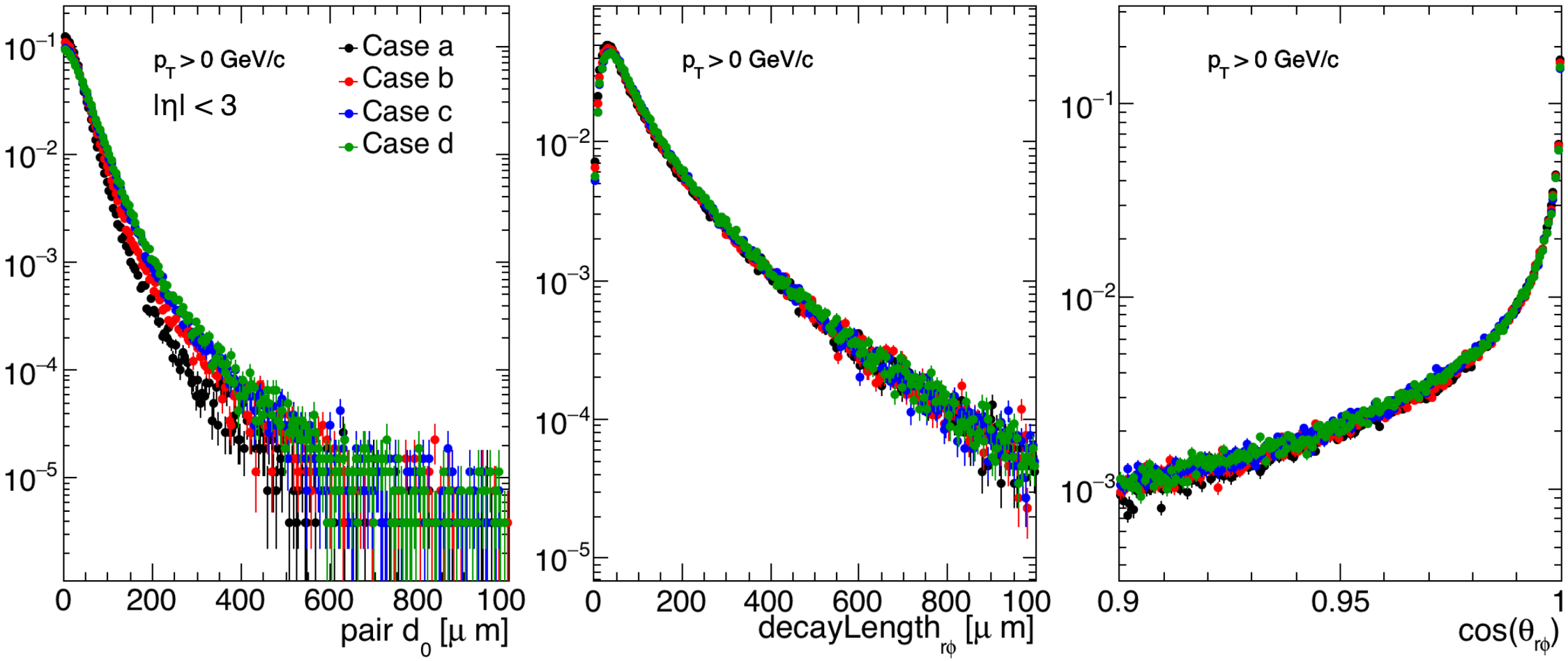
Impact of different pointing resolution scenarios of D and DDbar reconstruction

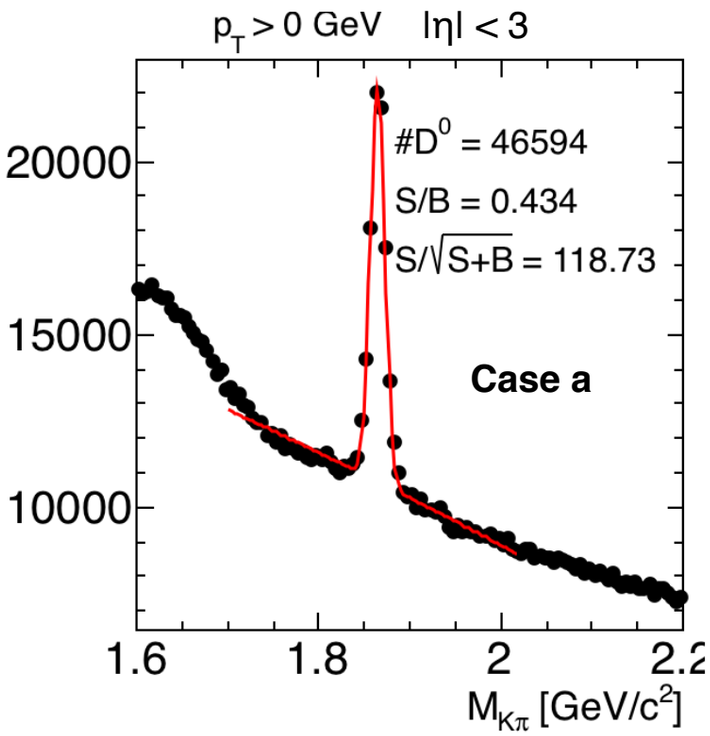
- Four different track pointing resolution scenarios are looked into
  - Case a:
    $20/p_T + 5$ at all η
  - Case b (proposed by LBNL):
    $20/p_T + 5$ for $0 < |\eta| < 1$
    $25/p_T + 10$ for $1 < |\eta| < 2$
    $30/p_T + 10$ for $2 < |\eta| < 3$
  - Case c (proposed by LANL):
    $25/p_T$ for $0 < |\eta| < 1$
    $30/p_T + 20$ for $1 < |\eta| < 2$
    $30/p_T + 40$ for $2 < |\eta| < 3$
  - Case d:
    $30/p_T + 5$ at all η

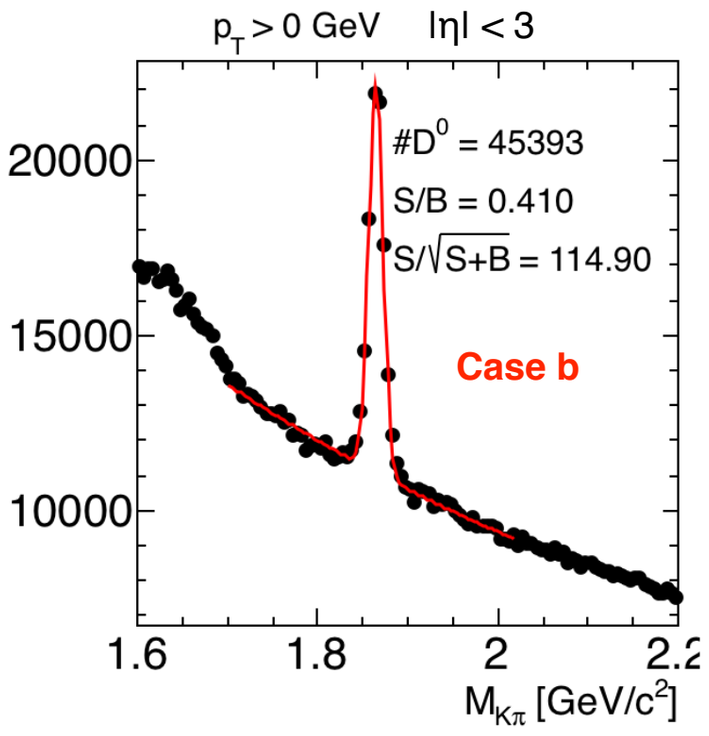
Topological variables

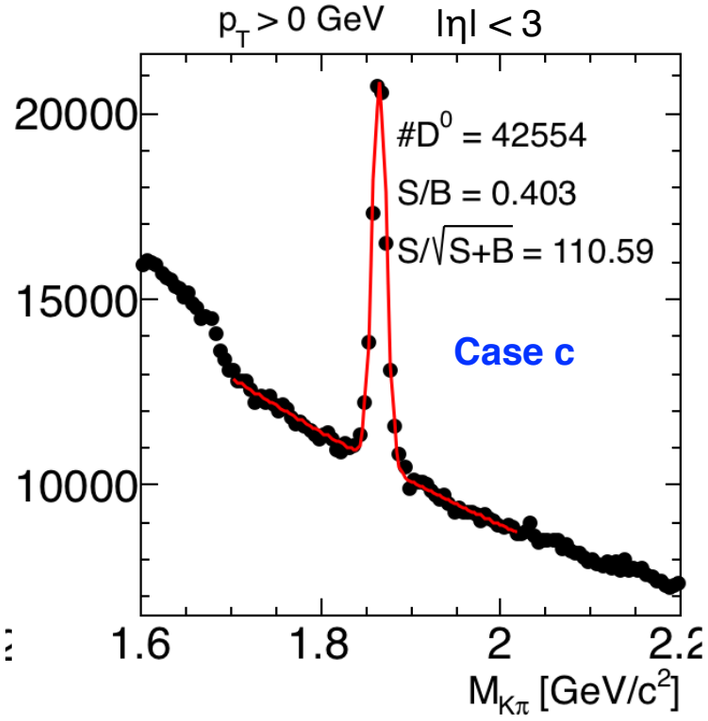


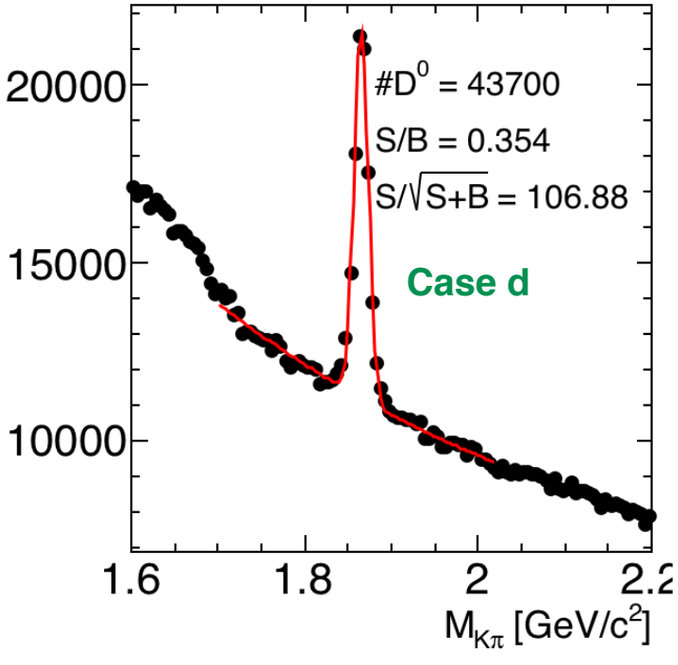
- Topological variable distributions for tracks from D^0 decay
- Major impact is on pair DCA
- In all cases progressive increase of smearing from Case a —> Case d

Total signal significance





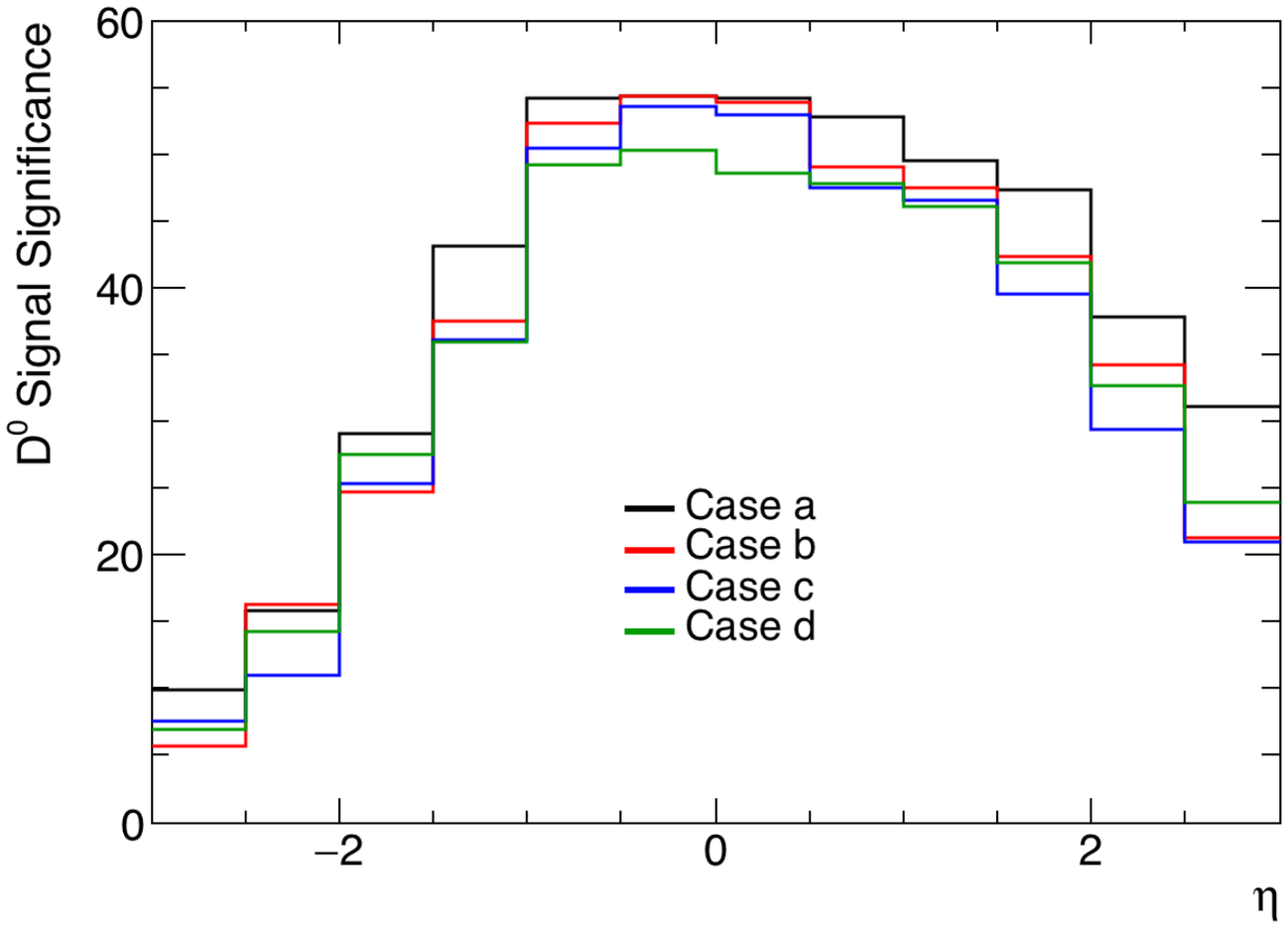




- About 10% reduction in signal significance from Case a —> Case d
- About 5% reduction in signal significance from Case b —> Case c

Results for D^0 reconstrcution (only D^0 here, no D^0bar)
Collision Energy: 18 + 275 GeV (e + p)
Luminosity: 0.1 fb^{-1}

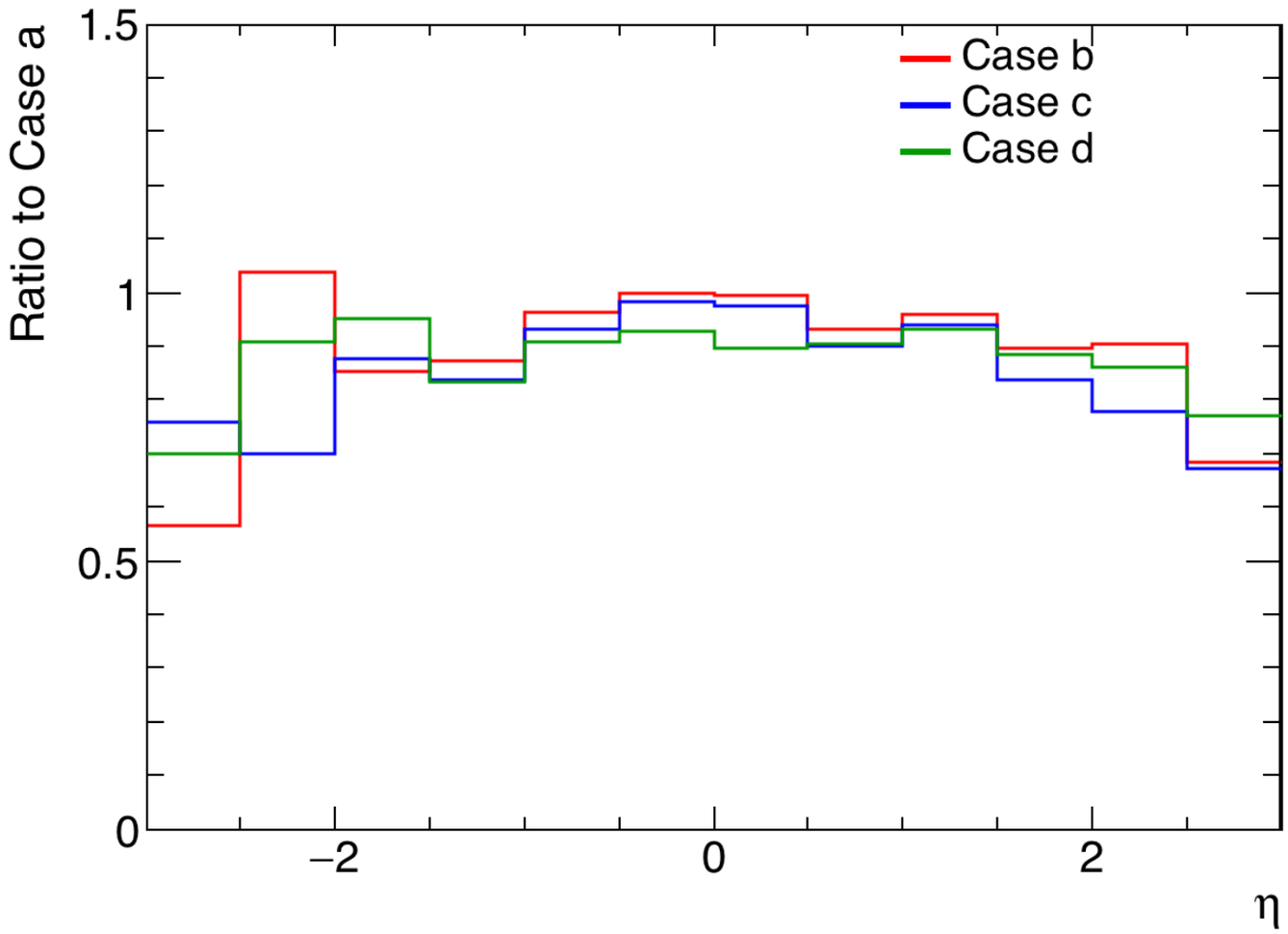
Signal significance vs eta



- Midrapidity (for |η| < 1.5) performance is similar between Case b and Case c
- Forward rapidity, Case b gives better significance by 5-10%

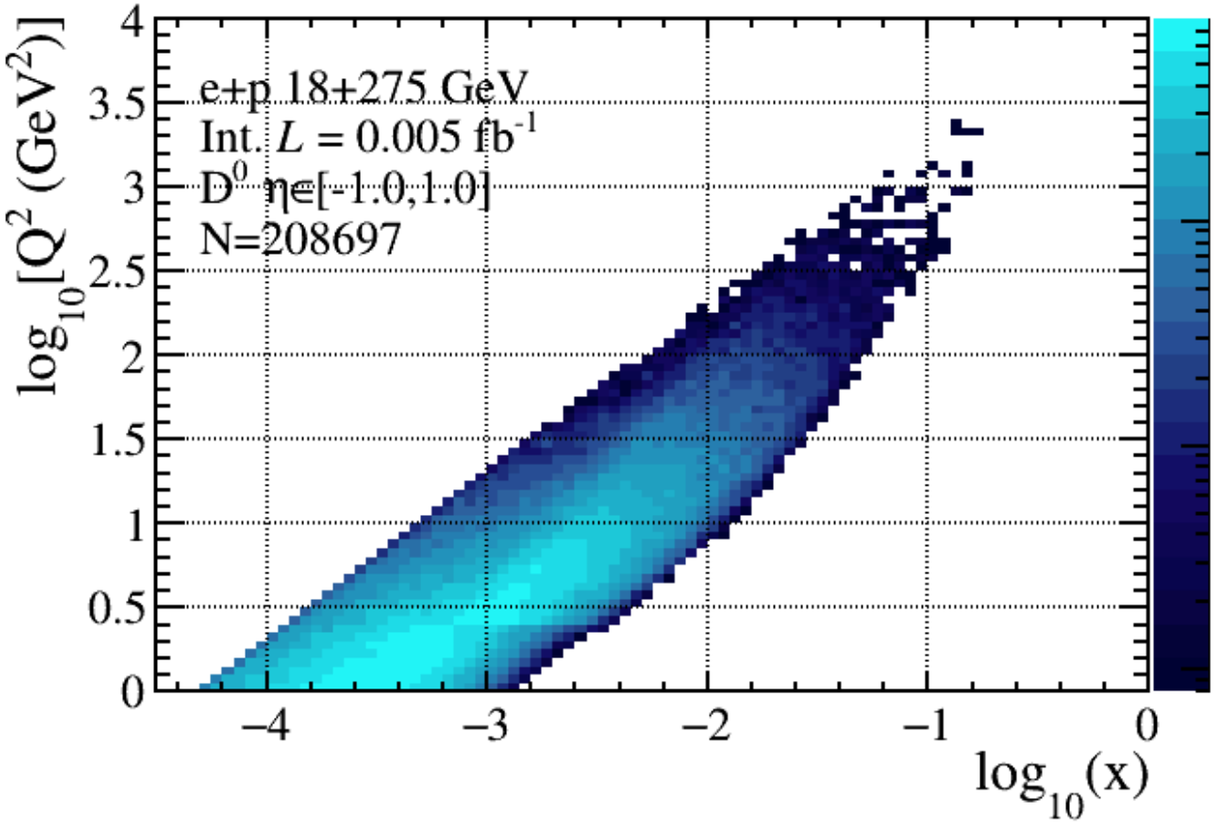
Results for D^0 reconstrcution (only D^0 here, no D^0bar)
Collision Energy: 18 + 275 GeV (e + p)
Luminosity: 0.1 fb^{-1}

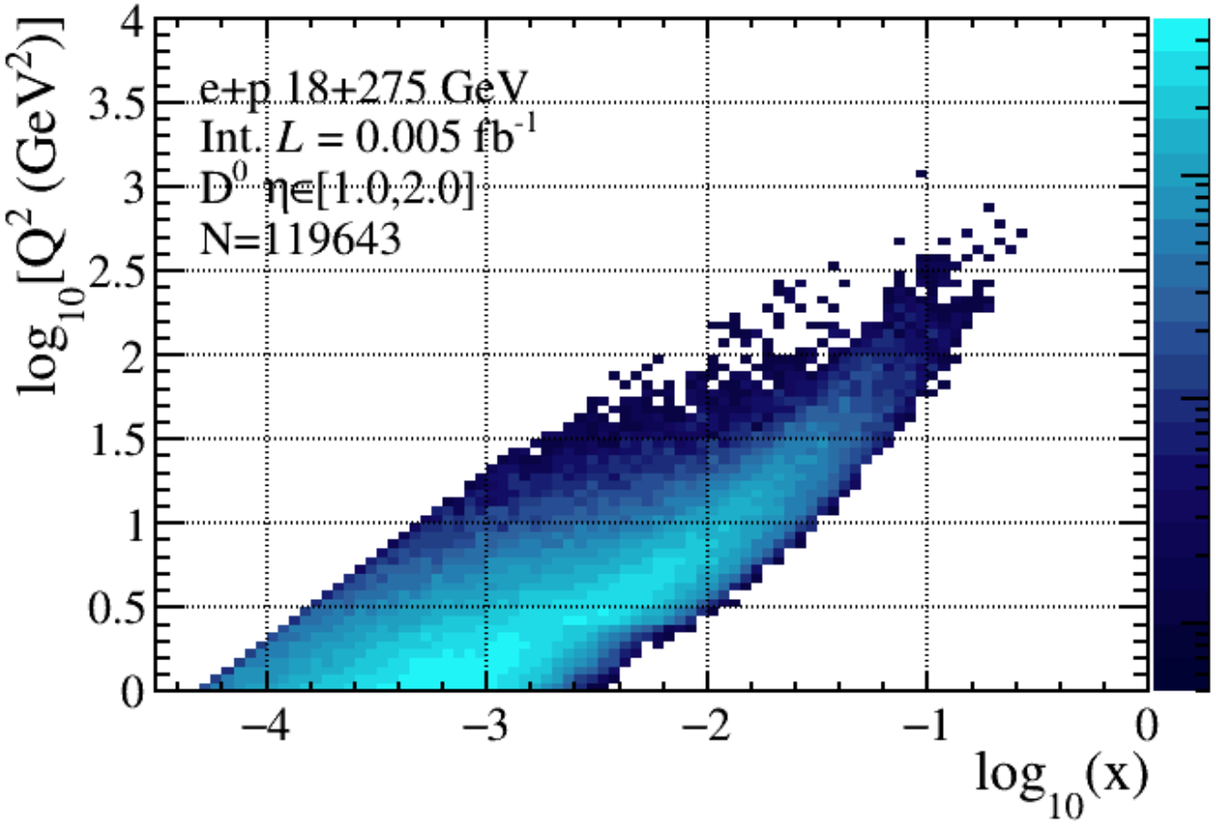
Signal significance vs eta

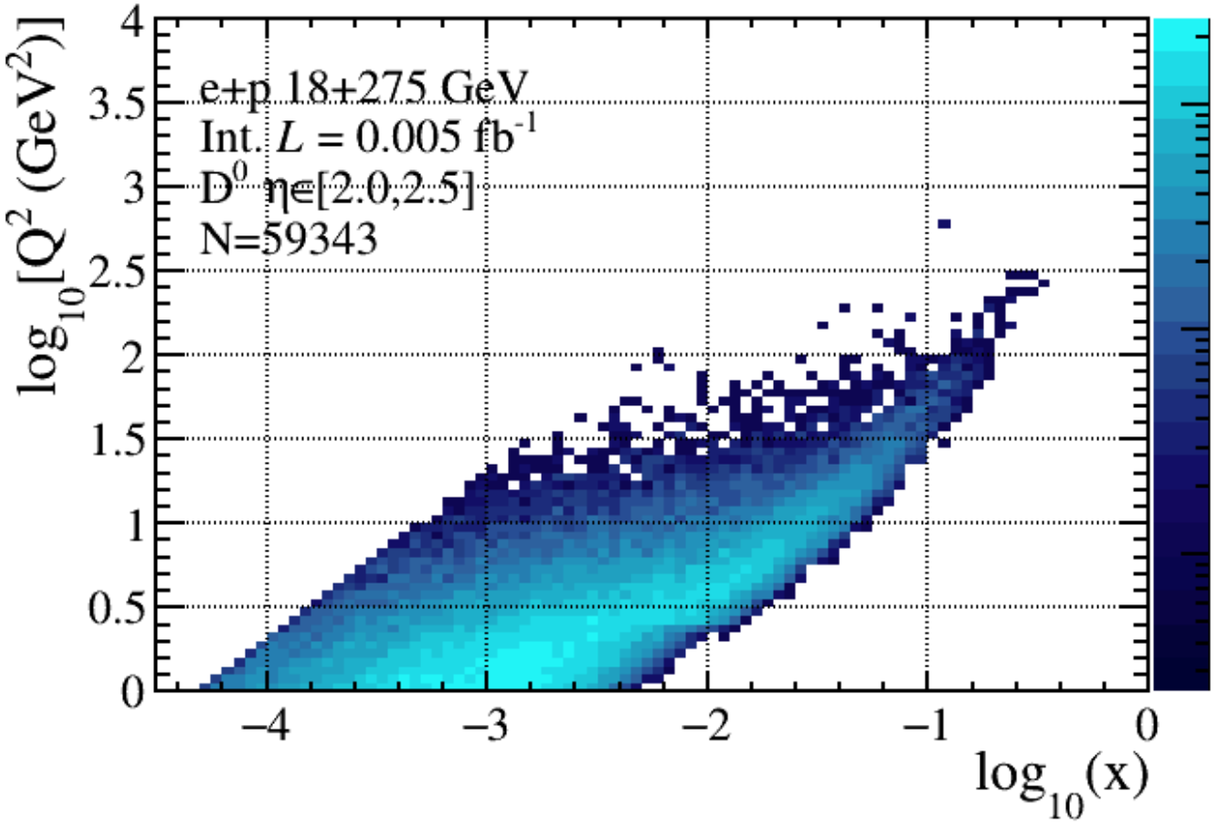


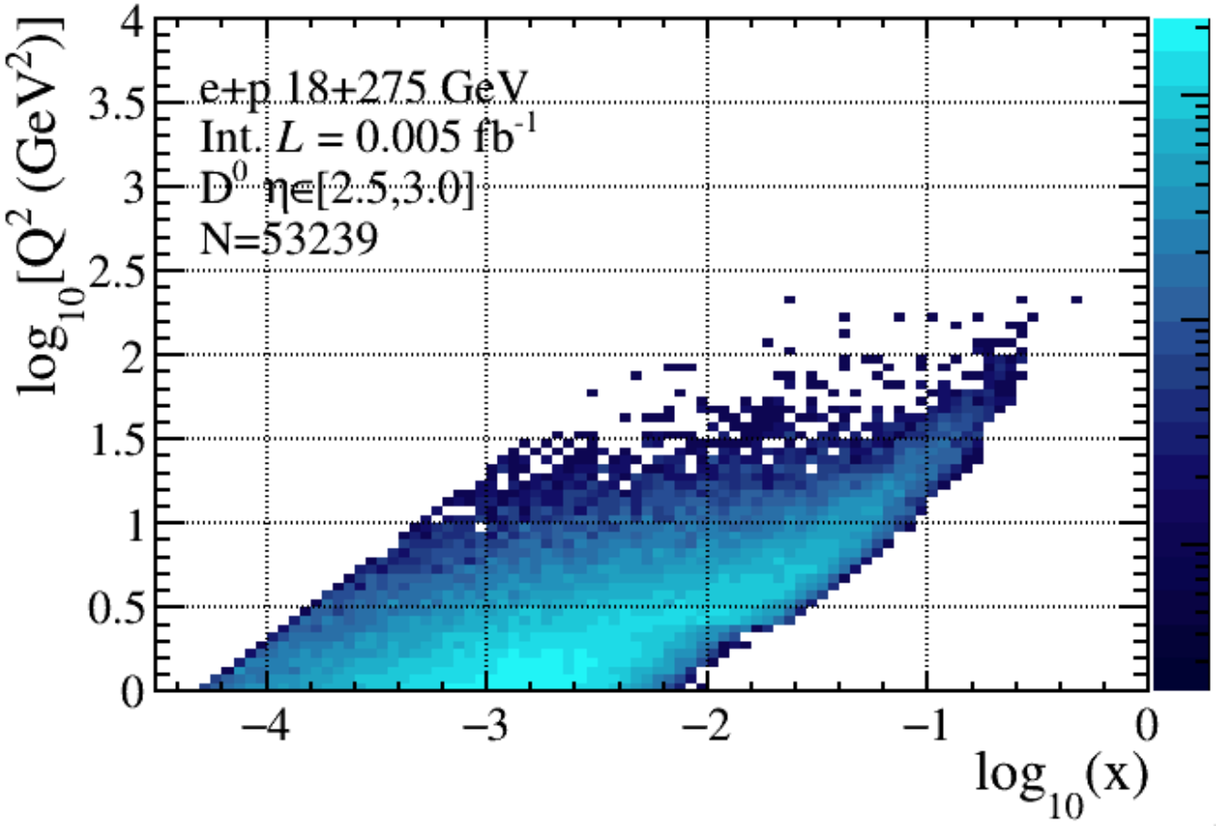
- Midrapidity (for |η| < 1.5) performance is similar between Case b and Case c
- Forward rapidity, Case b gives better significance by 5-10%

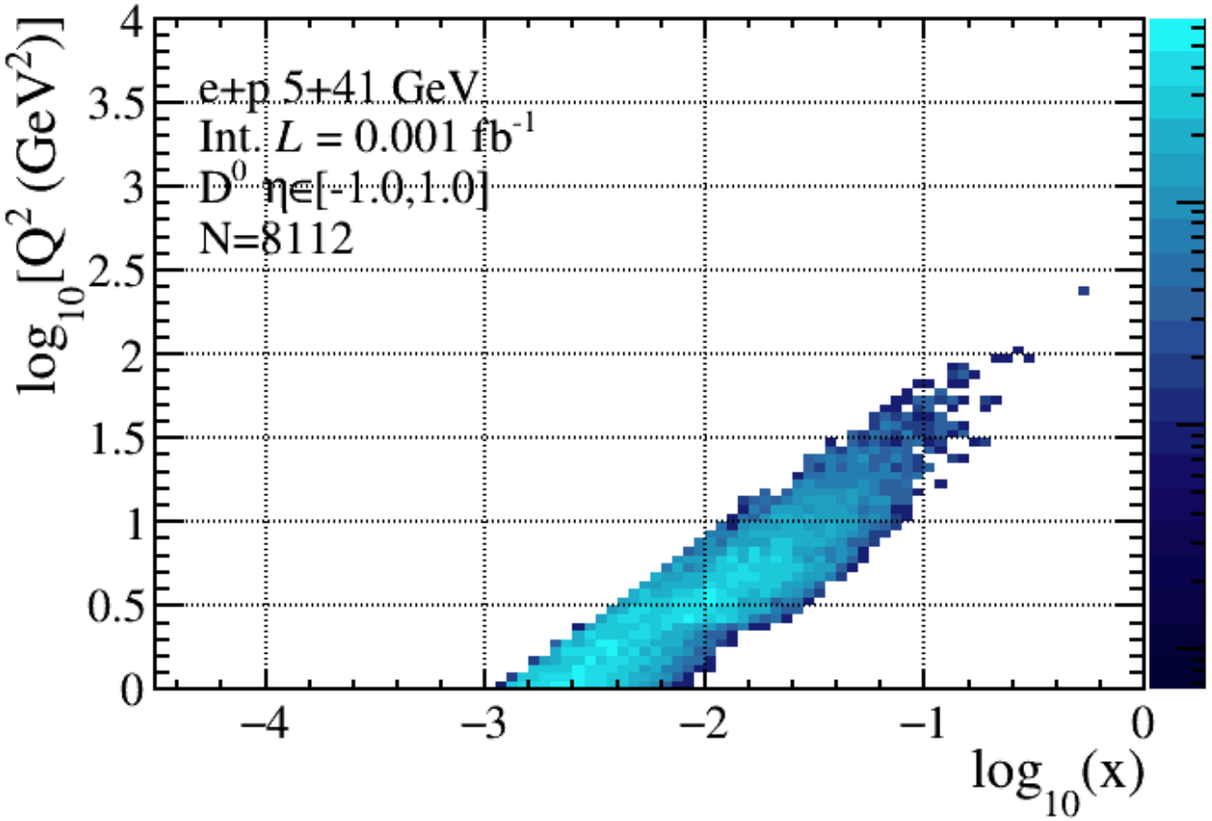
Results for D^0 reconstrcution (only D^0 here, no D^0bar)
Collision Energy: 18 + 275 GeV (e + p)
Luminosity: 0.1 fb^{-1}

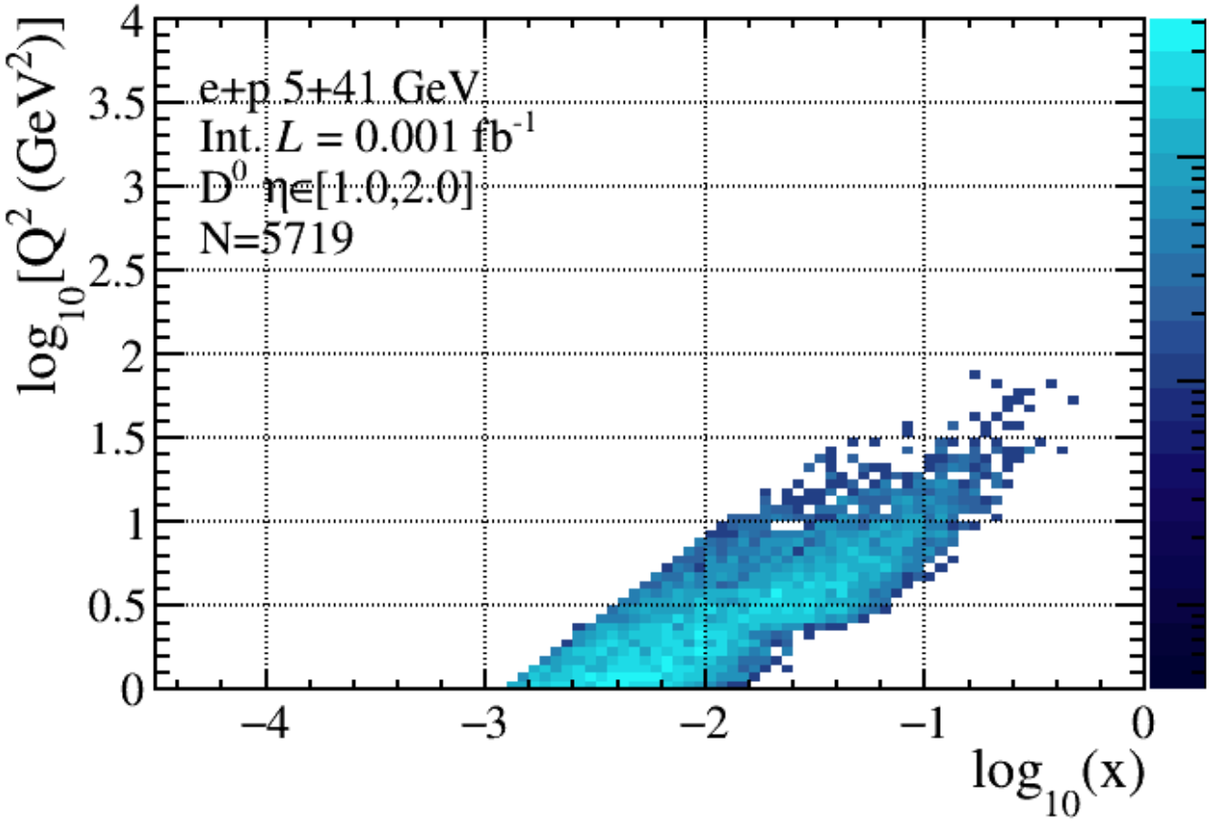

e+p 18+275 GeV
Int. L = 0.005 fb^{-1}
D^0 η∈[-1.0,1.0]
N=208697
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)

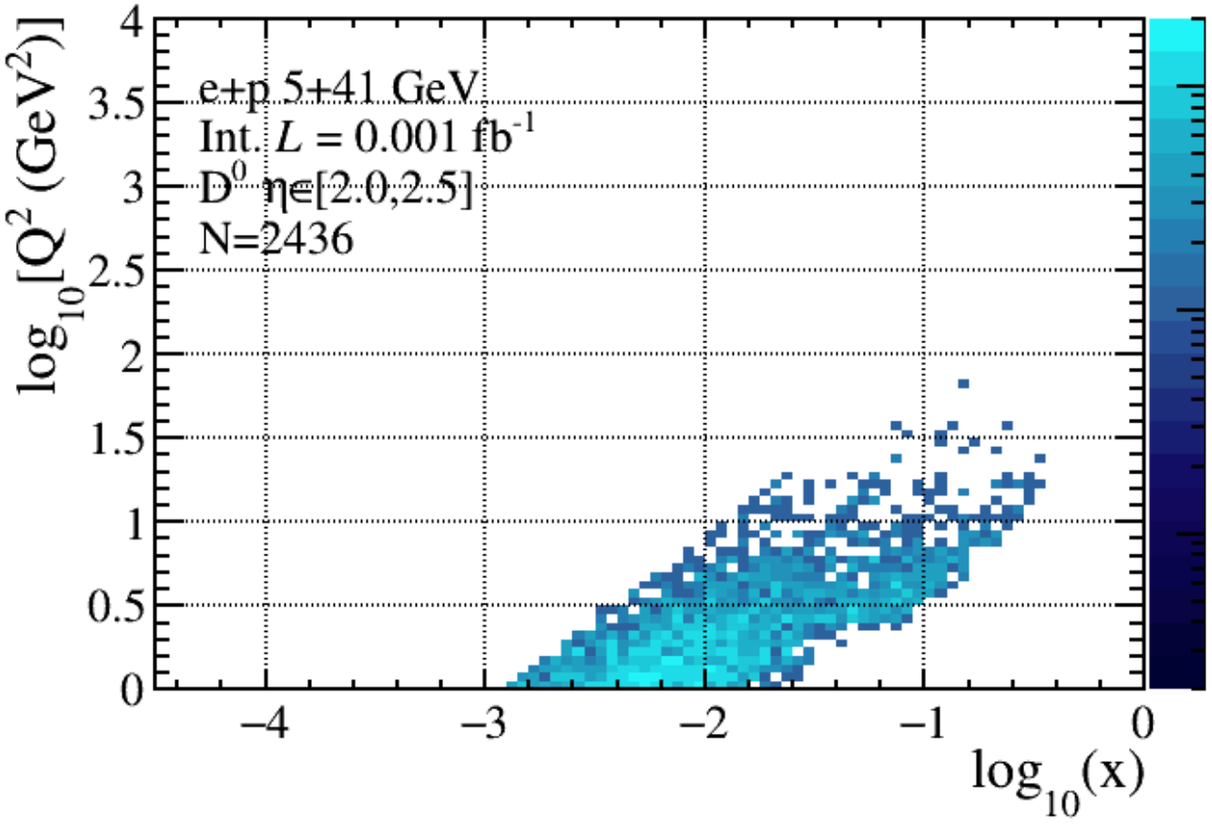

e+p 18+275 GeV
Int. L = 0.005 fb^{-1}
D^0 η∈[1.0,2.0]
N=119643
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)

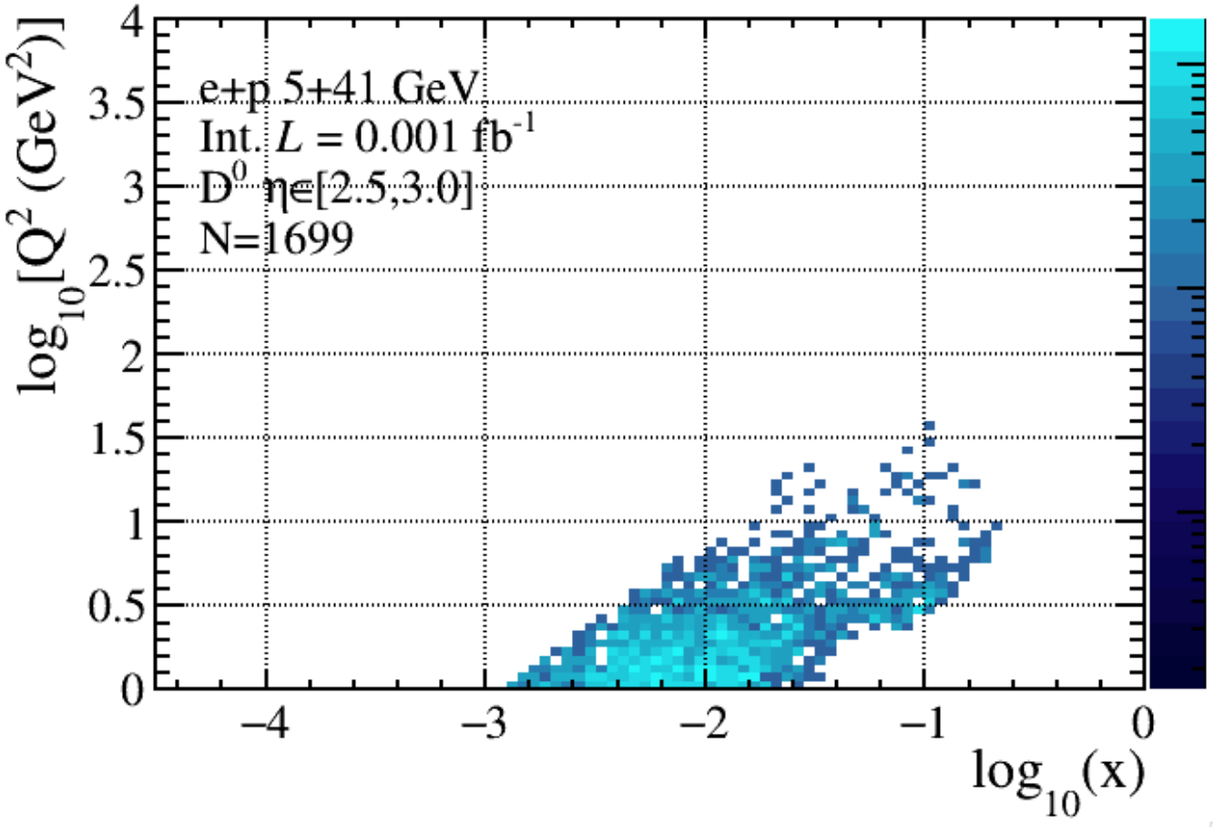

e+p 18+275 GeV
Int. L = 0.005 fb^{-1}
D^0 η∈[2.0,2.5]
N=59343
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)


e+p 18+275 GeV
Int. L = 0.005 fb^{-1}
D^0 η∈[2.5,3.0]
N=53239
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)

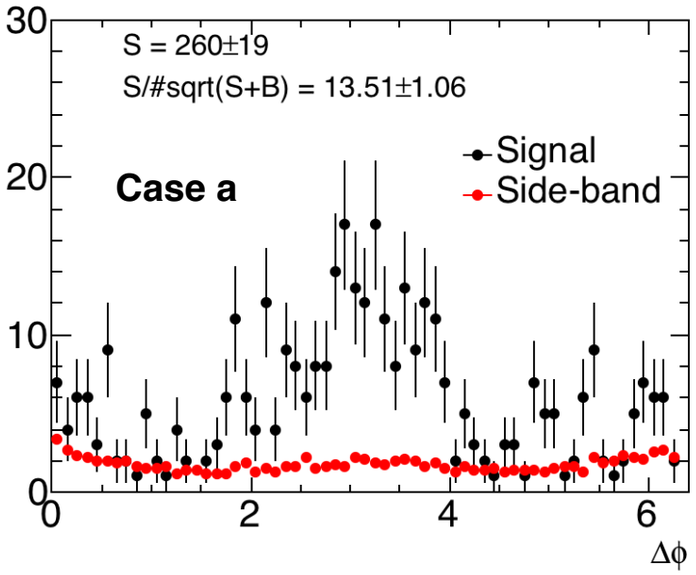

e+p 5+41 GeV
Int. L = 0.001 fb^{-1}
D^0 η∈[-1.0,1.0]
N=8112
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)

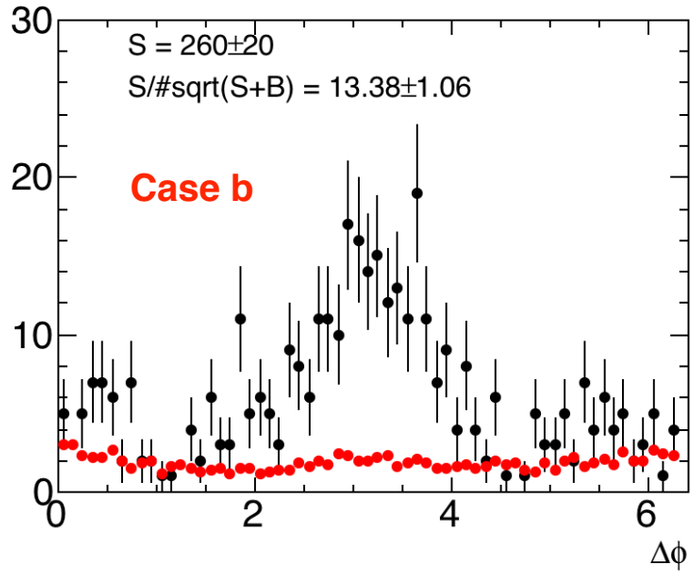

e+p 5+41 GeV
Int. L = 0.001 fb^{-1}
D^0 η∈[1.0,2.0]
N=5719
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)

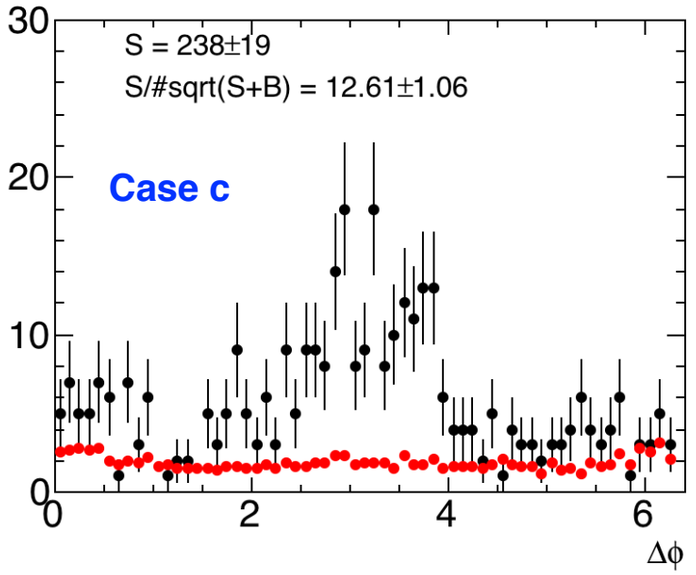

e+p 5+41 GeV
Int. L = 0.001 fb^{-1}
D^0 η∈[2.0,2.5]
N=2436
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)

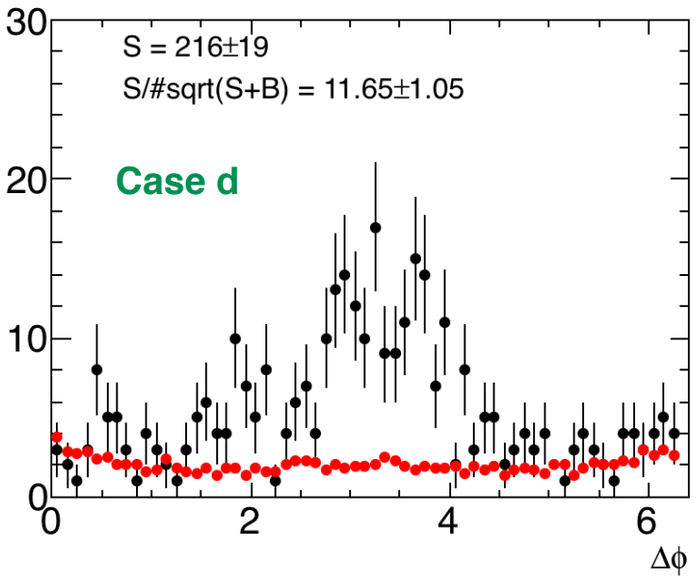

e+p 5+41 GeV
Int. L = 0.001 fb^{-1}
D^0 η∈[2.5,3.0]
N=1699
log$_{10}$[Q^2 (GeV^2)]
log$_{10}$(x)

DDbar reconstruction









- Drop in counts and significance going from Case a —> Case d
- About 5% difference in significance between Case b and Case c, ~15% between Case a and Case d

Collision Energy: 18 + 275 GeV (e + p)
Luminosity: 0.1 fb^{-1}