

Radiative corrections

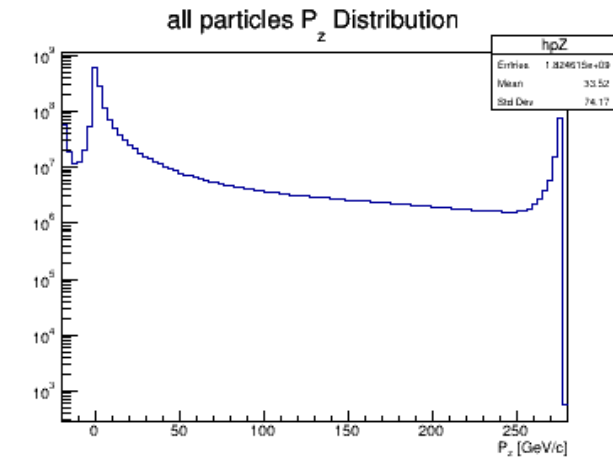
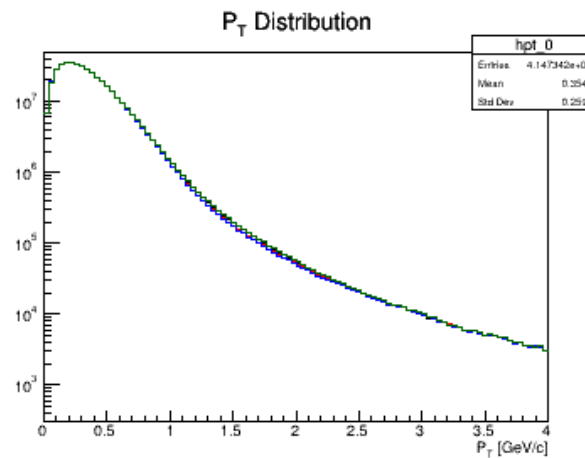
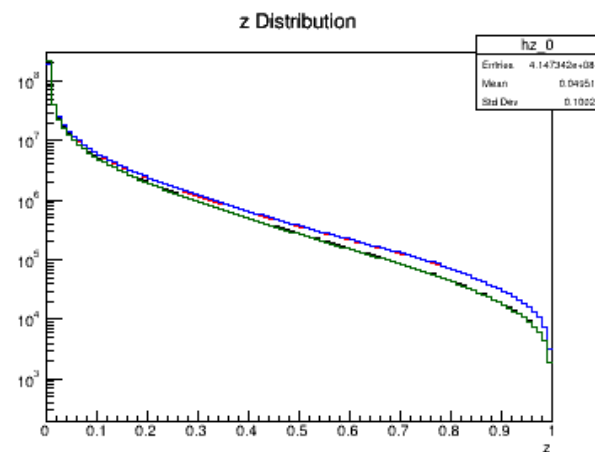
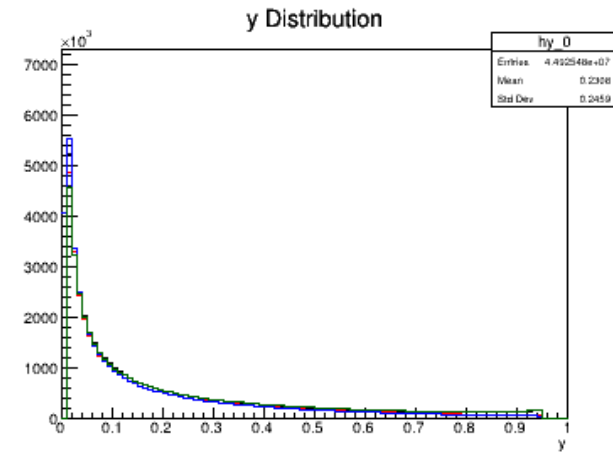
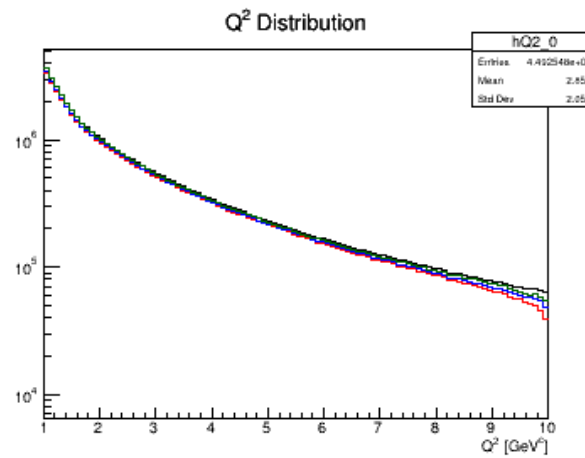
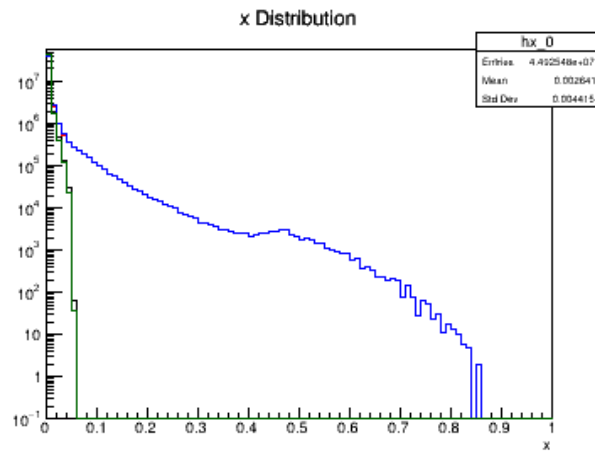
SIDIS PWG meeting
March 26, 2024,
Ralf Seidl (RIKEN)

Setup

- Used unpolarized Djangoh at 18 GeV x 275 GeV where ISR and FSR is correctly included
- 4 Q2 bins based on the true values between 1,10,100,1000,100000
- Calculated (SI)DIS kinematics based on reconstructed lepton kinematics, true kinematics, only ISR kinematics correct (incoming beam) and only FSR kinematics correct (scattered lepton)

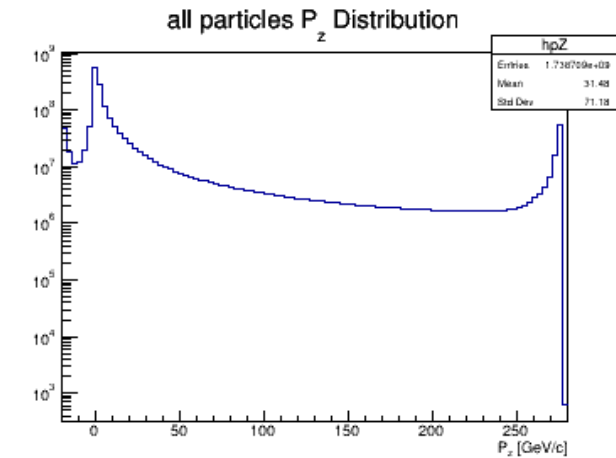
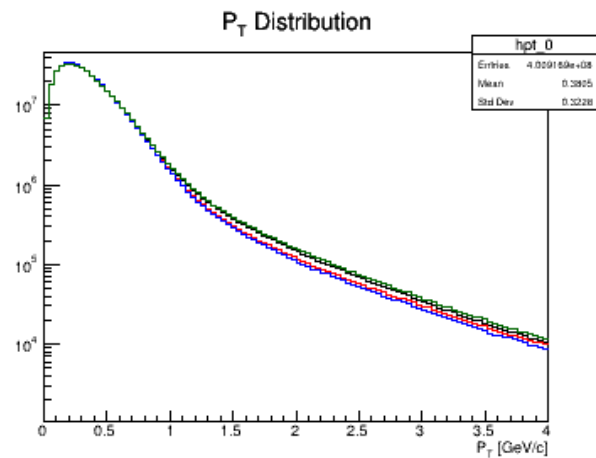
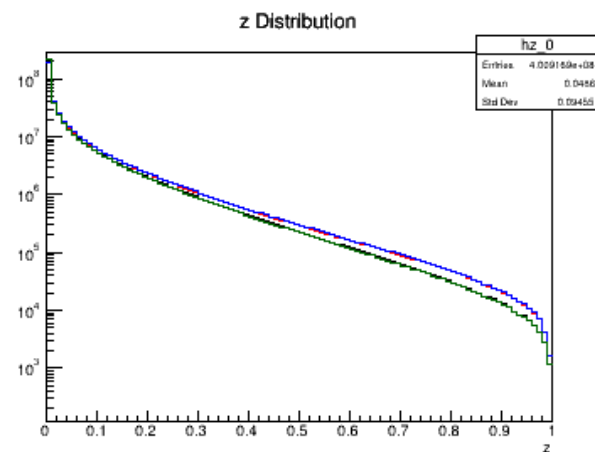
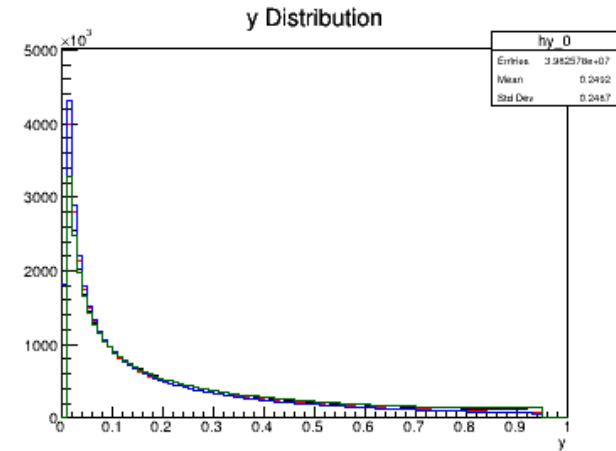
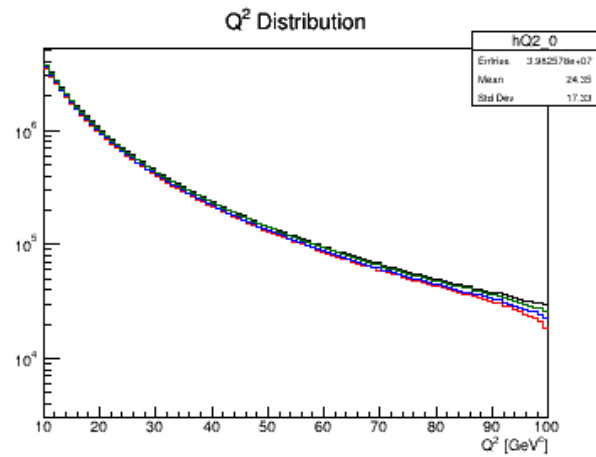
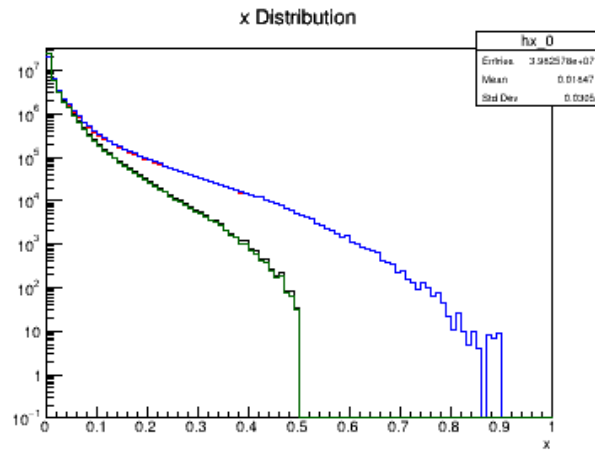
Basic distributions $1 < Q^2 < 10$

reco lepton kin
true lepton kin
true ISR only
true FSR only



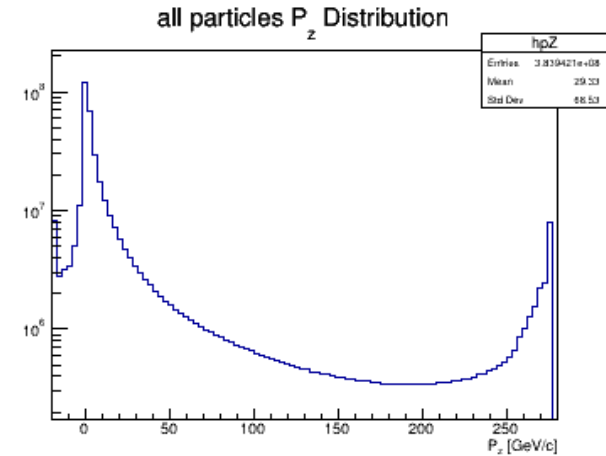
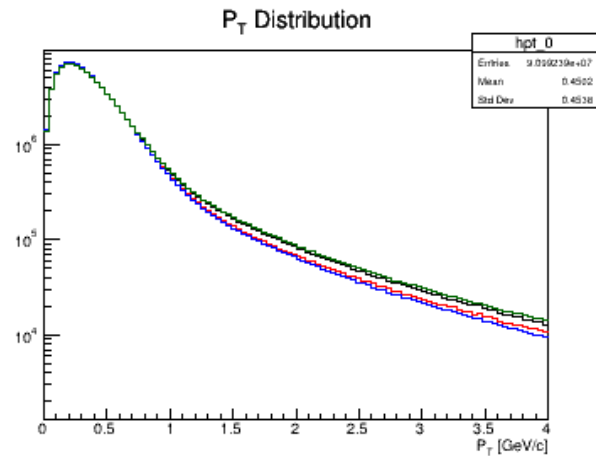
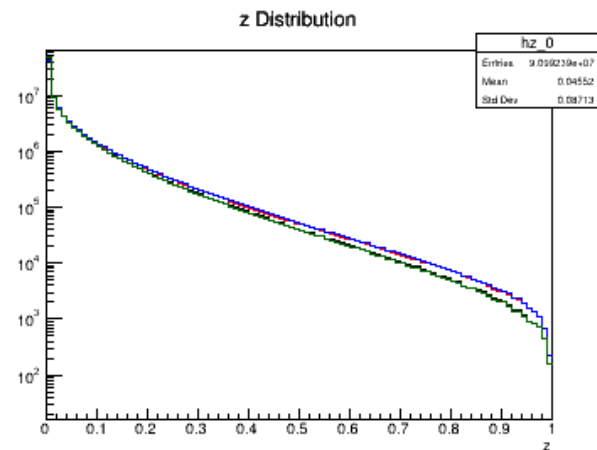
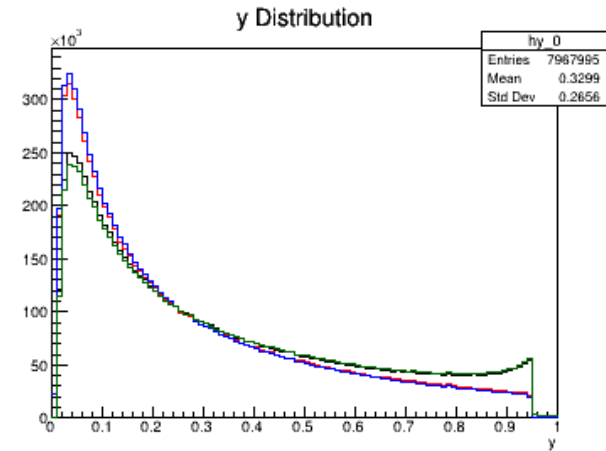
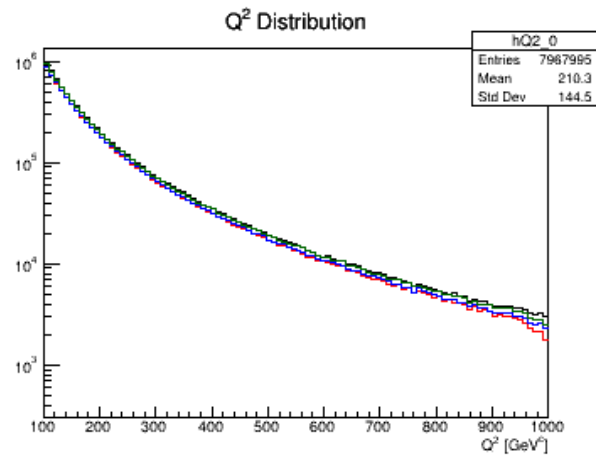
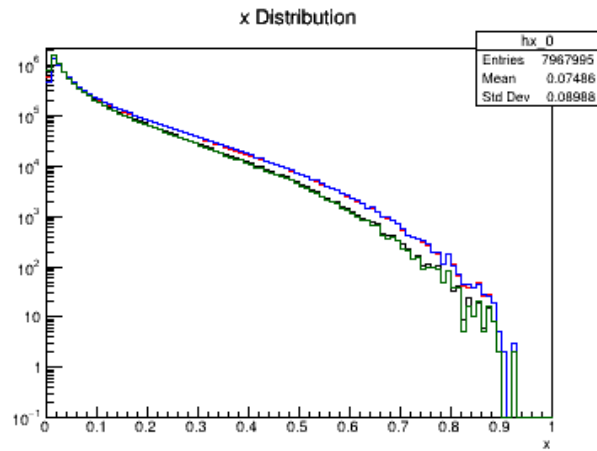
Basic distributions $10 < Q^2 < 100$

reco lepton kin
true lepton kin
true ISR only
true FSR only



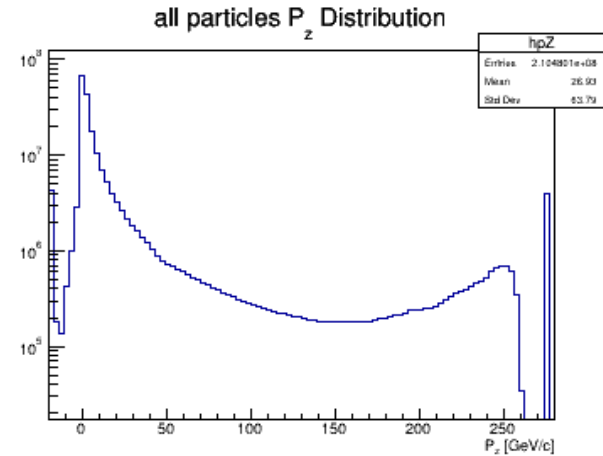
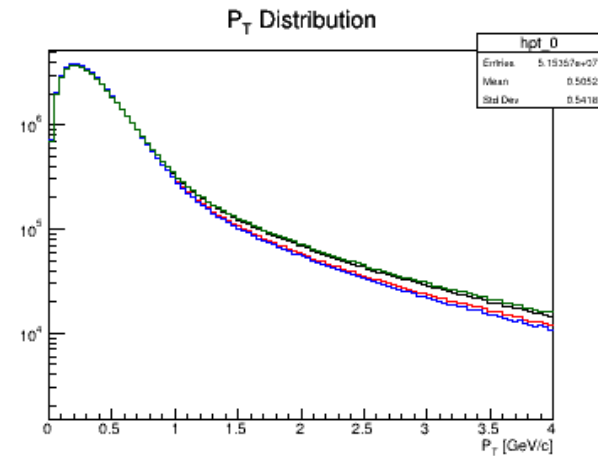
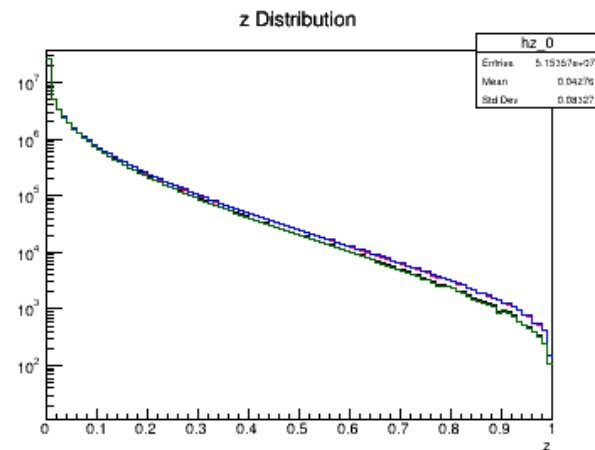
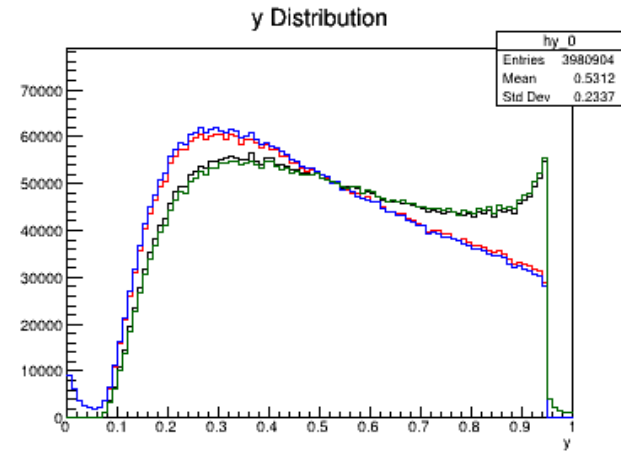
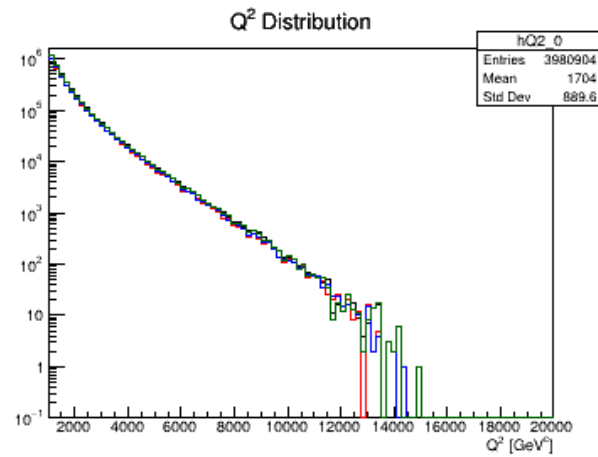
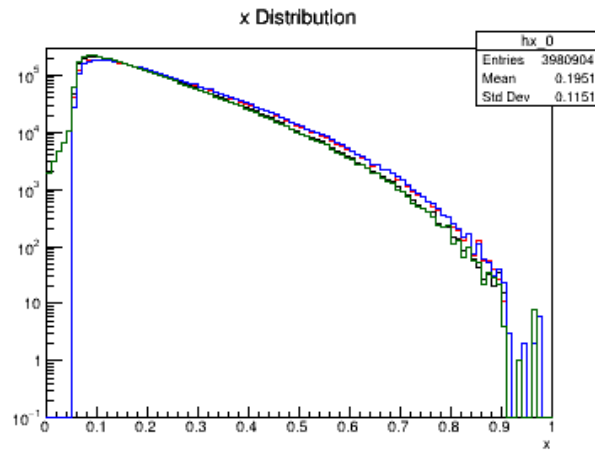
Basic distributions $100 < Q^2 < 1000$

reco lepton kin
true lepton kin
true ISR only
true FSR only

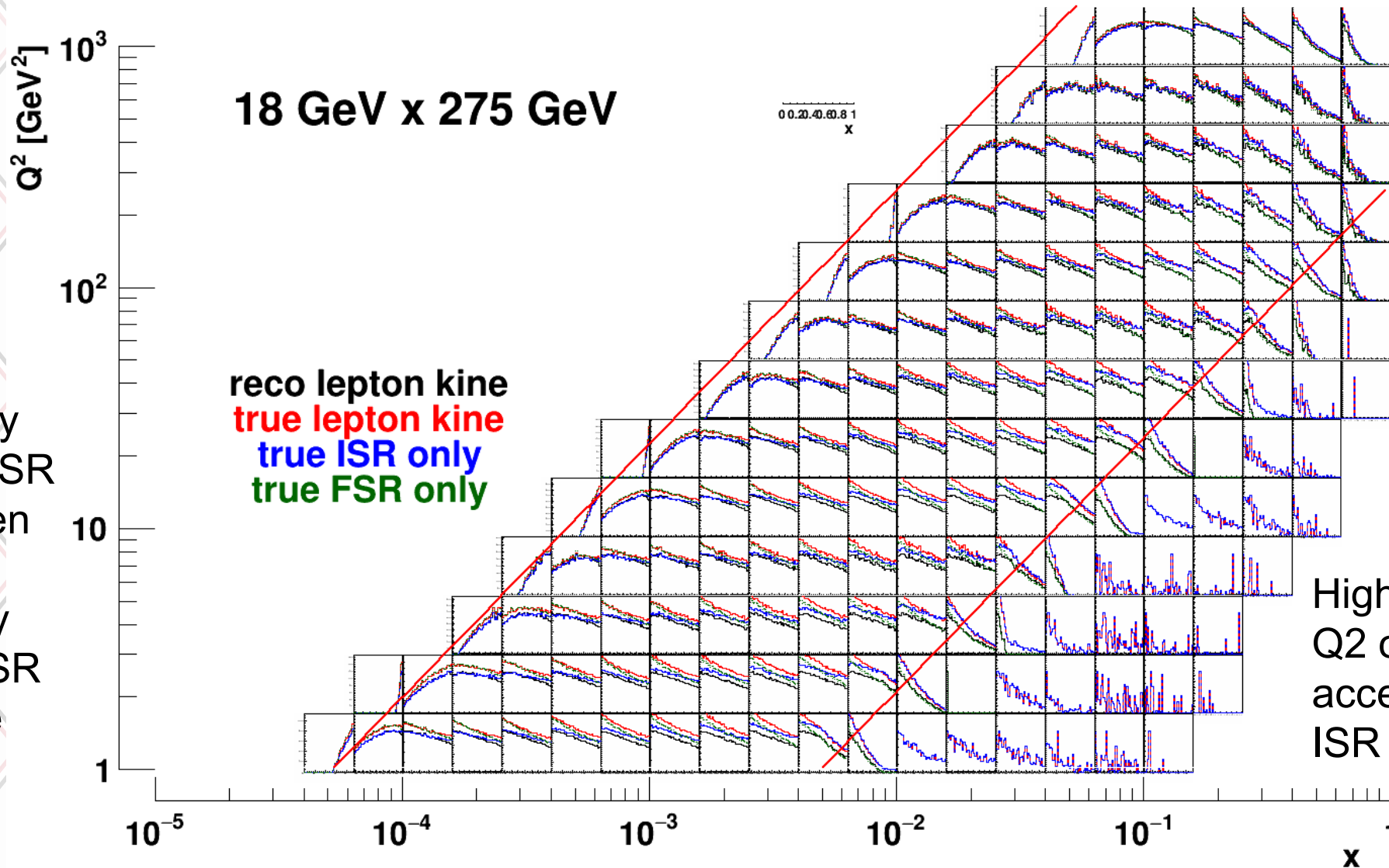


Basic distributions $1000 < Q^2 < 100000$

reco lepton kin
true lepton kin
true ISR only
true FSR only



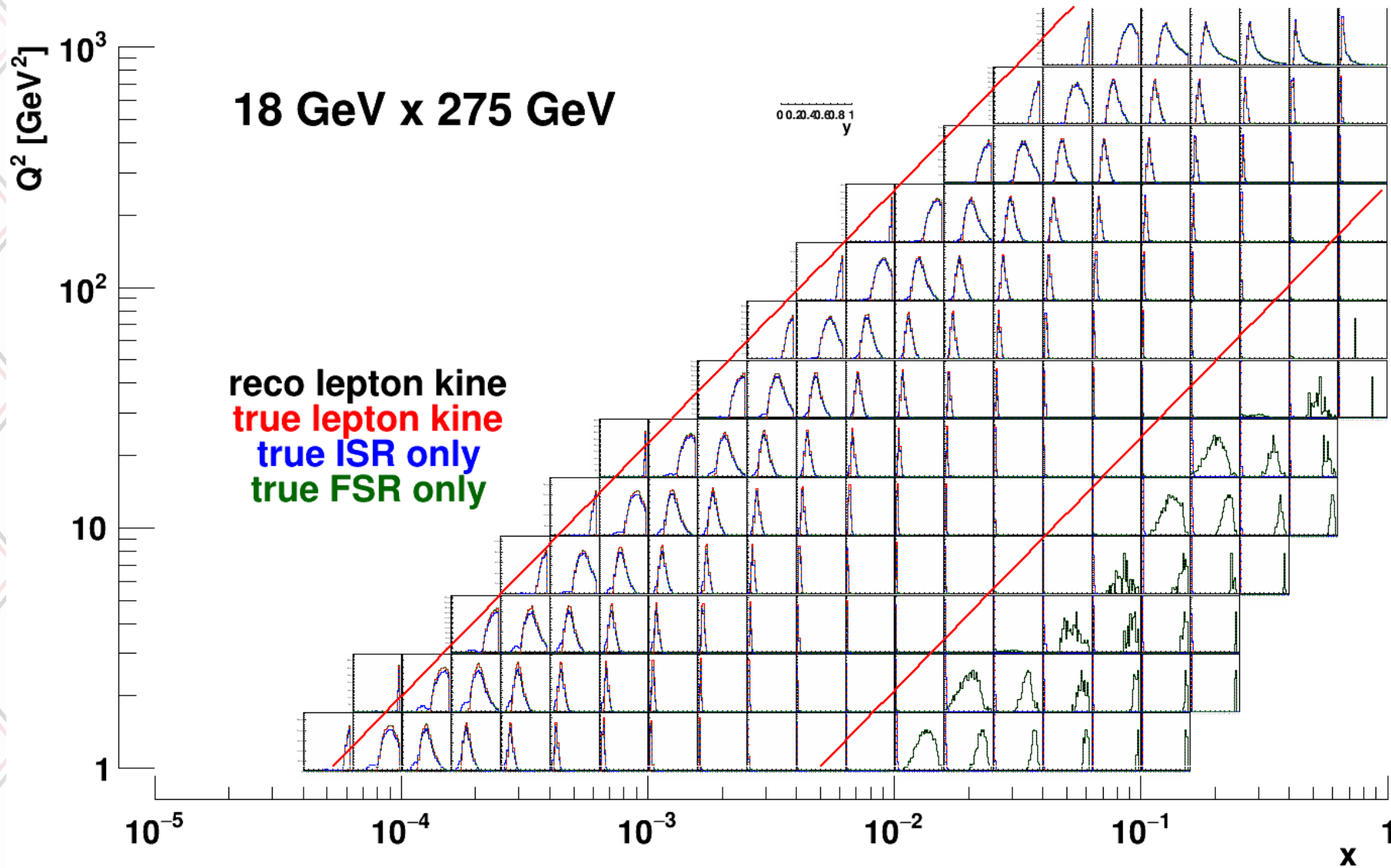
x distributions



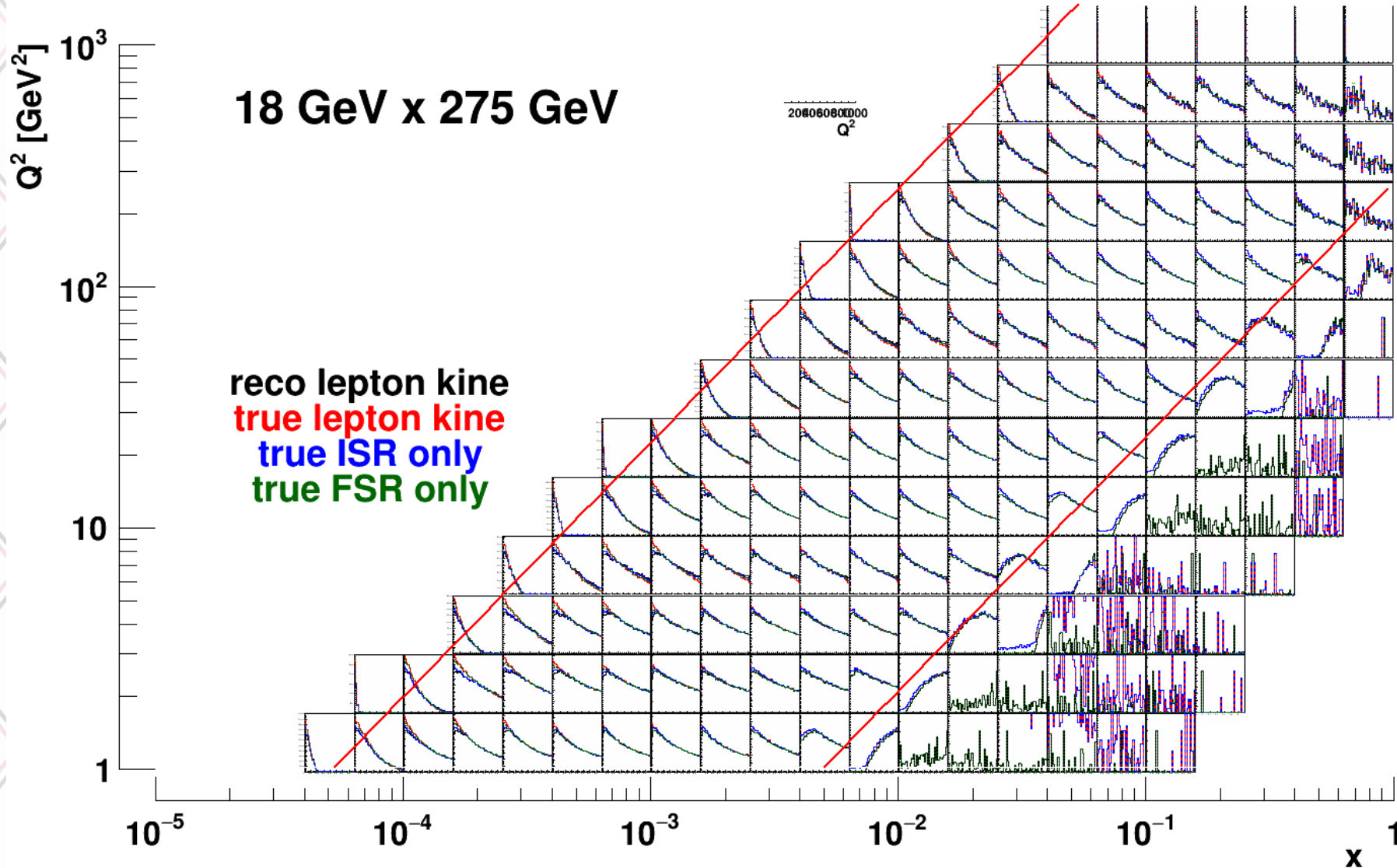
High y : mostly affected by FSR (red and green similar)

Low y : mostly affected by ISR (red and blue similar)

y distributions

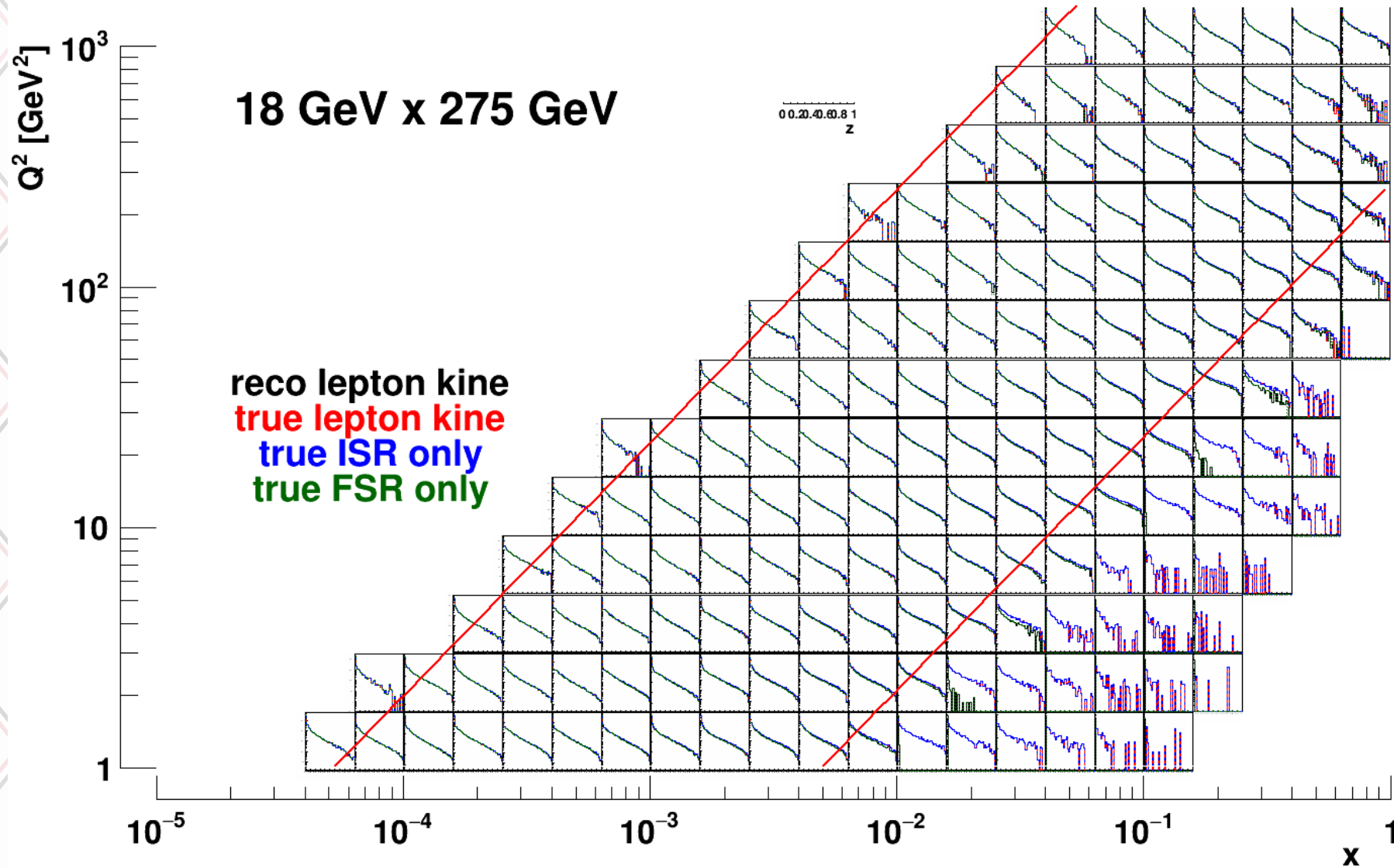


Q2 distributions

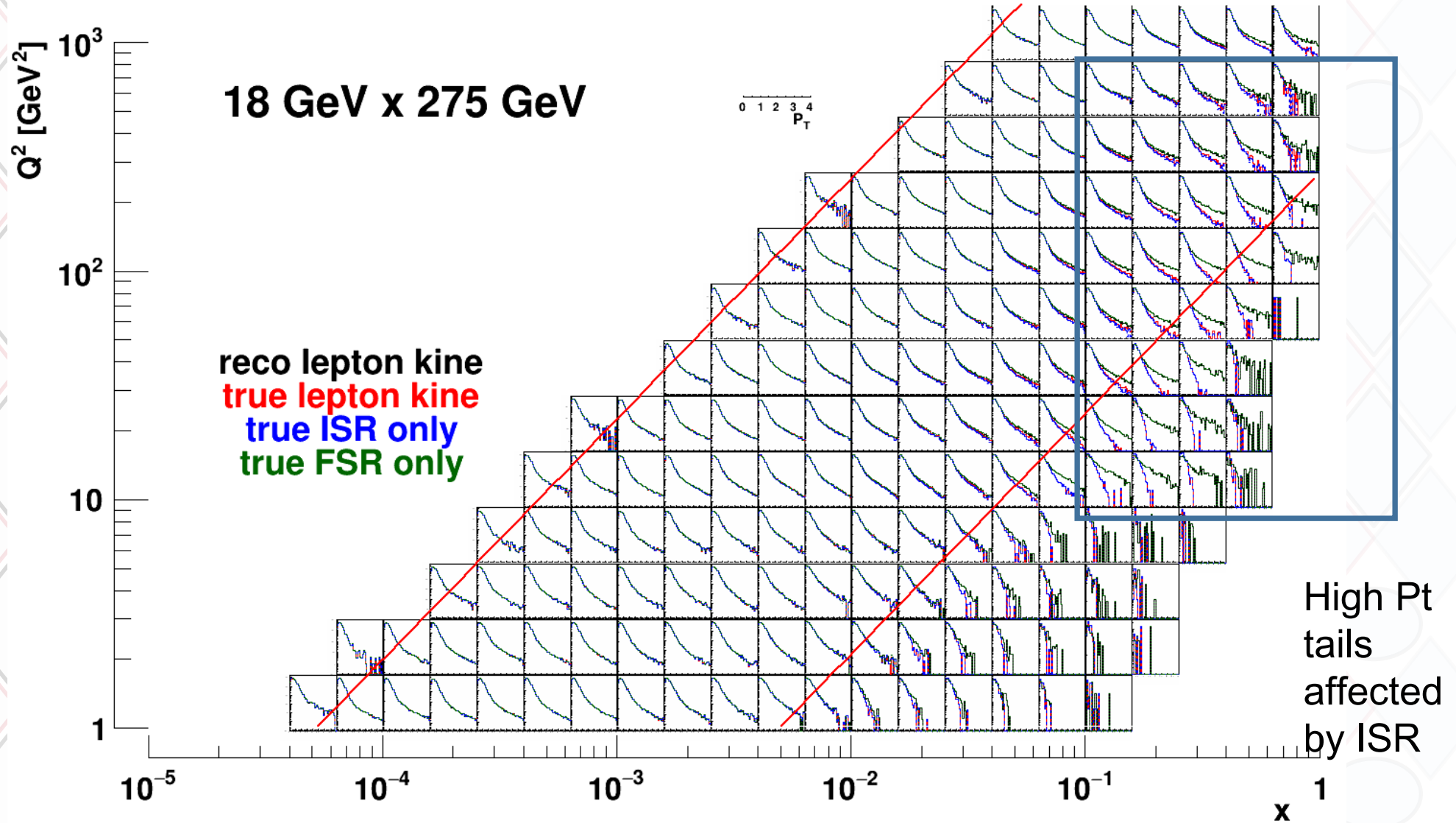


Low Q^2
edge in each
bin affected
by ISR/FSR
bin migration

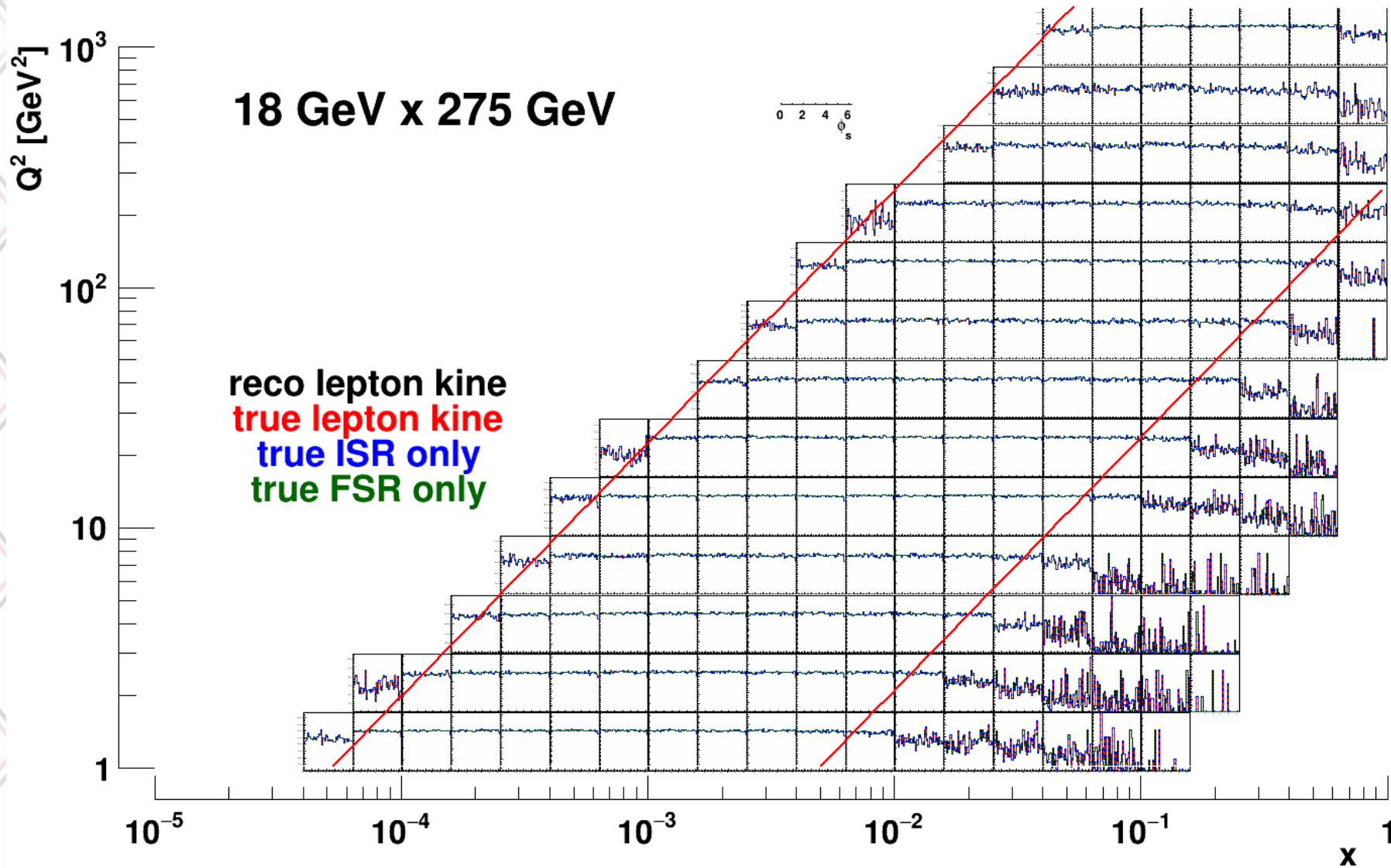
z distributions



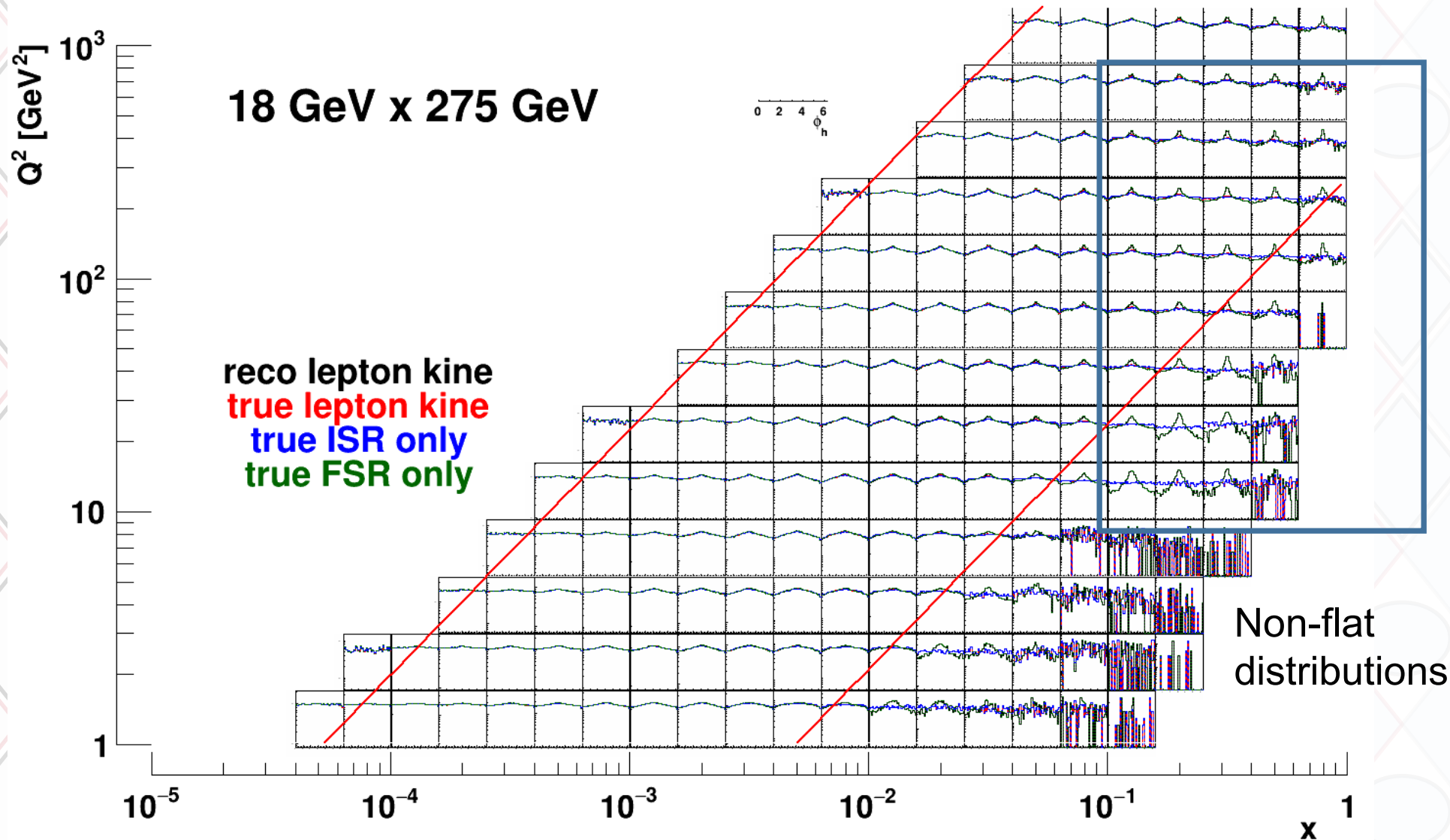
PhT distributions



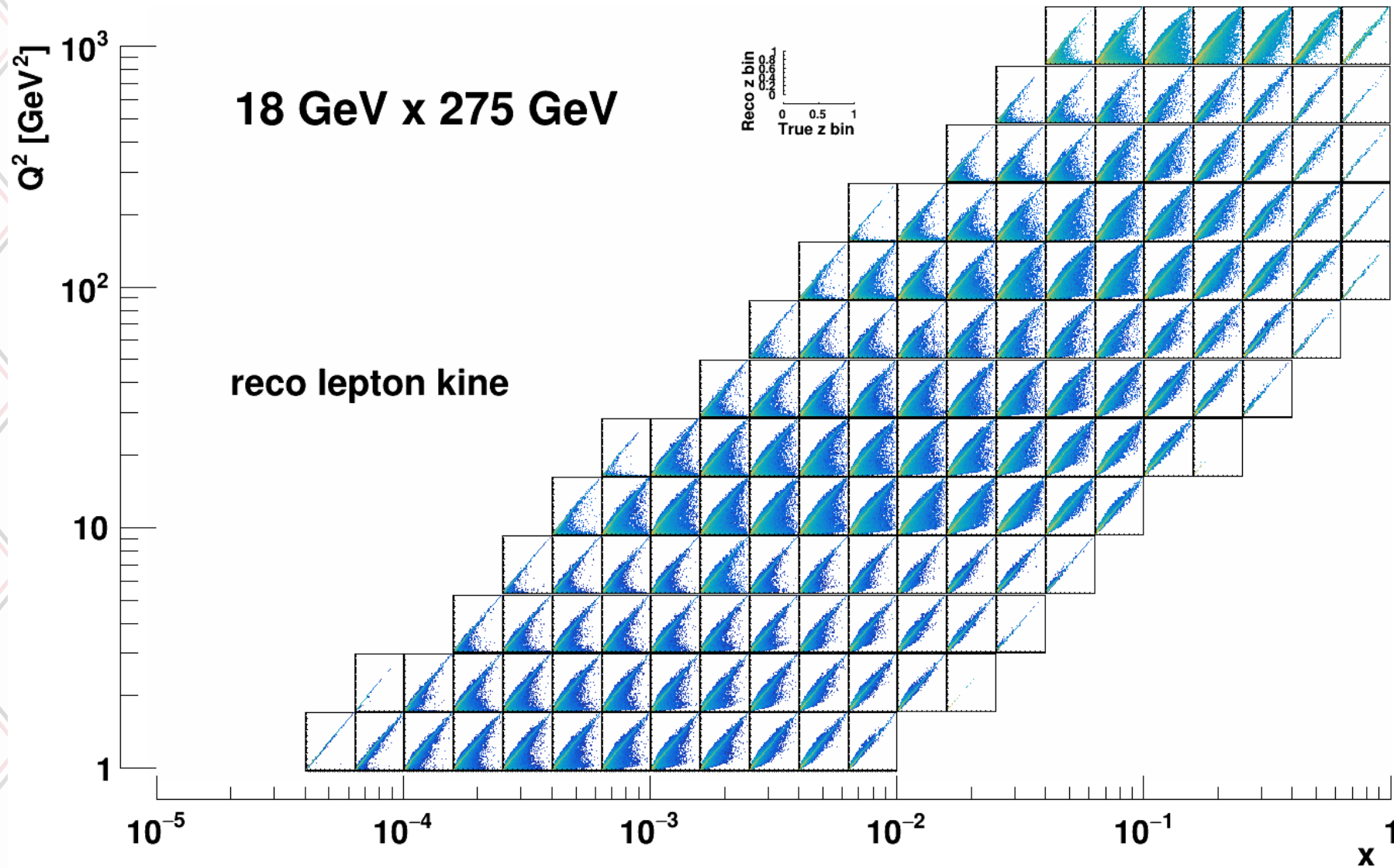
ϕ_s distributions



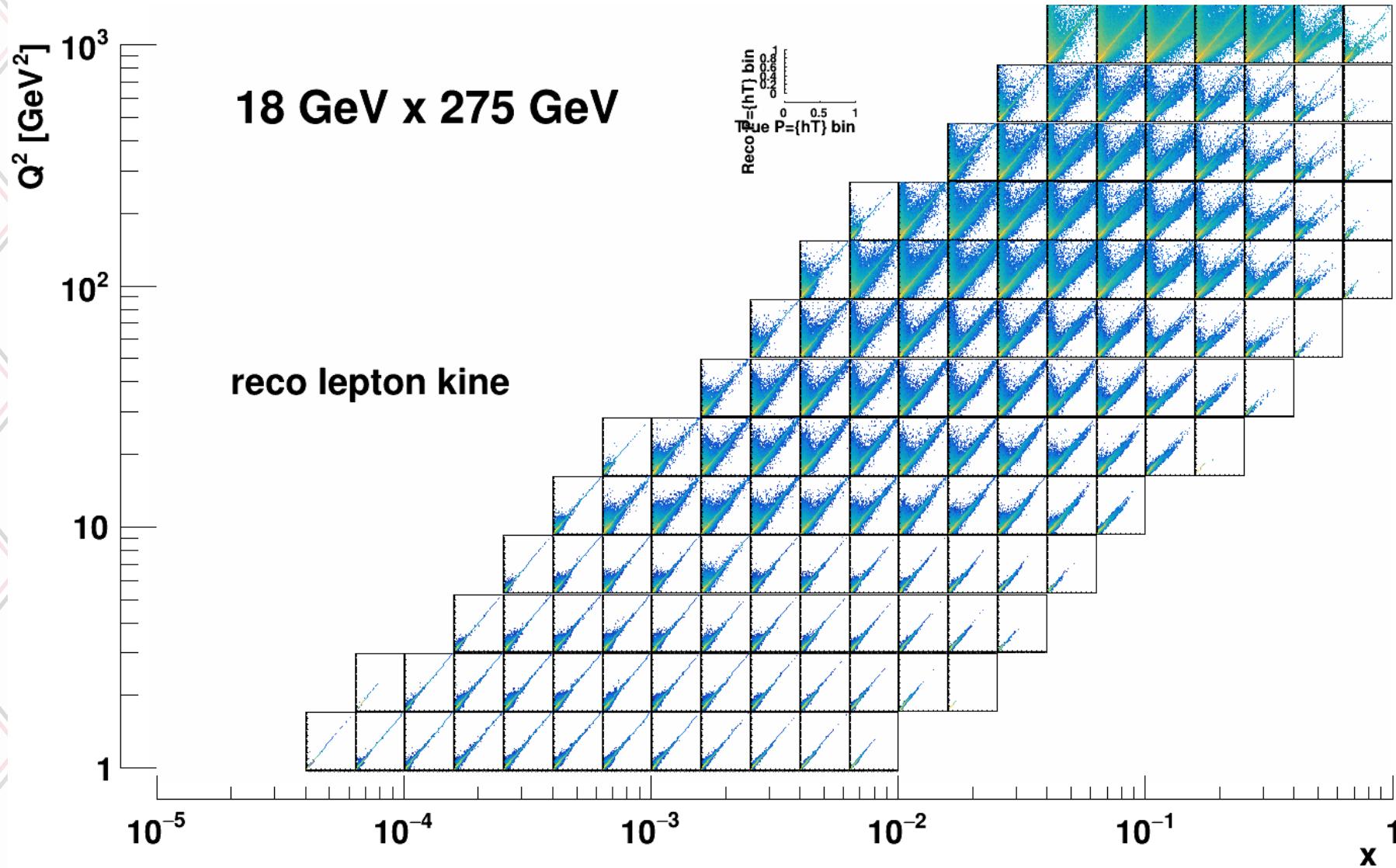
ϕ_h distributions



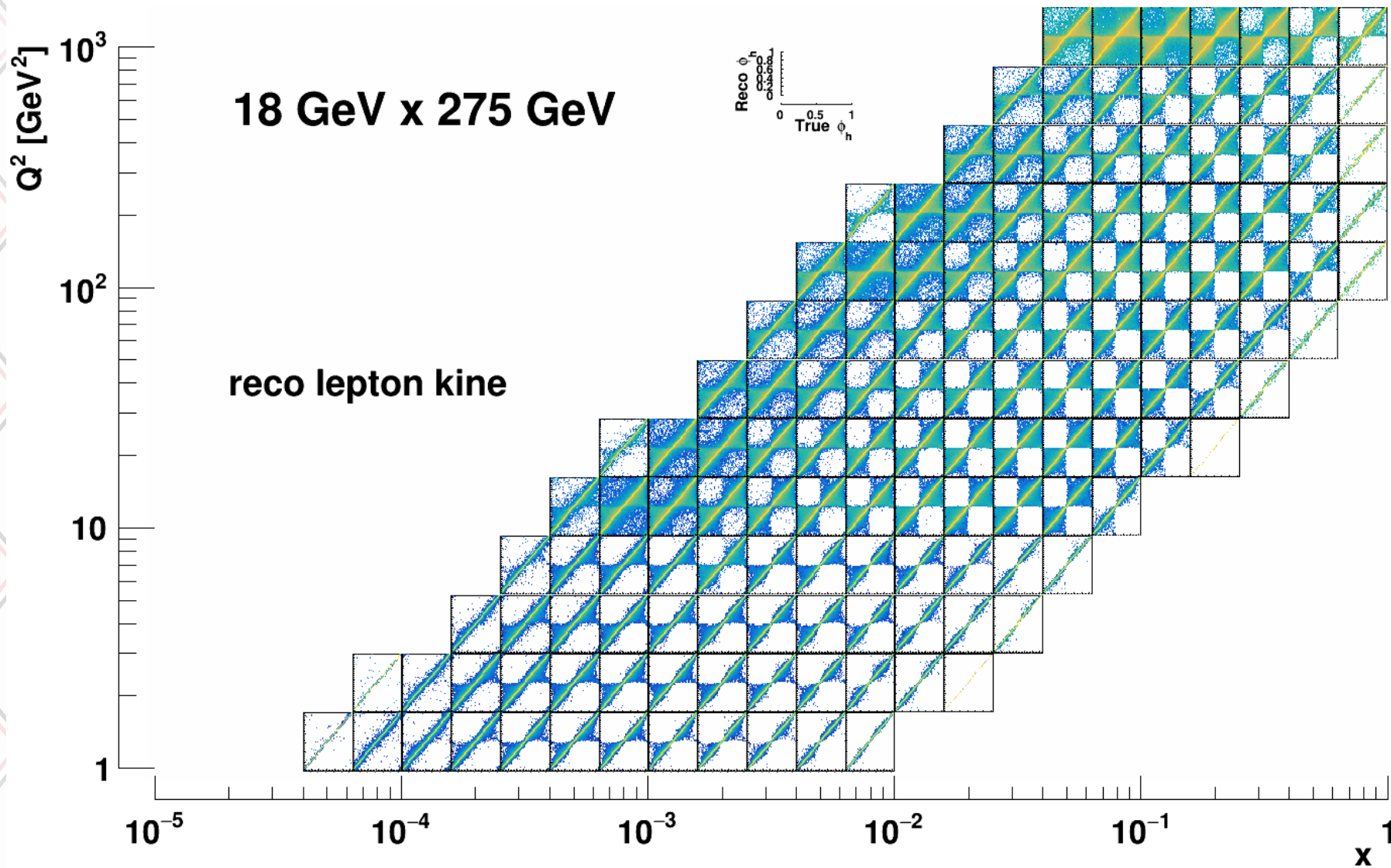
z smearing in x-Q2 bins



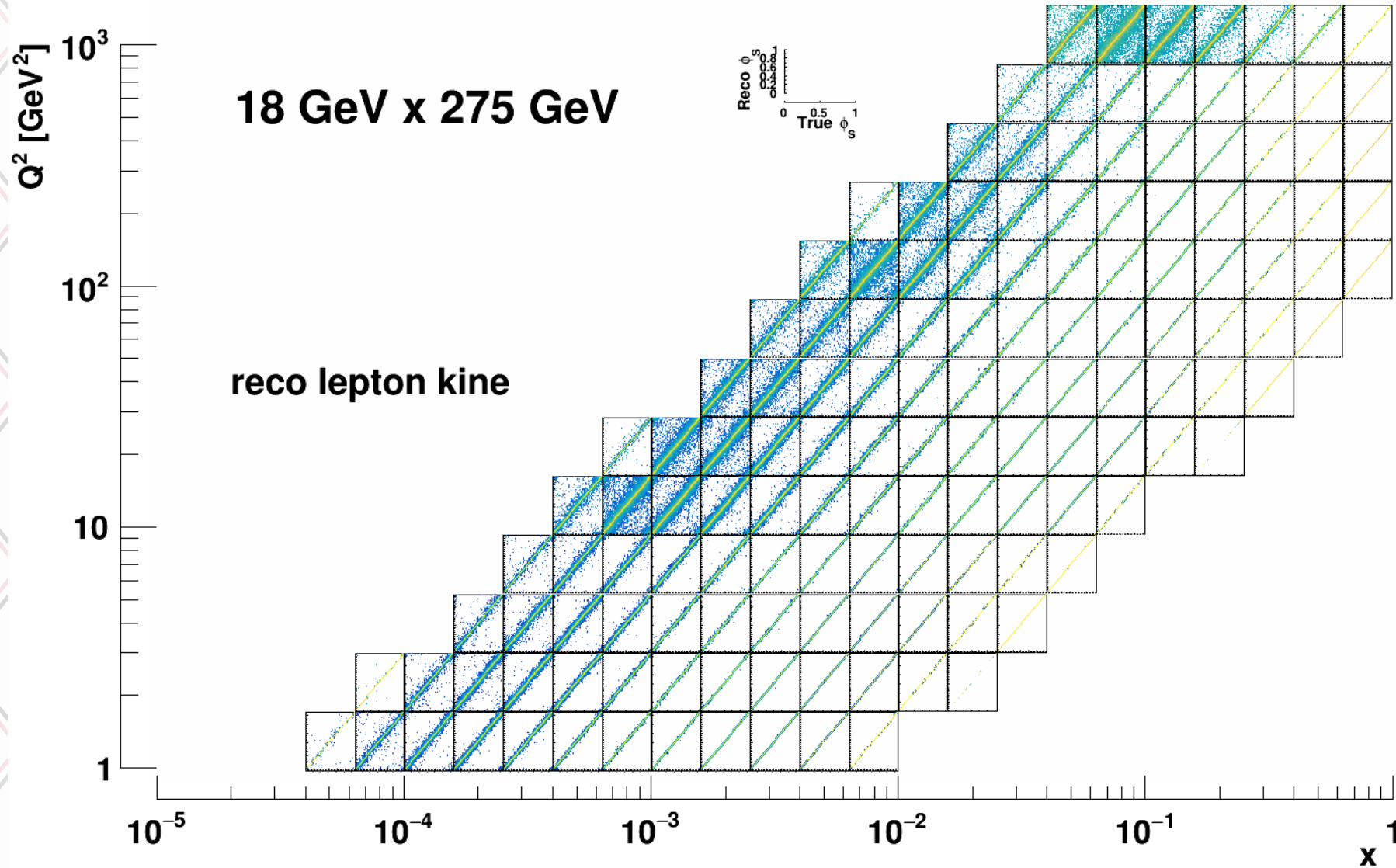
P_{hT} smearing in x-Q2 bins



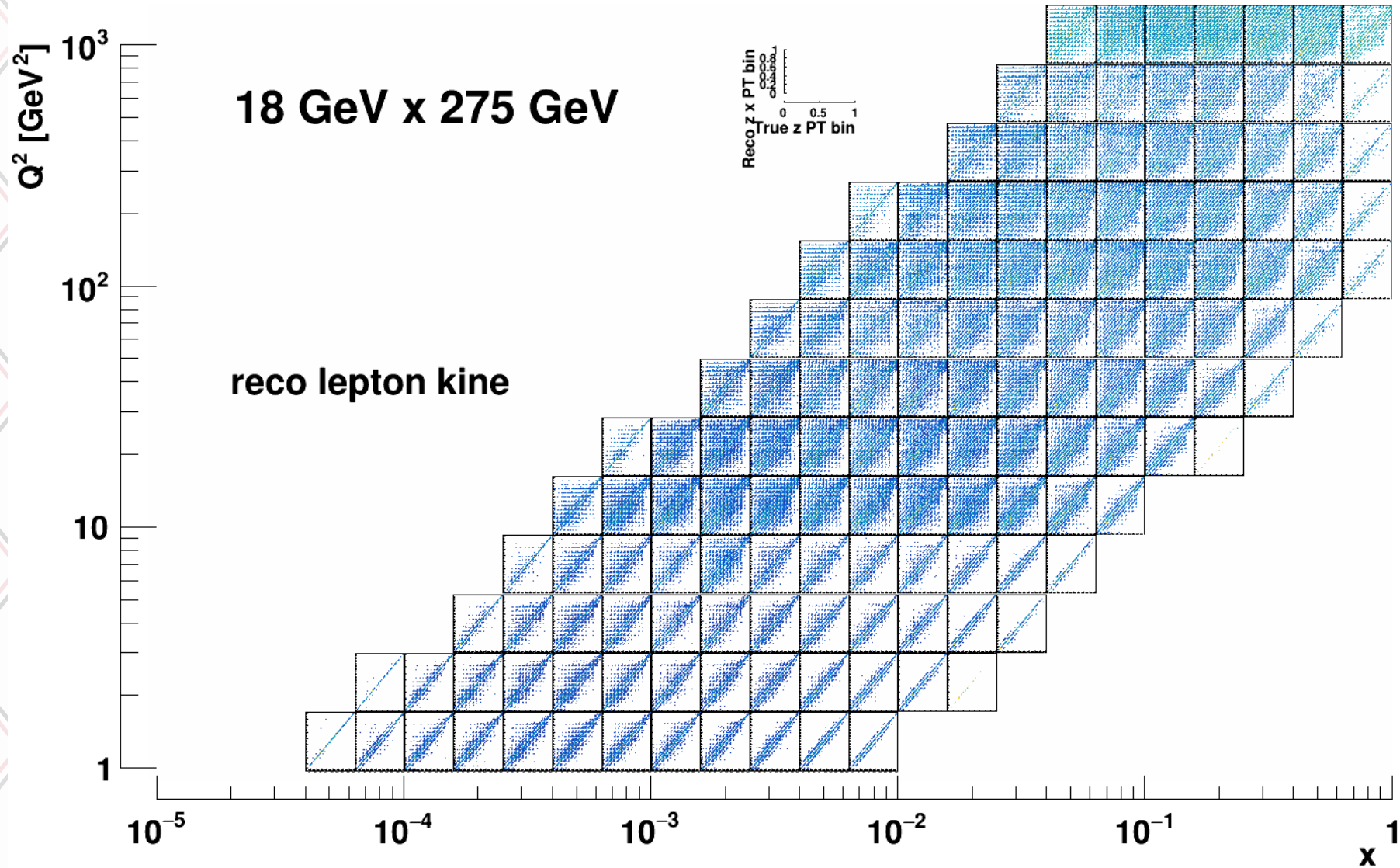
ϕ_h smearing in x-Q2 bins



ϕ_S smearing in x-Q2 bins



Z x P_{hT} smearing in x-Q2 bins

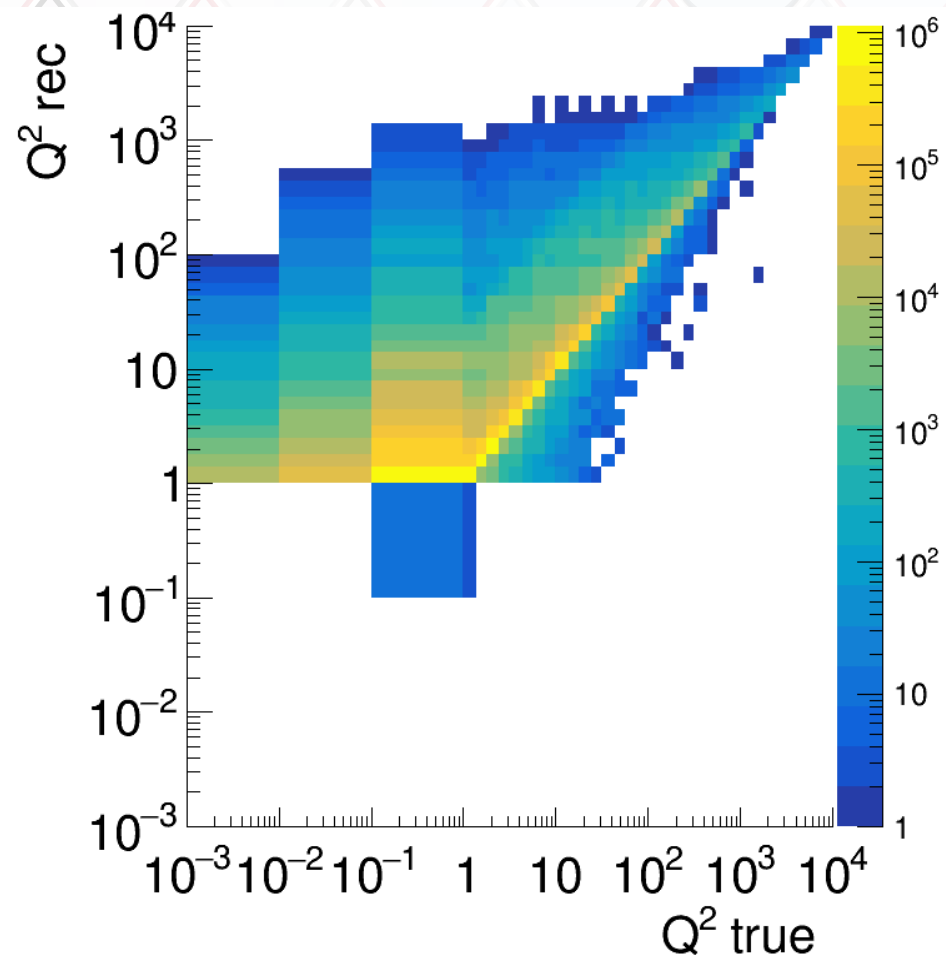


Summary

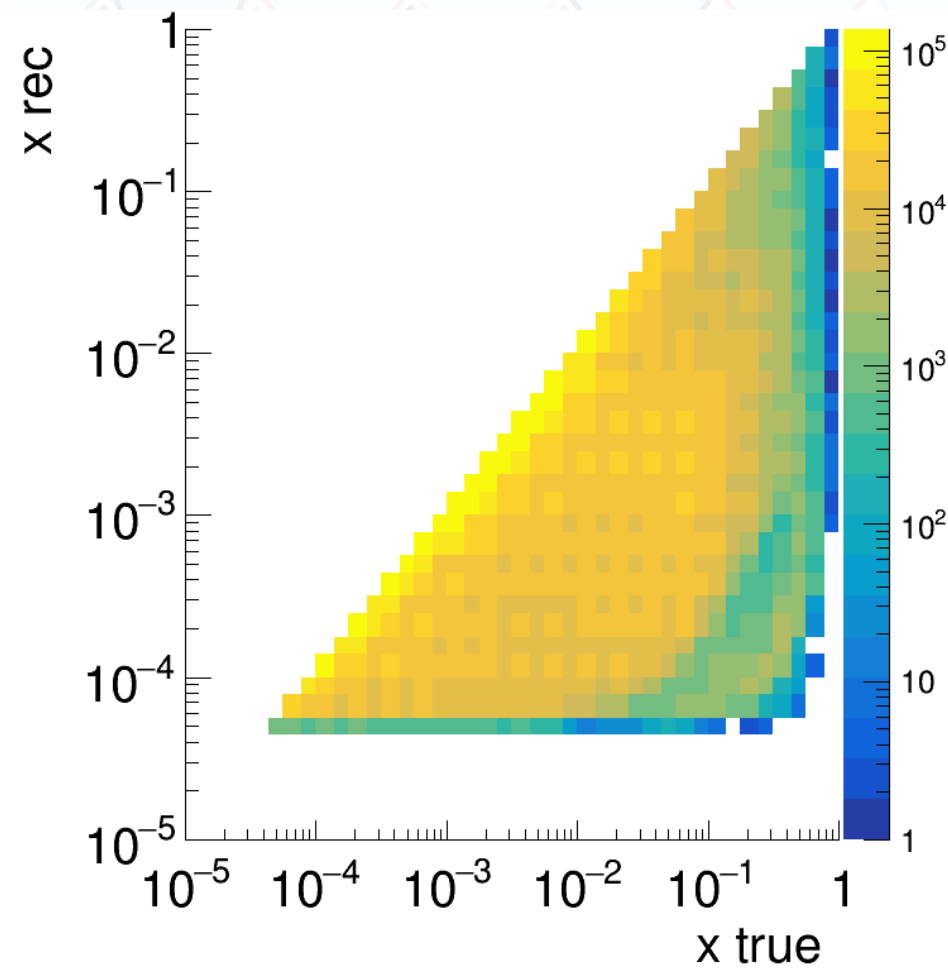
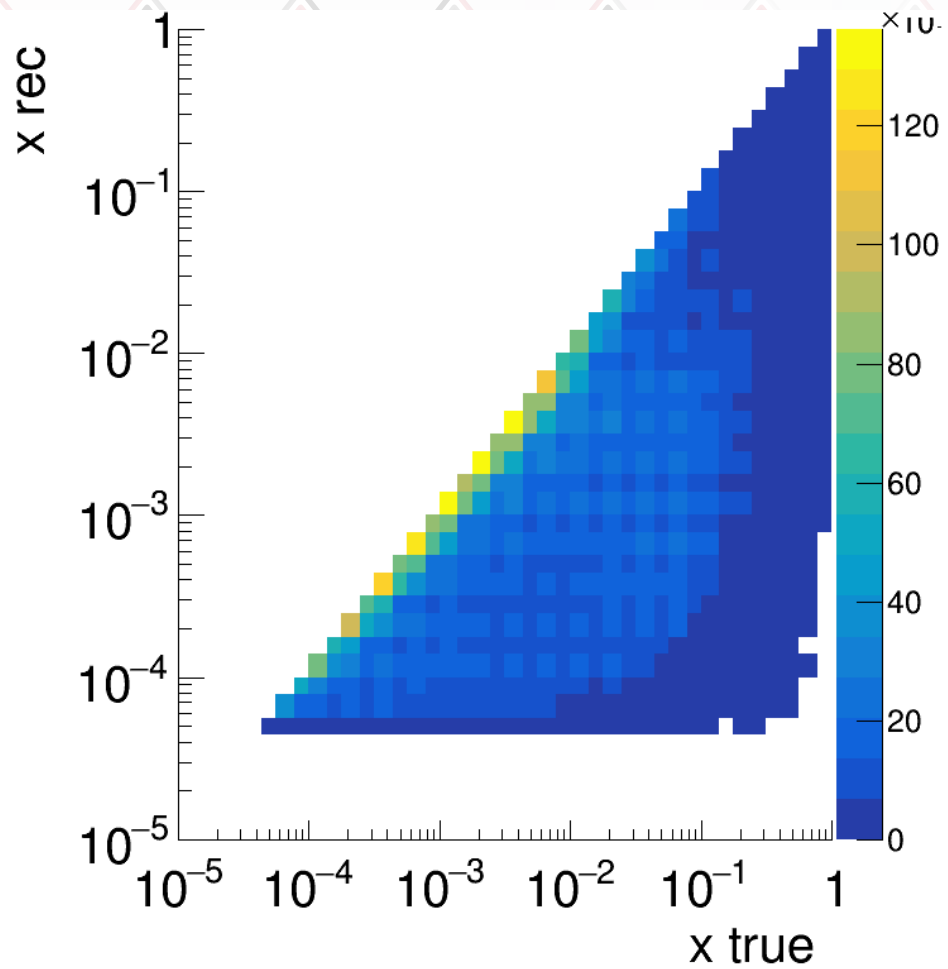
- Radiative corrections studied with Djangoh
 - Overall effects moderate, very high x at moderate Q^2 can be accessed via ISR
 - SIDIS hadron high p_T tails at higher x/Q^2 different in ISR
 - SIDIS hadron z only slightly affected
 - ϕ_s not much affected
 - ϕ_h develops structure at higher x/Q^2 ,
- impact on azimuthal asymmetries need to be tested next
- How to perform an unfolding, 4 dimensions (x, Q^2, z, P_{hT}) would lead to too larger matrices – factorize into DIS and SIDIS (binned in reco DISkine) variables? Newer unfolding techniques (Multifold)?



Q² smearing



X smearing



Pion variables (integrated over all DIS kinematics)

