Silicon Vertex Detector Upgrade
Bjorken-X Coverage

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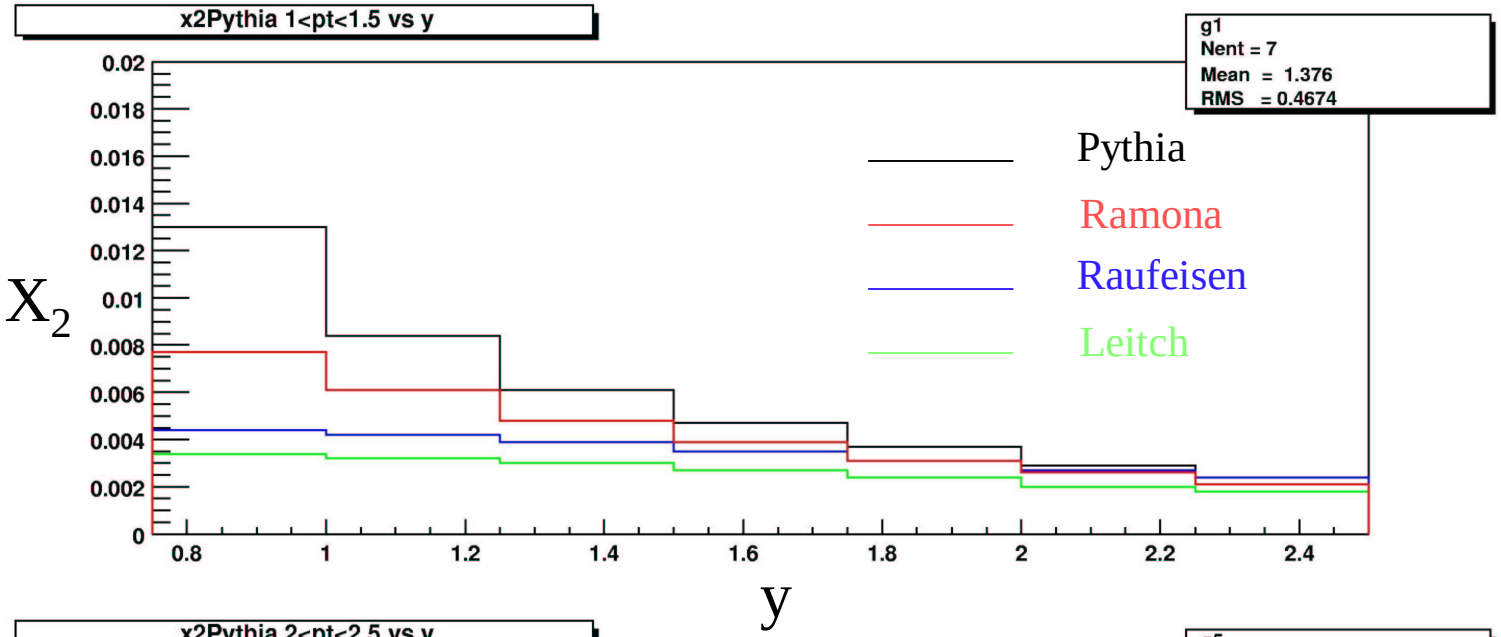
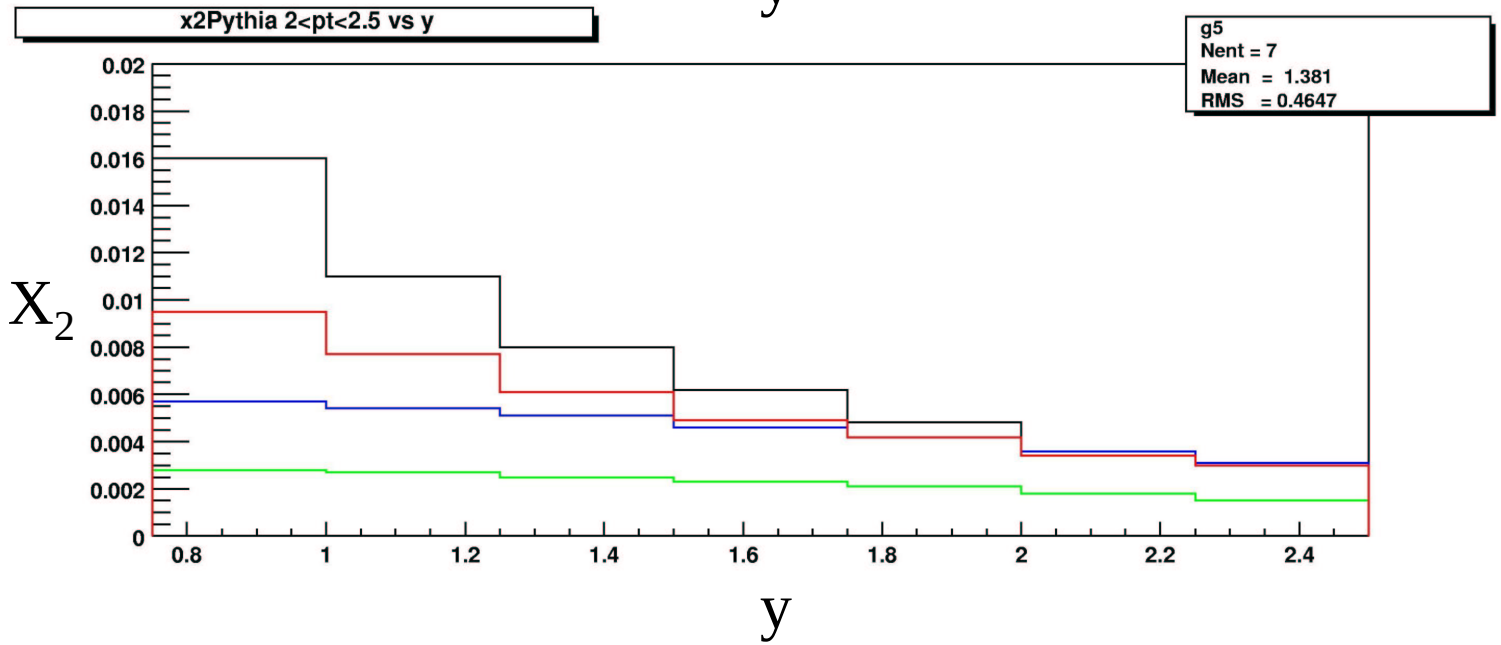
Outline

- J/ψ in central and muon arms
- D→ μ + X
- B→ J/ ψ + X in muon arms

J/ψ in muon arms

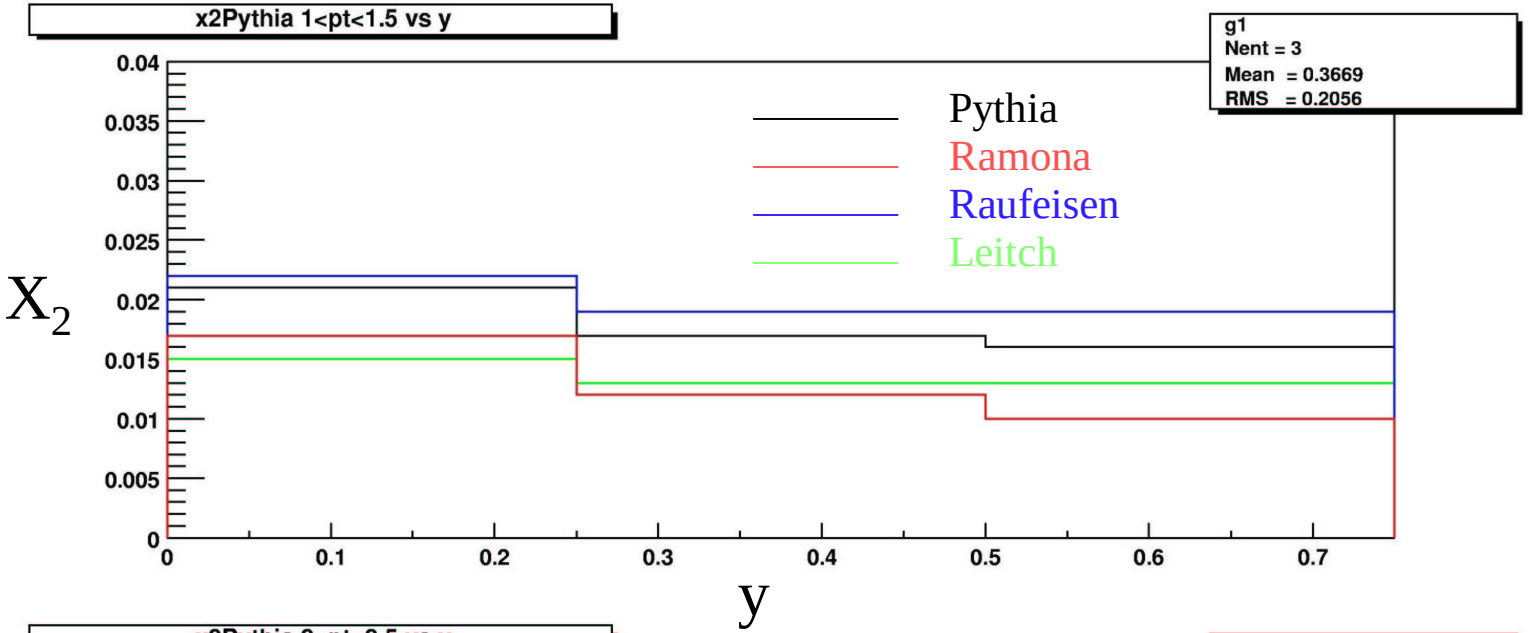


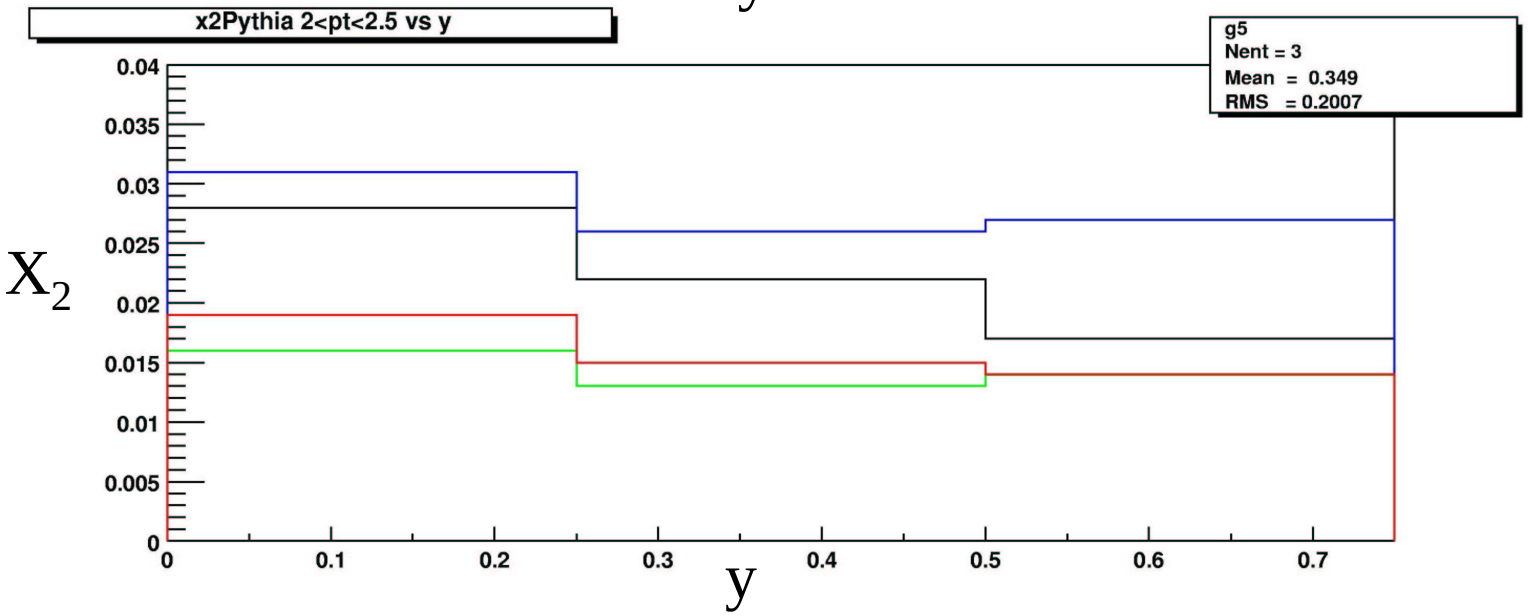


J/ψ in muon arms

- X_2 values computed from J/ψ kinematics (Leitch and Raufeisen curves) underestimate actual X_2, especially at low rapidity (large X_2).
- Choice of production model is important, PYTHIA and CEM disagree by up to 40% at low rapidity.
- Using PYTHIA values for convenience, may want to consider COM for future.

J/ψ in central arms

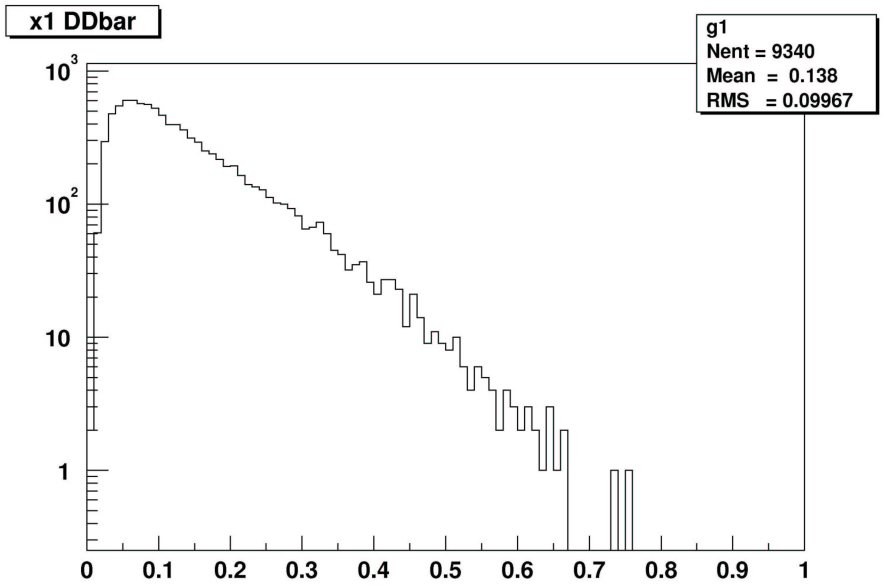




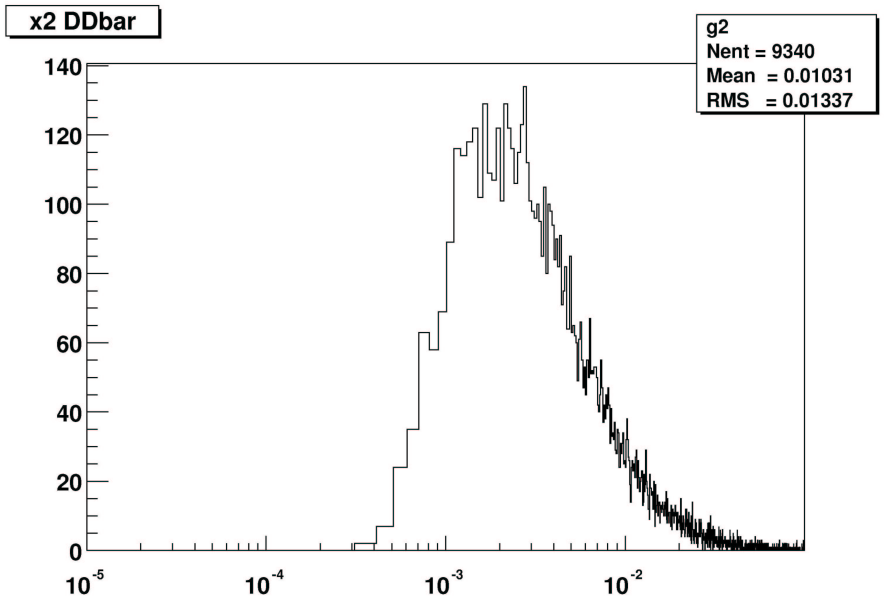
D→ μ + X

Raw X_1 and X_2 values for events with one accepted muon

Appears to have large gluon X_1 and X_2 coverage



X_1 gluon

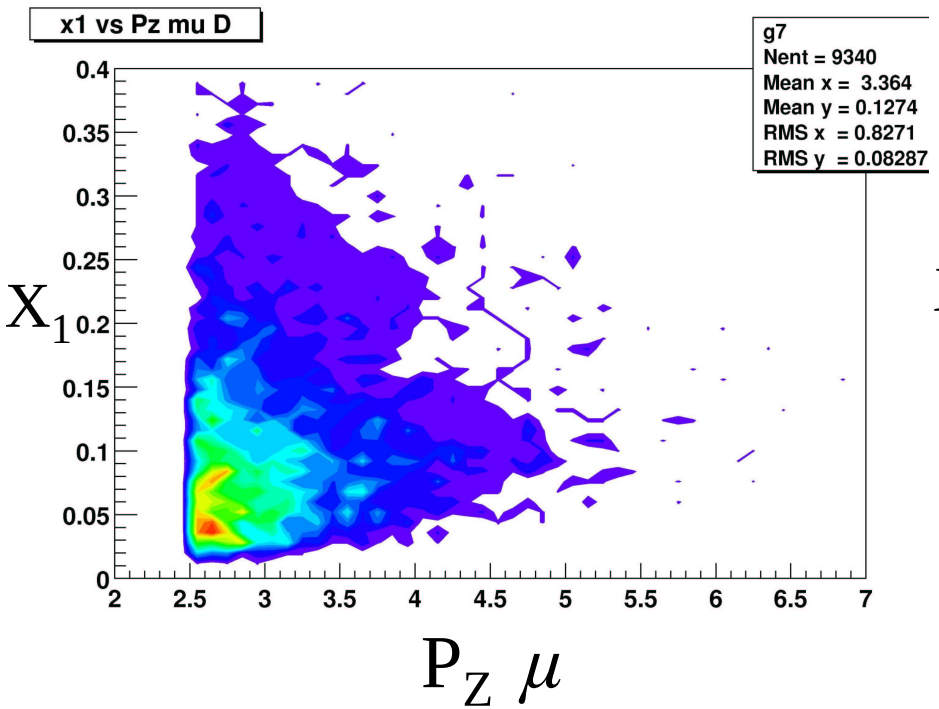


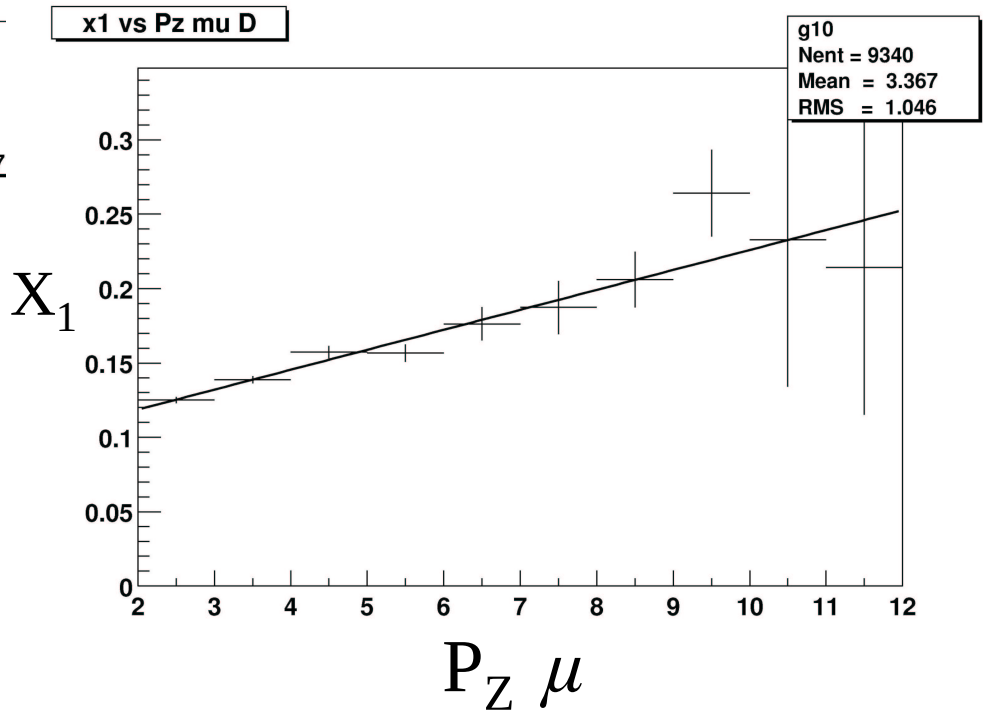
X_2 gluon

D→ μ + X

Gluon X_1 range from correlation with P_Z of μ

~0.13 < ave X_1 < ~0.22, m.p. X_1 ~2X smaller



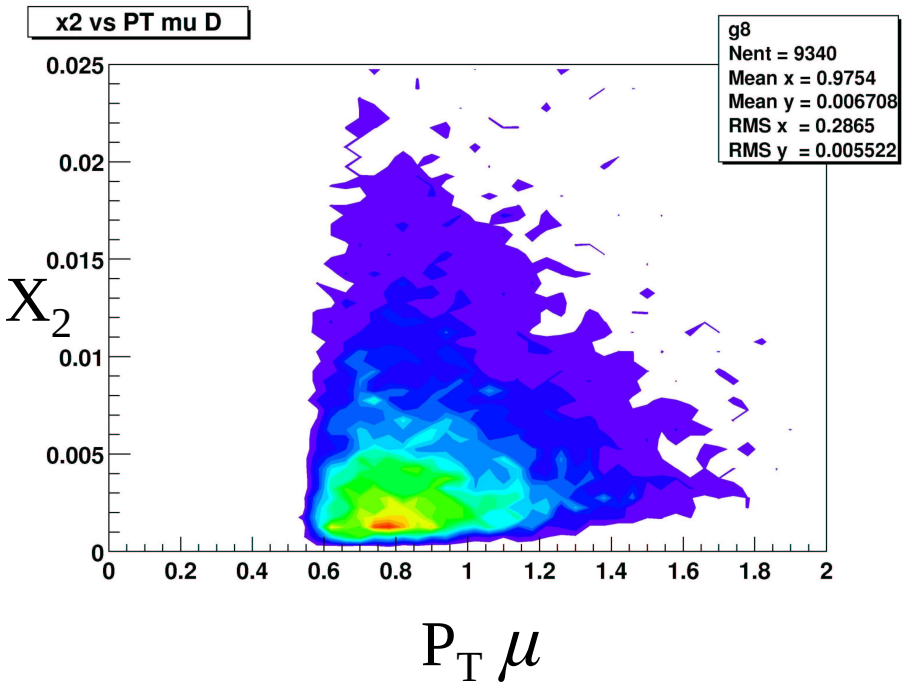


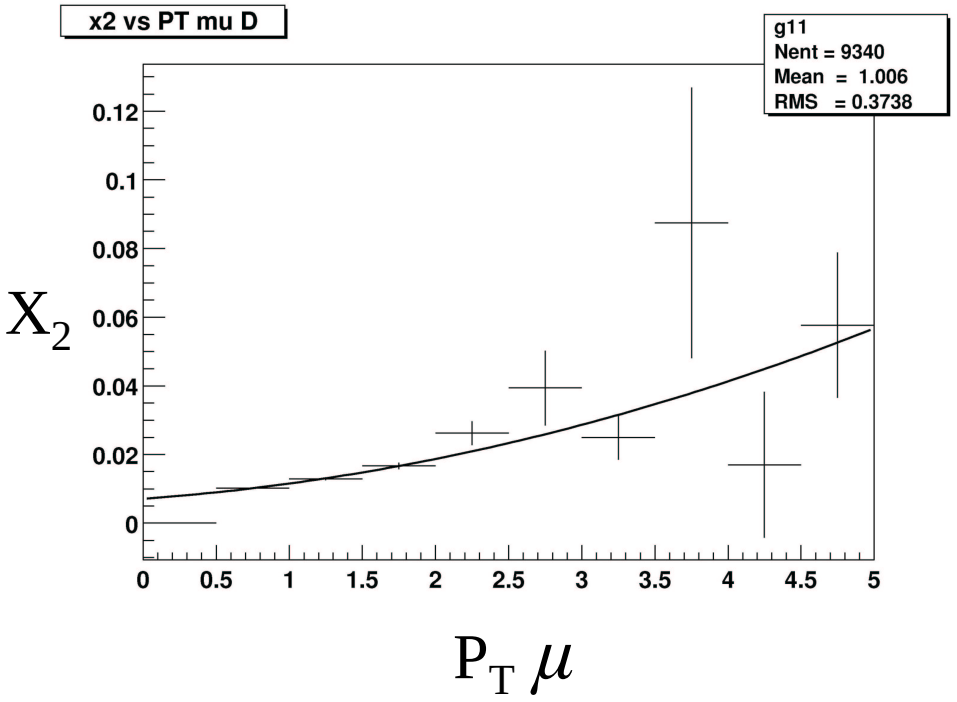
Weak correlation between X_1 and P_Z limits X_1 coverage

D→ μ + X

X_2 range from correlation with P_T of μ

~0.01 < ave X_2 < ~0.04, m.p. X_2 much lower

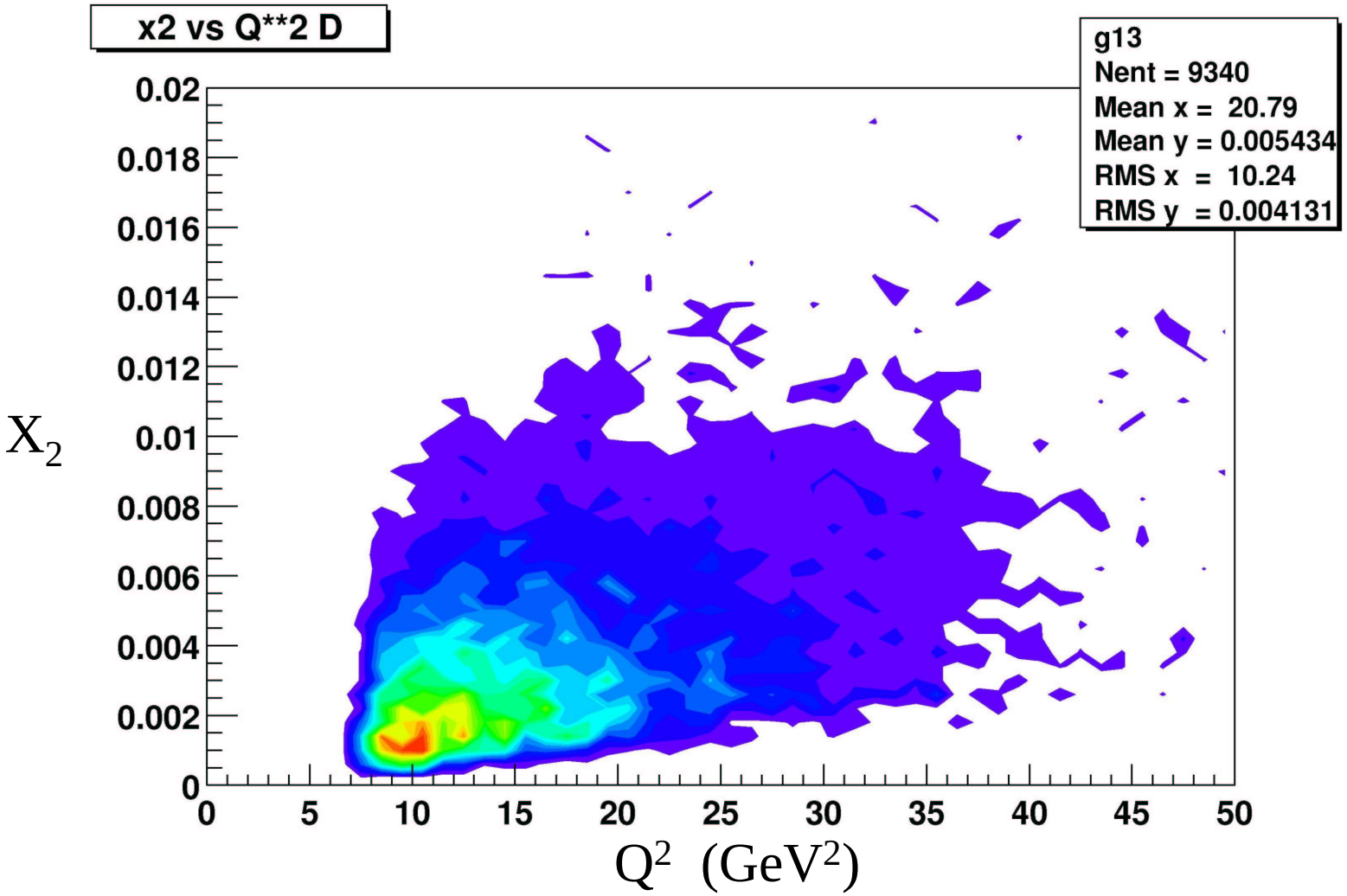




Weak correlation between X_2 and P_T limits X_2 coverage

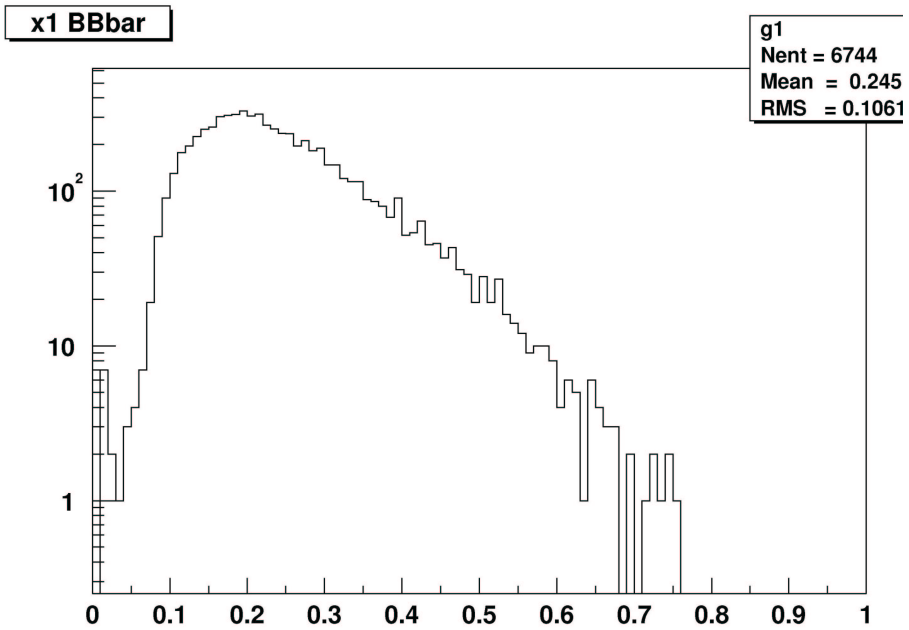
D→ μ + X

Correlation between X_2 and Q^2

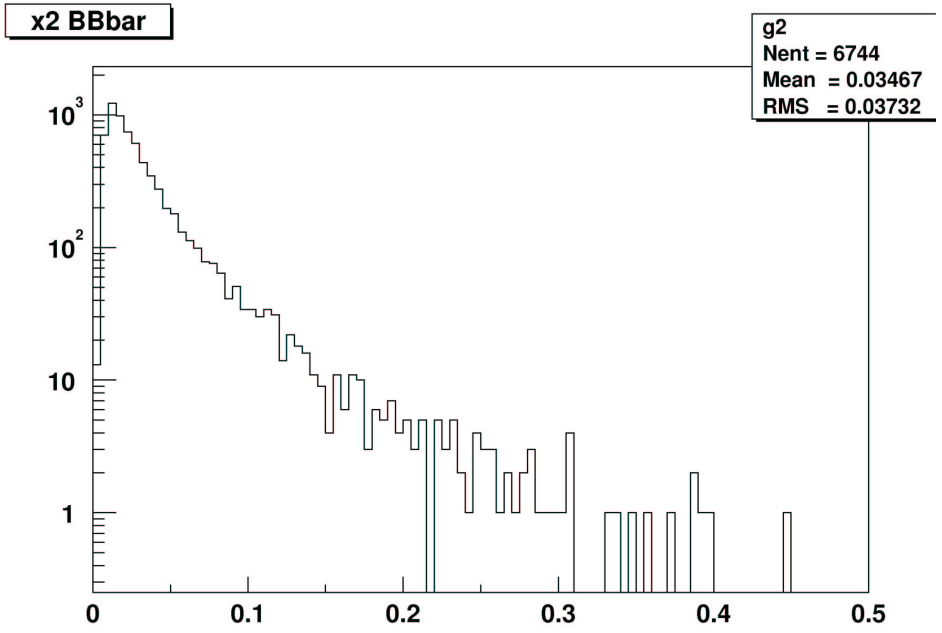


B→ J/ ψ + X with muon arms

Raw X_1 and X_2 values for events with accepted J/ψ



X_1

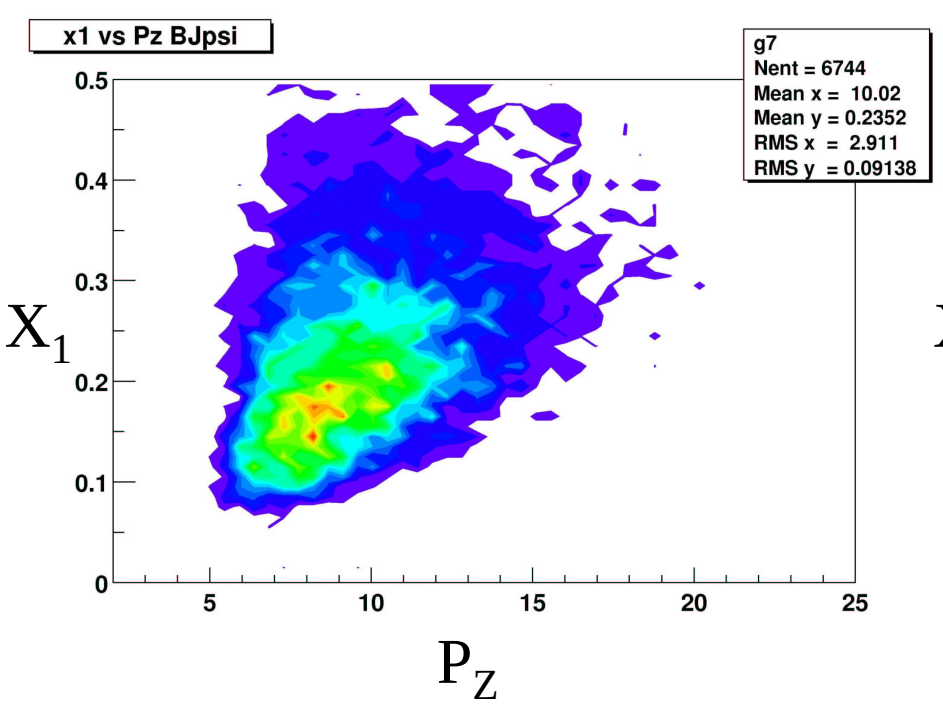


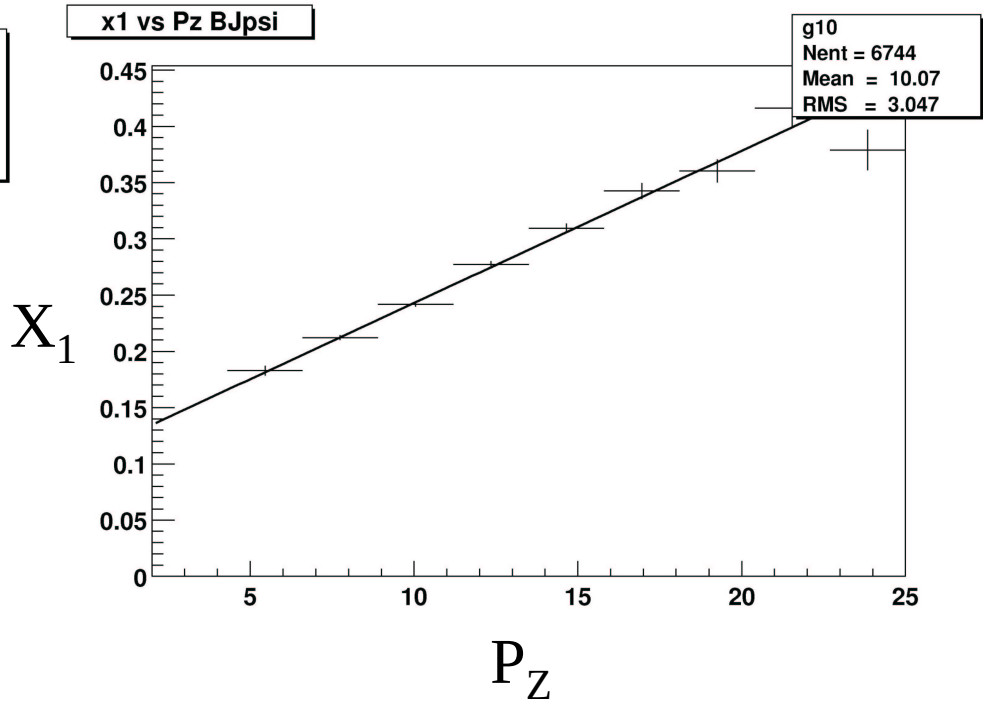
X_2

B→ J/ ψ + X

Gluon X_1 range from correlation with P_Z of J/μ

~0.18 < ave X_1 < ~0.40, m.p. X_1 slightly smaller

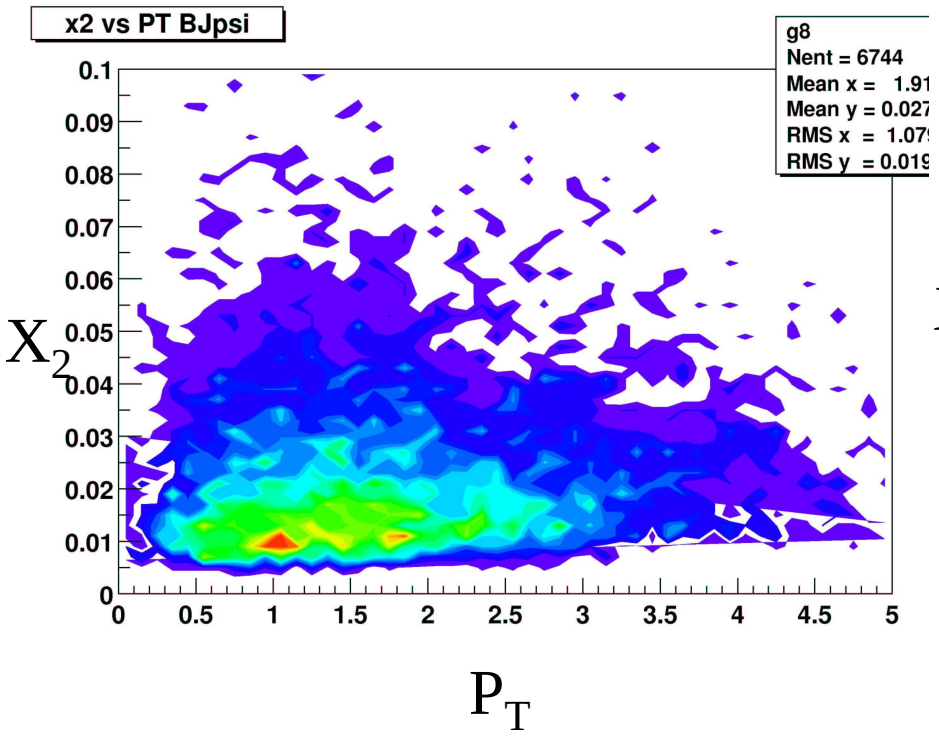


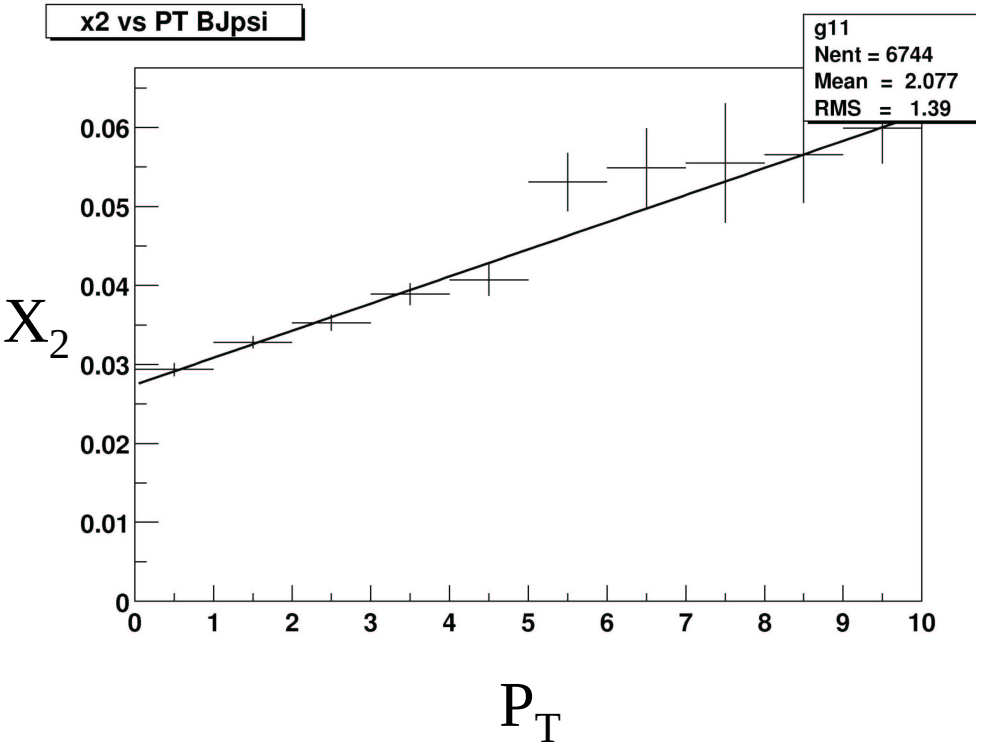


B→ J/ ψ + X

Gluon X_2 range from correlation with P_T of J/μ

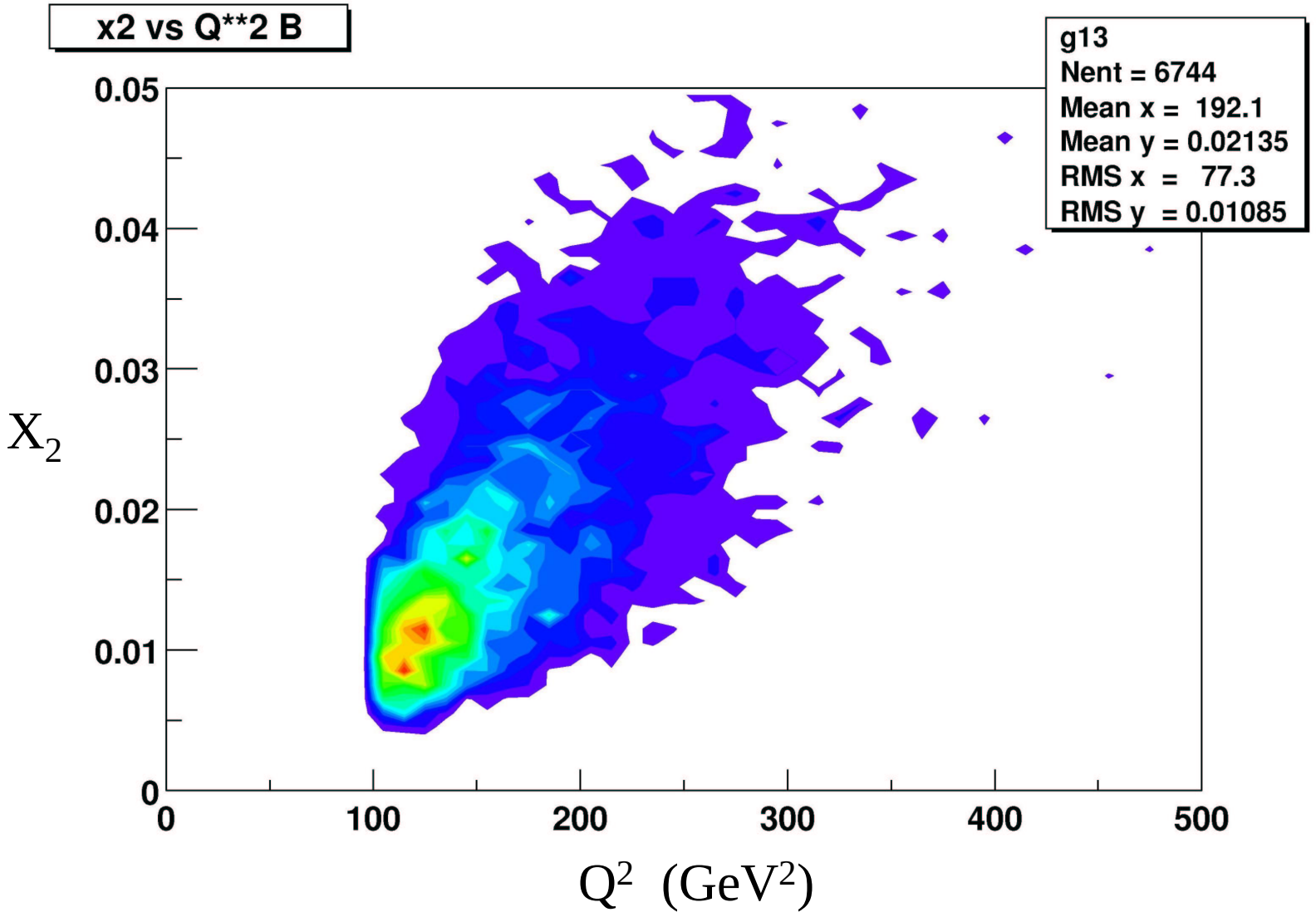
~0.03 < ave X_2 < ~0.06, m.p. X_2 much lower





B→ J/ ψ + X

Correlation between X_2 and Q^2



Summary of D and B Decays using the muon arms

- X_1 and X_2 can be indirectly determined from the transverse and longitudinal momentum of detected muons.
- Significant differences exist between mean and most probable values.
- Effective X ranges are much narrower than those of the raw gluon distributions.