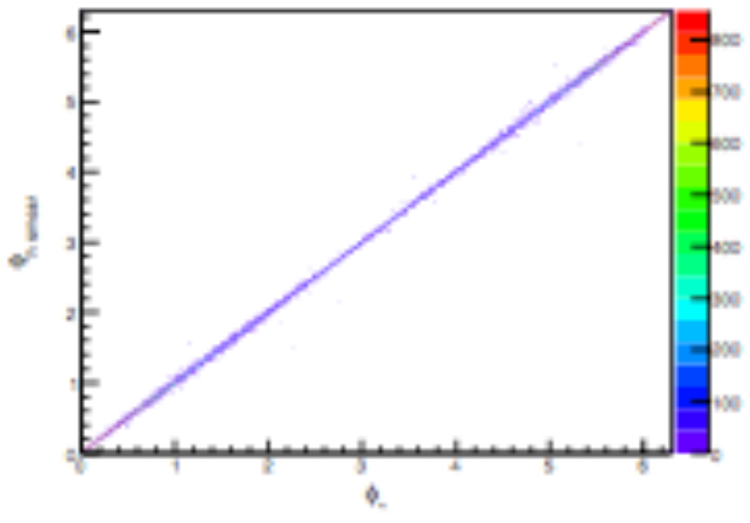
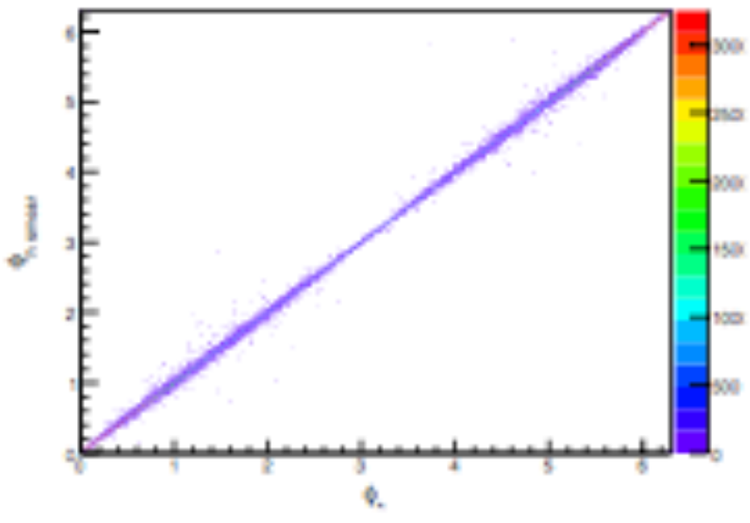
Resolution: z

	11 GeV	8.8 GeV	8.8 & 11 GeV
FA:			
LA:			

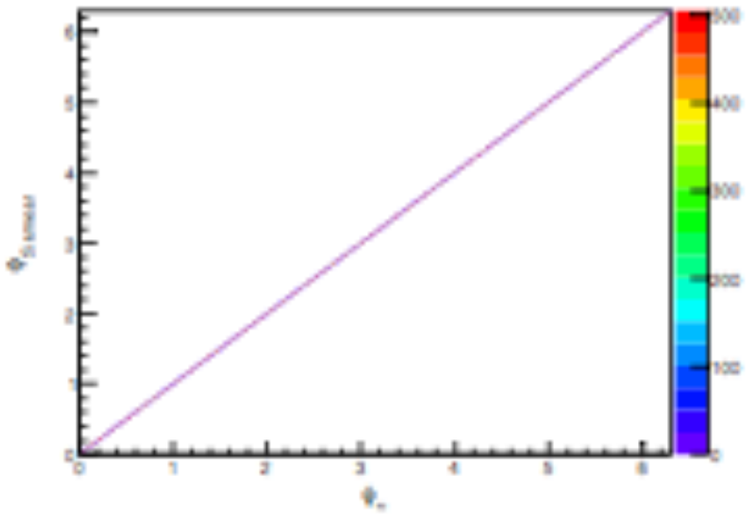
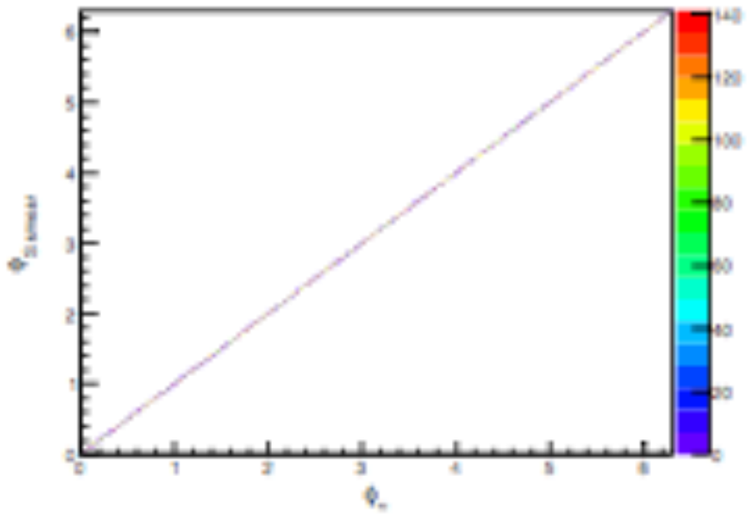
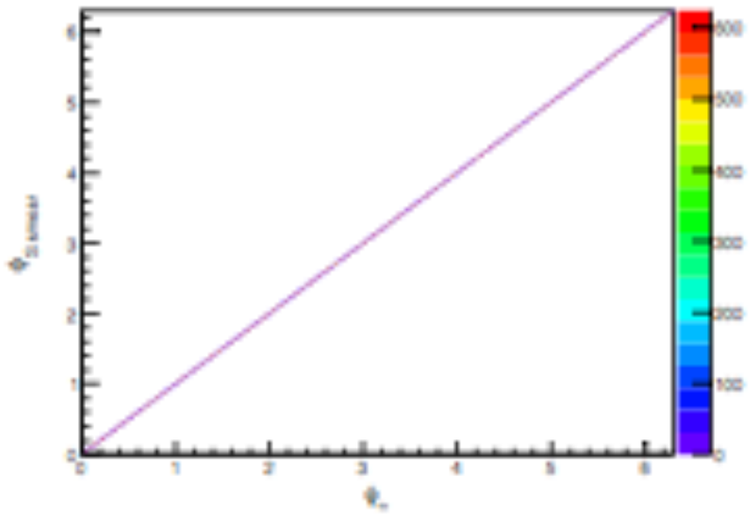
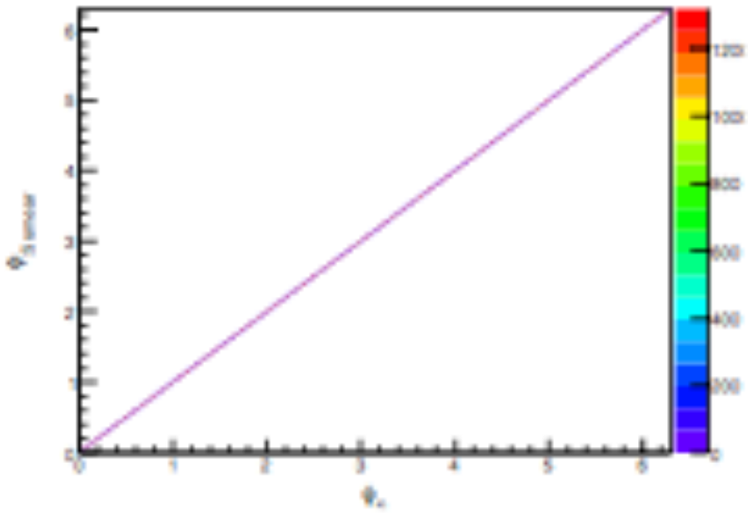
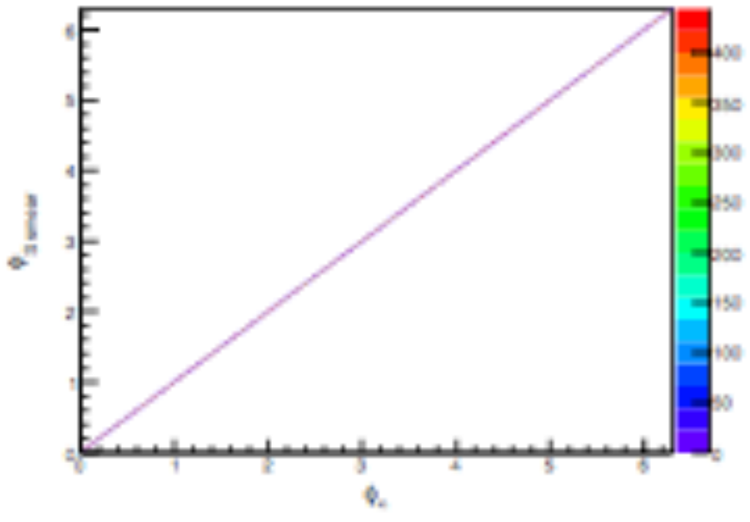
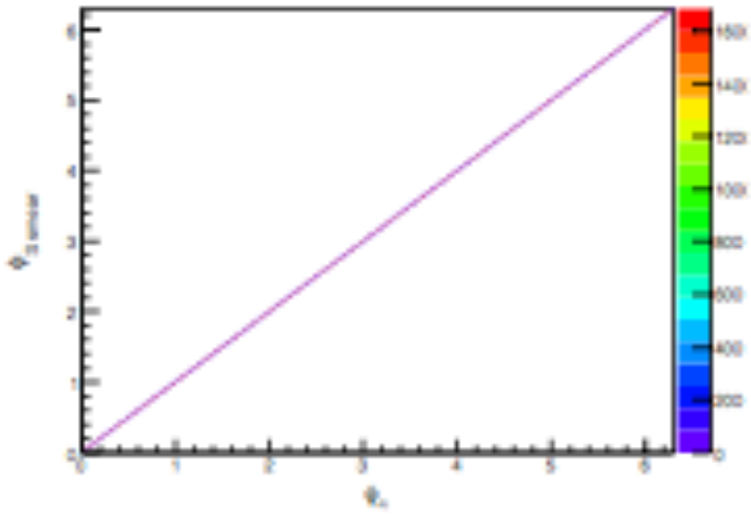
Resolution: P_T

	11 GeV	8.8 GeV	8.8 & 11 GeV
FA:			
LA:			

Resolution: ϕ_h

	11 GeV	8.8 GeV	8.8 & 11 GeV
FA:			
LA:			

Resolution: ϕ_S

	11 GeV	8.8 GeV	8.8 & 11 GeV
FA:			
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