Blessing
Gap-X-Gap studies
for √s = 1960GeV, 900GeV
X = 2 hadrons

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- Gap cuts & exclusivity cuts
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- Mass vs Pt raw data / acceptance / corrected
- Invariant mass corrected for acceptance – energy comparison
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Gap cuts and exclusivity cuts

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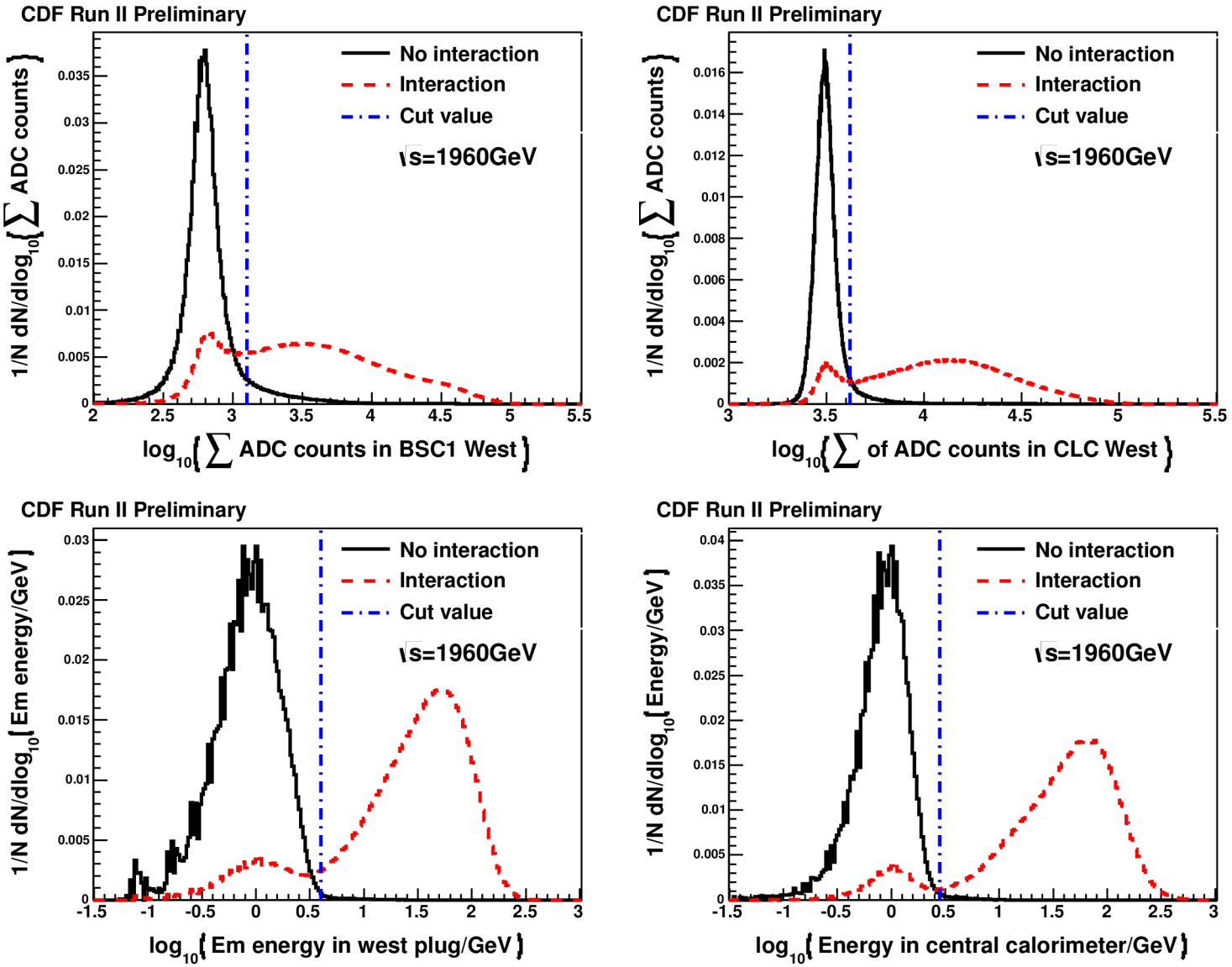

Exclusive efficiencies & L

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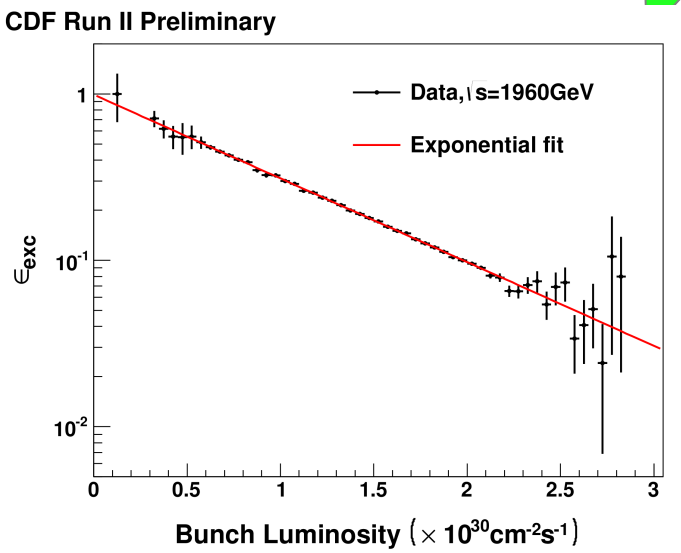
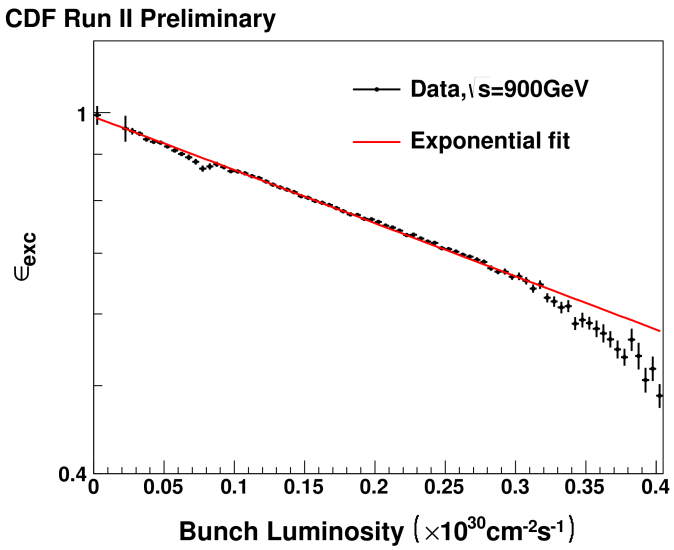
- Total luminosities:
  - 7.12/pb – 1960 GeV
  - 0.074/pb – 900 GeV
- Effective luminosities:
  - 1.18/pb – 1960 GeV
  - 0.059/pb – 900 GeV





Invariant mass – no corrections

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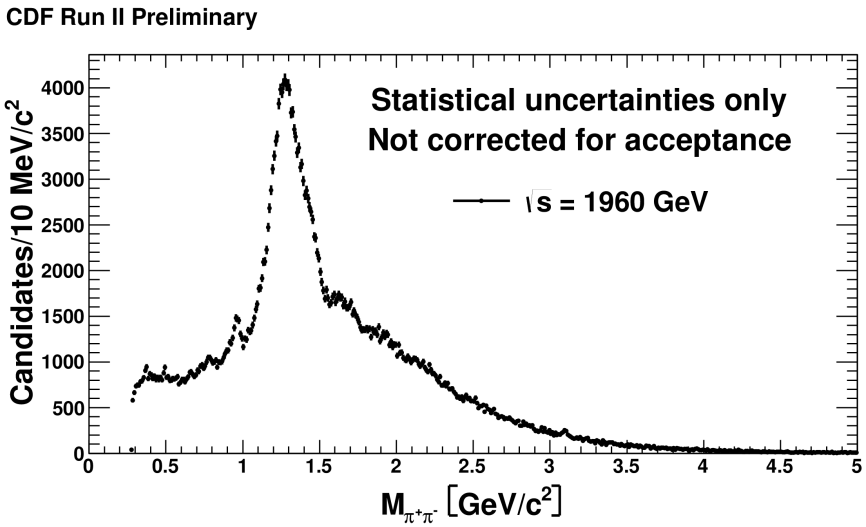
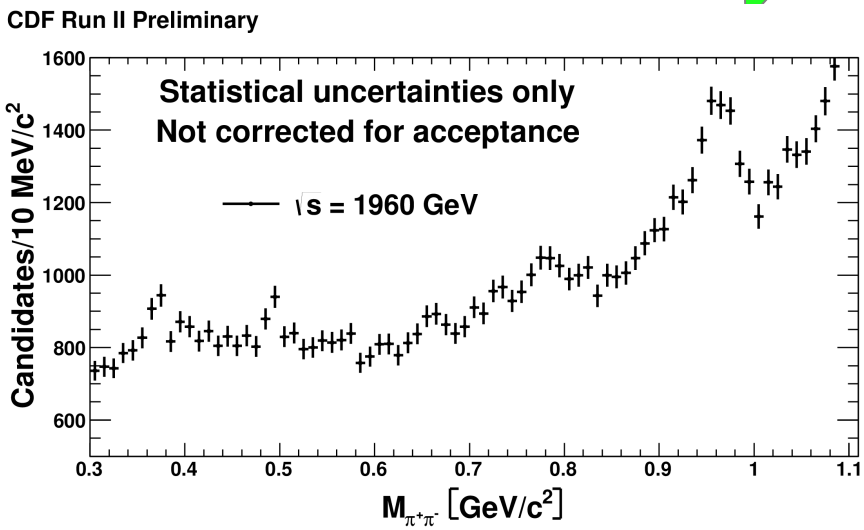
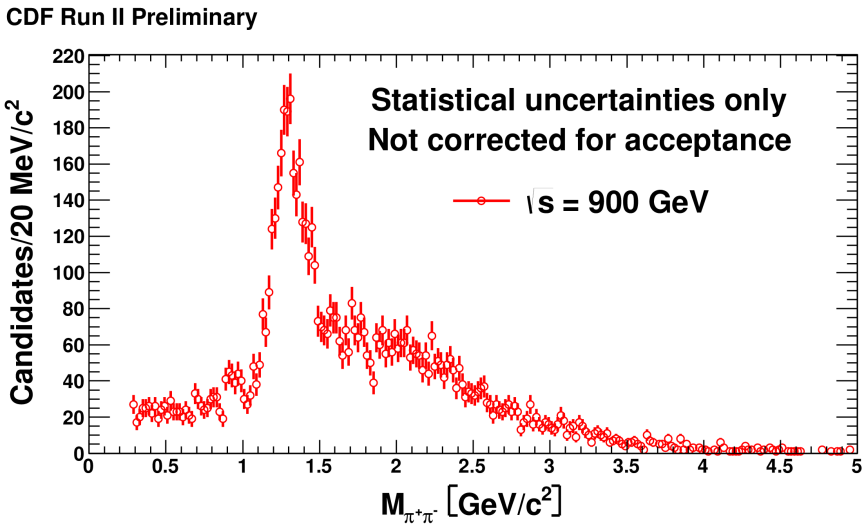
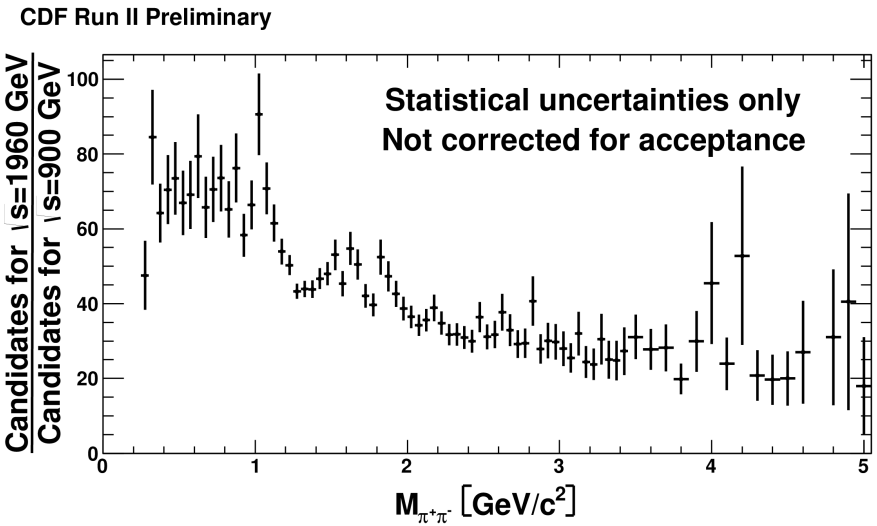
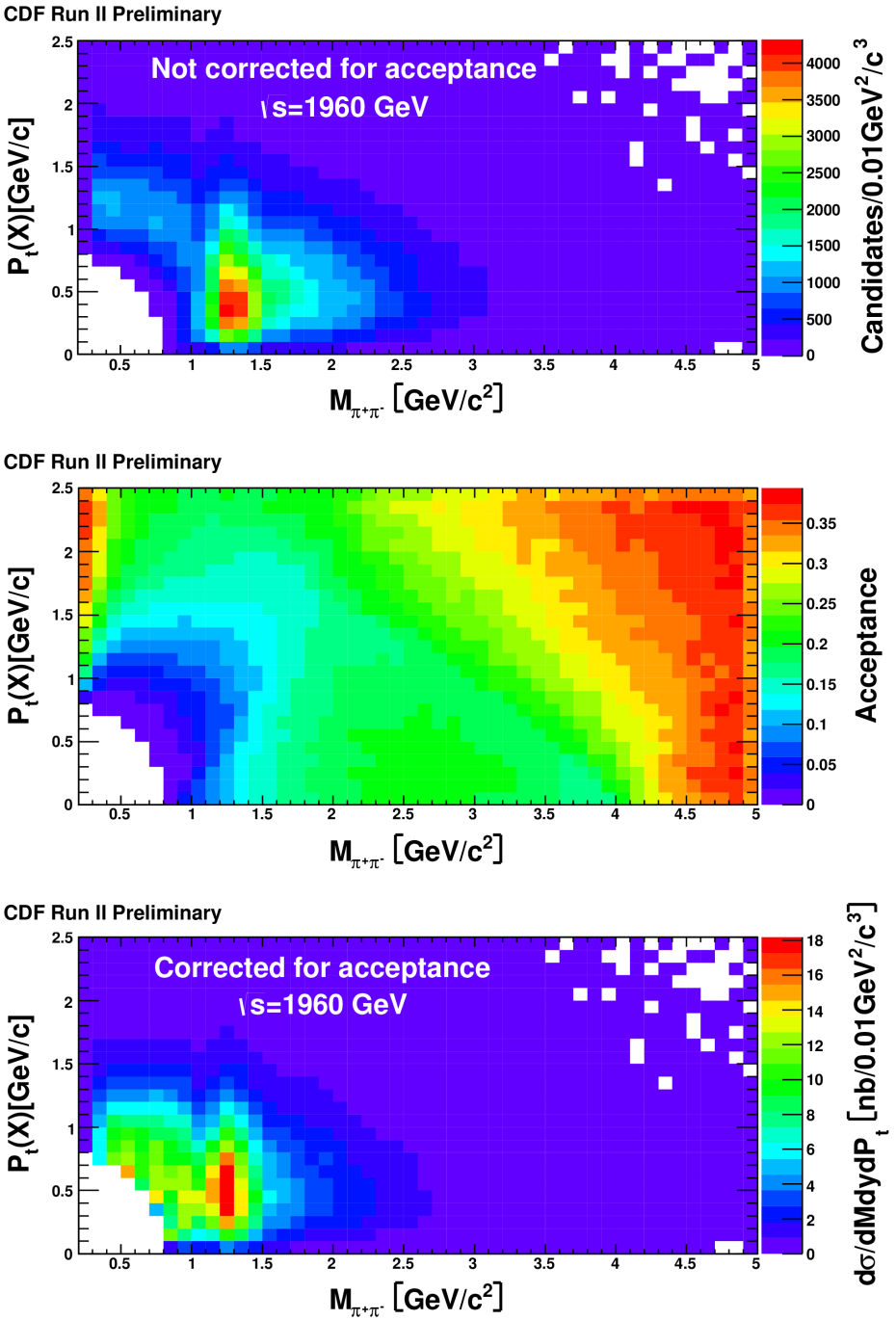




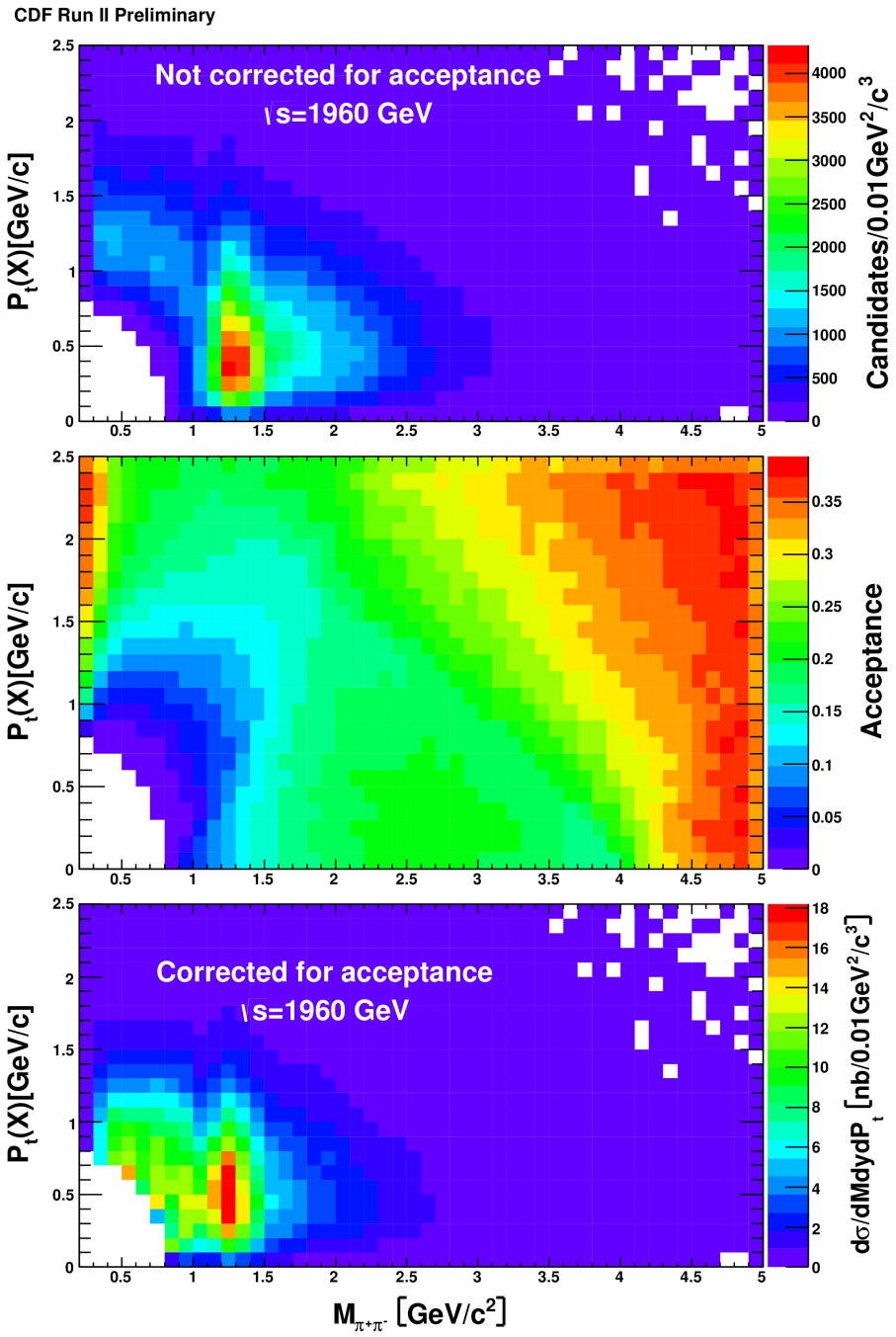




Invariant mass vs p_T Acceptance

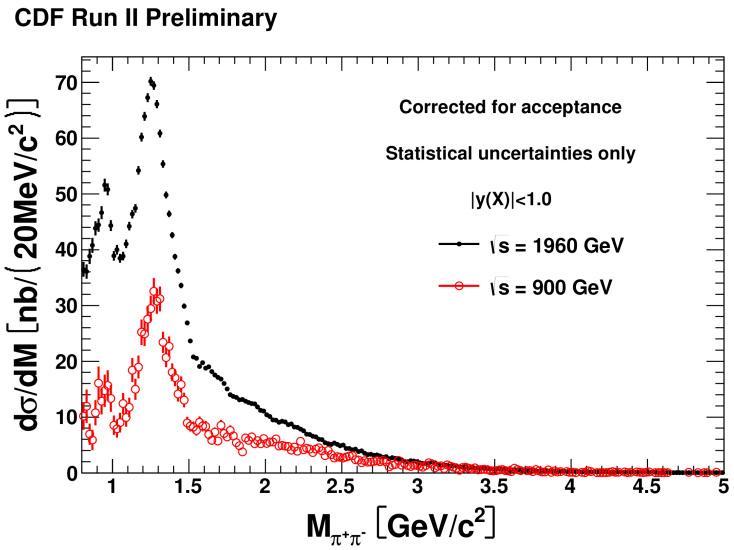


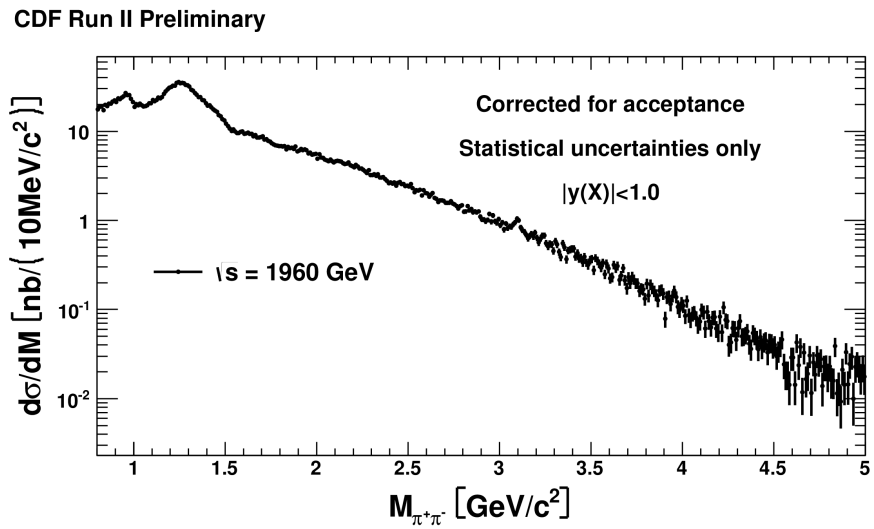
Invariant mass vs p_T Acceptance

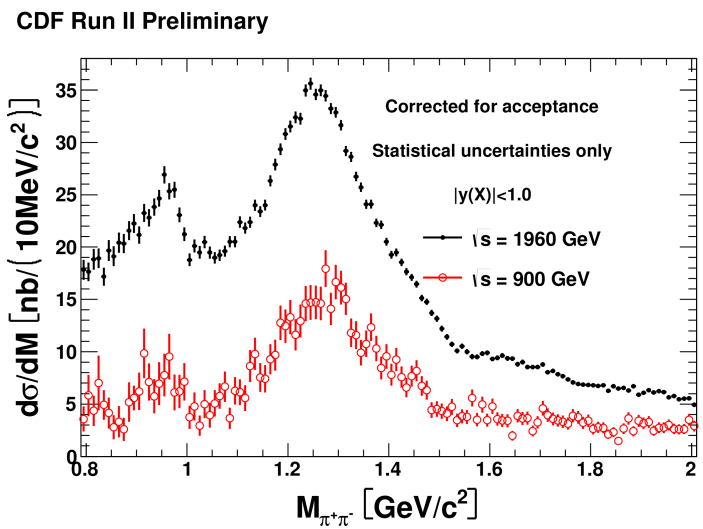


Invariant mass
Energy comparison

Bless







Integrated cross sections

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1960 GeV [0.8 : 5.0] GeV/c^2 –
2343.17 +/- (470)syst +/- (5.5)stat

1960 GeV [1.0 : 5.0] GeV/c^2 –
1909.58 +/- (380)syst +/- (4.0)stat

900 GeV [0.8 : 5.0] GeV/c^2 –
943.187 +/- (190)syst +/- (13) stat

900 GeV [1.0 : 5.0] GeV/c^2 –
824.904 +/- (160)syst +/- (11) stat

Tail fitting

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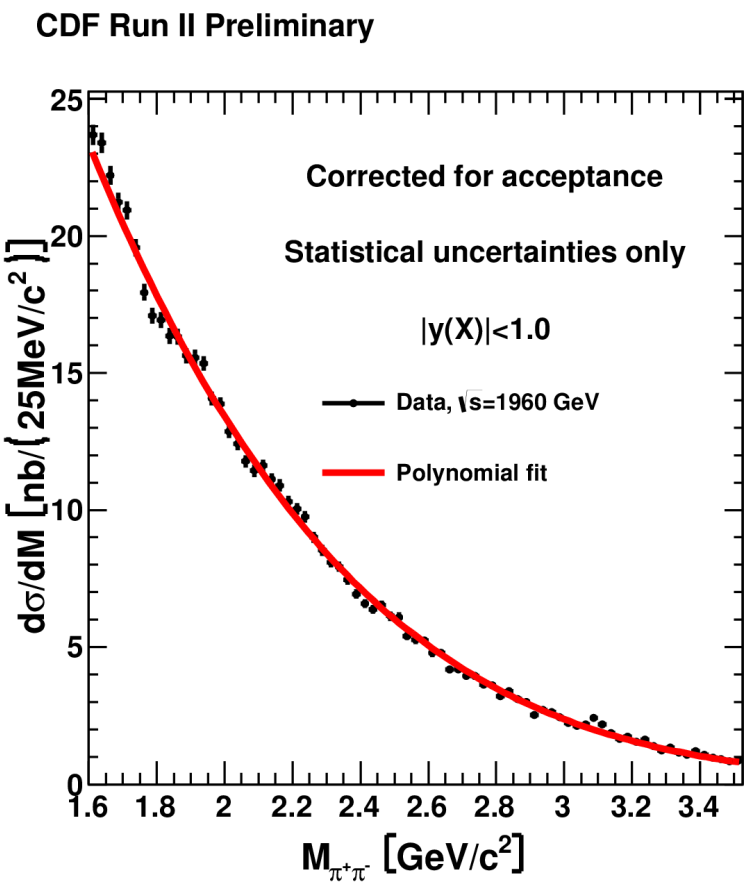

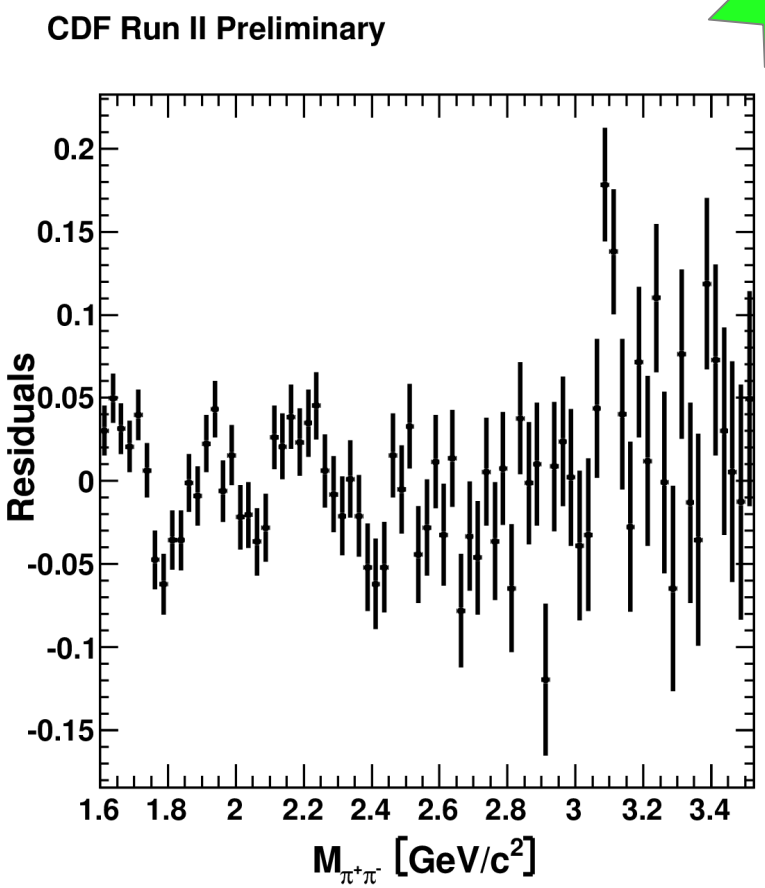

4'th order polynomial fit, coefficients

p0	128.778	+-	0.0181
p1	-113.060	+-	0.00558
p2	37.6828	+-	0.000126
p3	-5.63559	+-	0.000255
p4	0.318353	+-	0.0000447

Mean p_T

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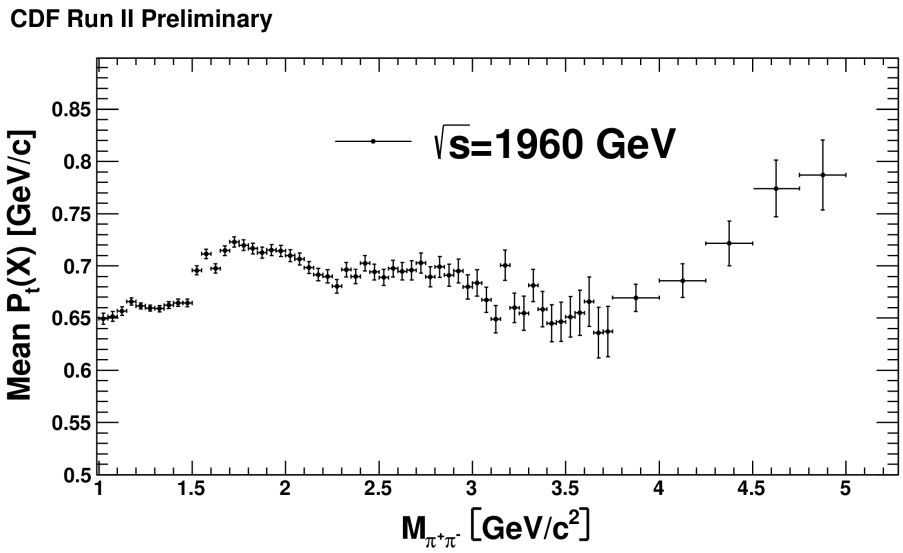

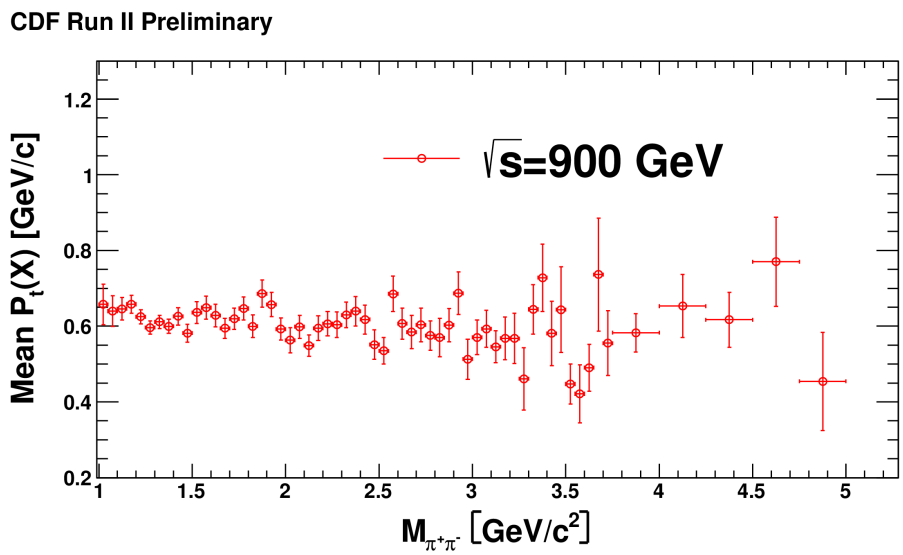

p_T distributions

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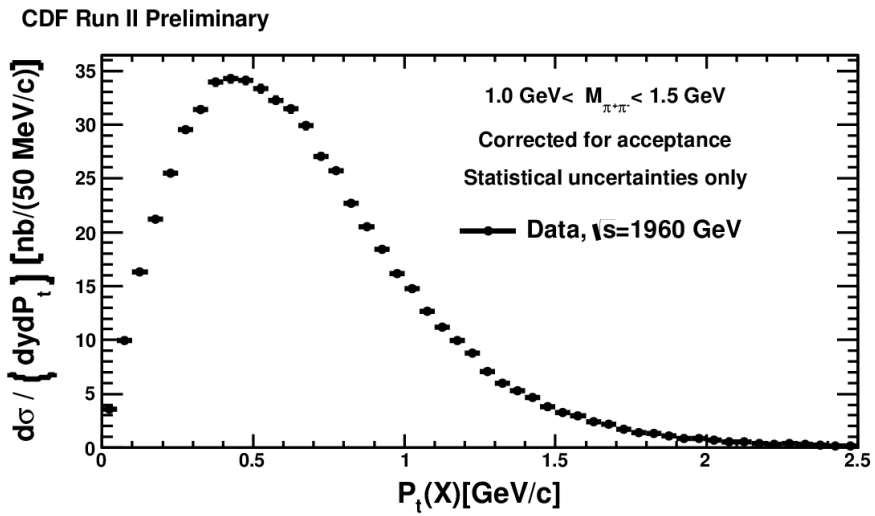
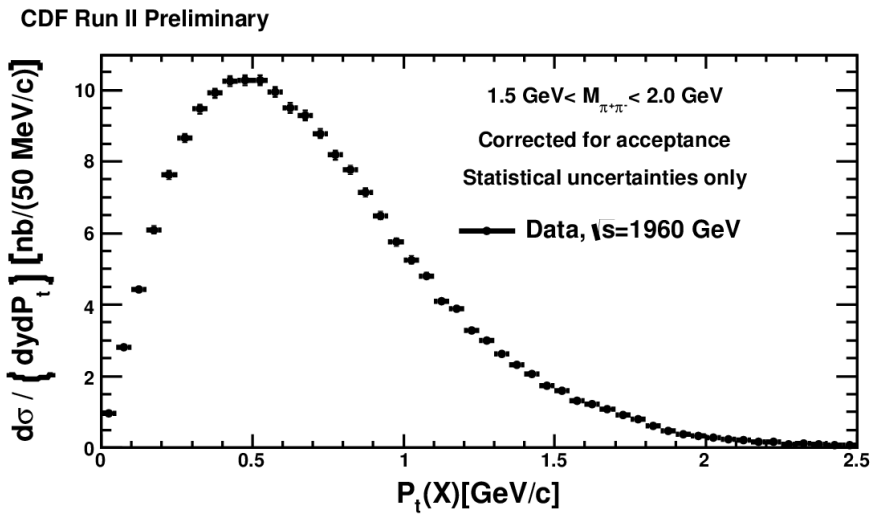
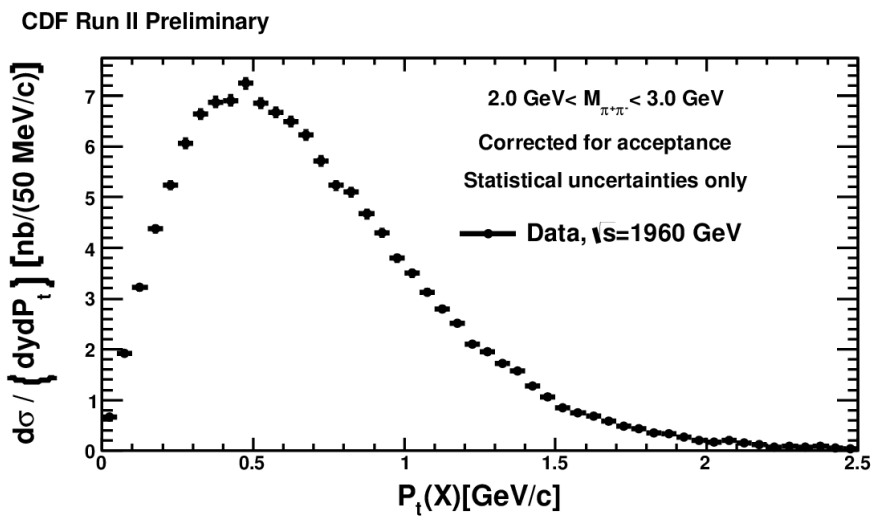
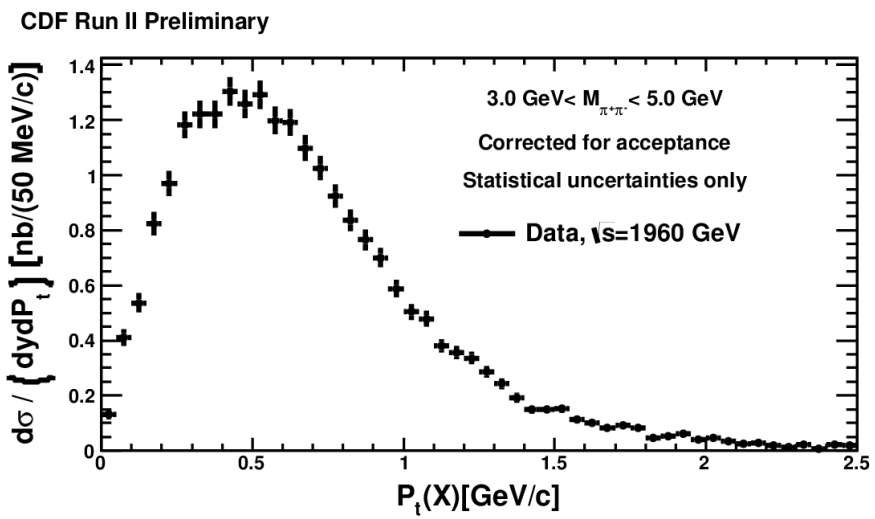


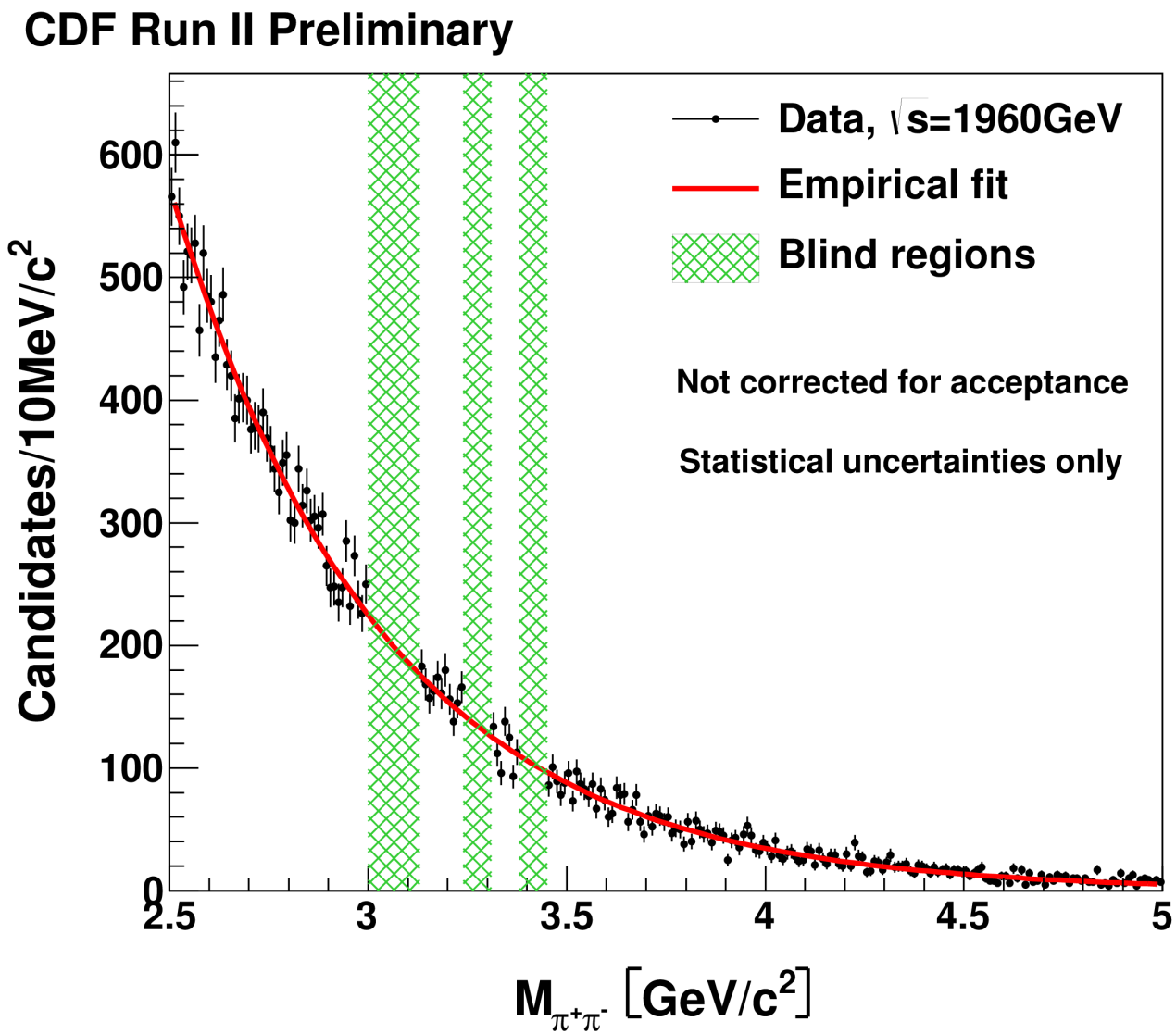






Chi_c & J/psi region

Bless



Exponential fit

Parameters:
Constant:
11.0436 +- 0.0374
Slope:
-1.8761 +- 0.0124

Chi_c → pi^+pi^- limit

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We set 90% upper limit on chi_c production using the invariant mass distribution, fitting exponential background to the sidebands and counting events in +- 3 sigma window.

Estimated background	722.9	events
Events in window	754	events
Limit	69.6	
90% ($d\sigma$)/(dy) limit	21.4 +/– 4.2 nb syst	

(24.2% acceptance, BR=0.0057(3))

Chi_c → K^+K^- limit

Bless

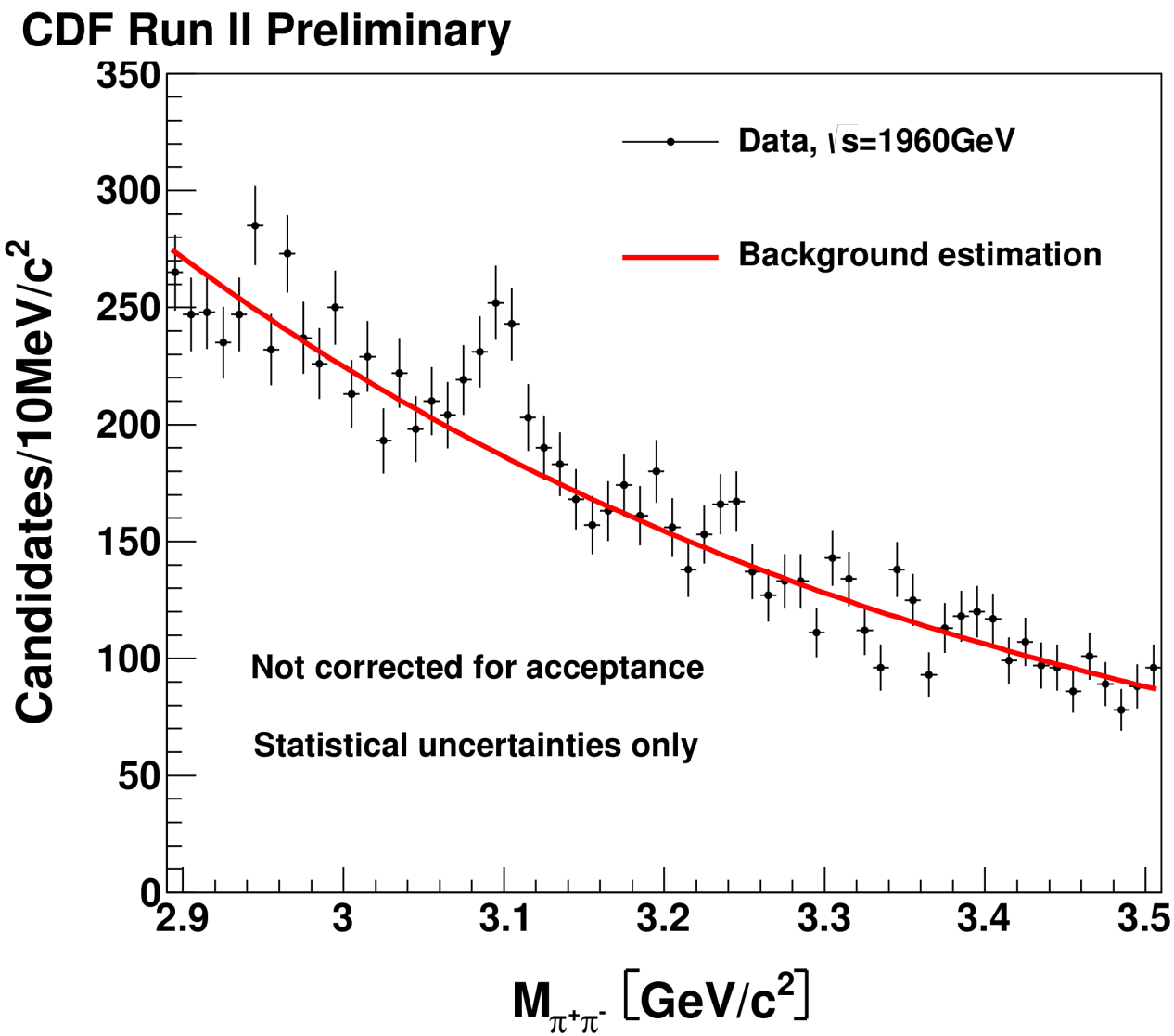
We set 90% upper limit on chi_c production using the invariant mass distribution, fitting exponential background to the sidebands and counting events in +- 3 sigma window.

Estimated background	940.0	events
Events in window	951	events
Limit	59.2	events
90% ($d\sigma$)/(dy) limit	18.9 +/– 3.8 nb syst	

(21.8% acceptance, BR=0.00606(35))

J/psi region

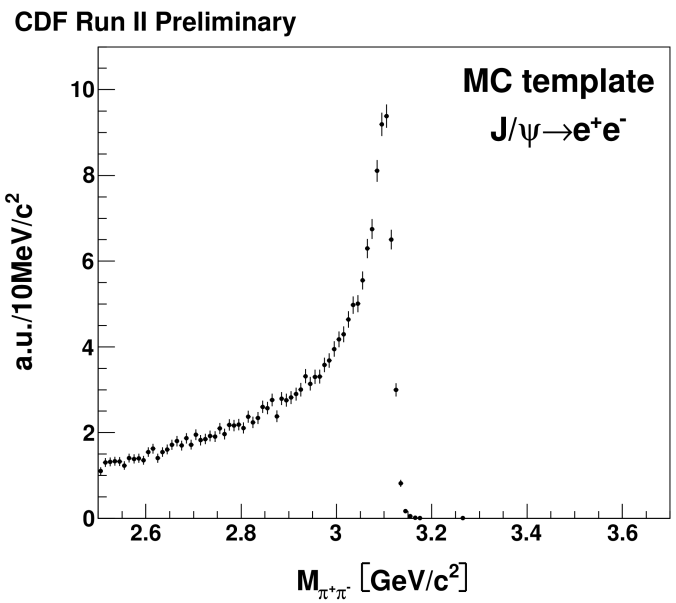
Bless

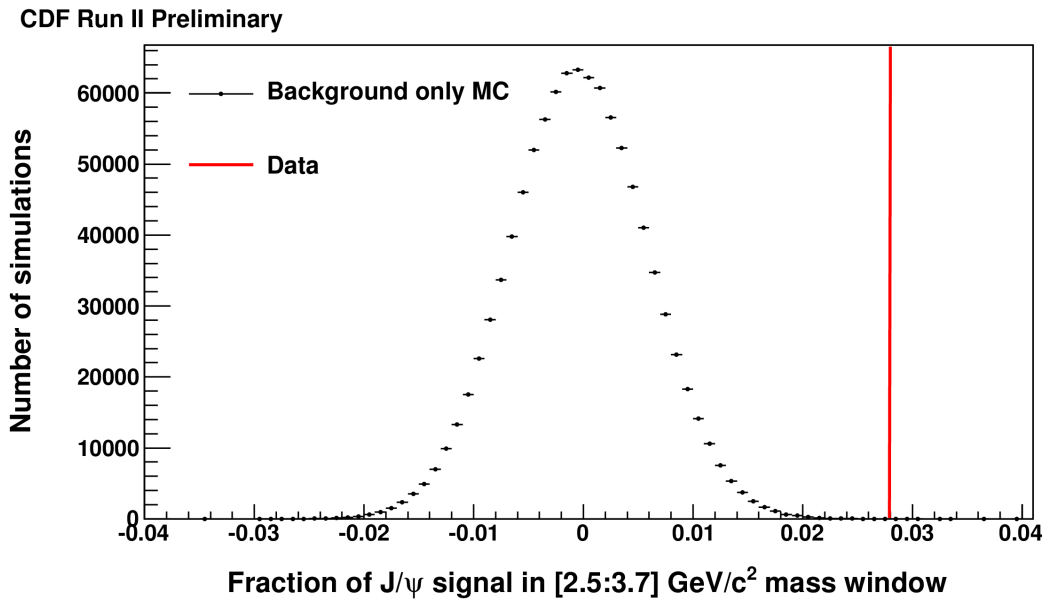


Same background as on previous slides

Peak significance

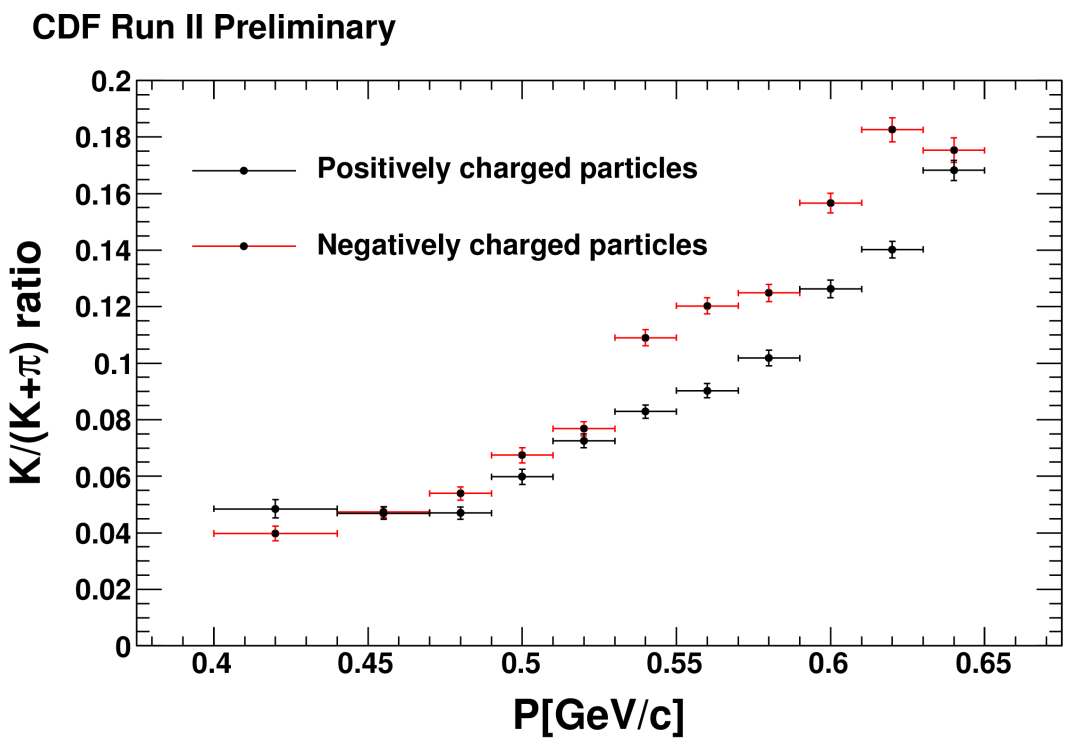
Significance of the peak assuming J/psi->e+e- only is 4.46 σ. This is overestimating the amount of J/psi (factor of 10), probably because of μ+μ- decay mode.





K^+K^- background

Estimation of K^+K^- background using dE/dx method: 2 Gaussians fits to P bands



In 0.40-0.75 GeV/c

12 %

Summary and concusions

This is the largest sample of exclusive 2-hadron data (Double Pomeron), at the highest √s (LHC experiments have only few thousands of events, unpublished), with the biggest rapidity gaps. Two s-value comparison is very useful (300 GeV too sparse)

We see several resonance structures, DPE quantum numbers are constraned: J(PC)=0(++) or 2(++). This sector is poorly known above 1.5GeV/c^2. Phase shift analysis to be done.

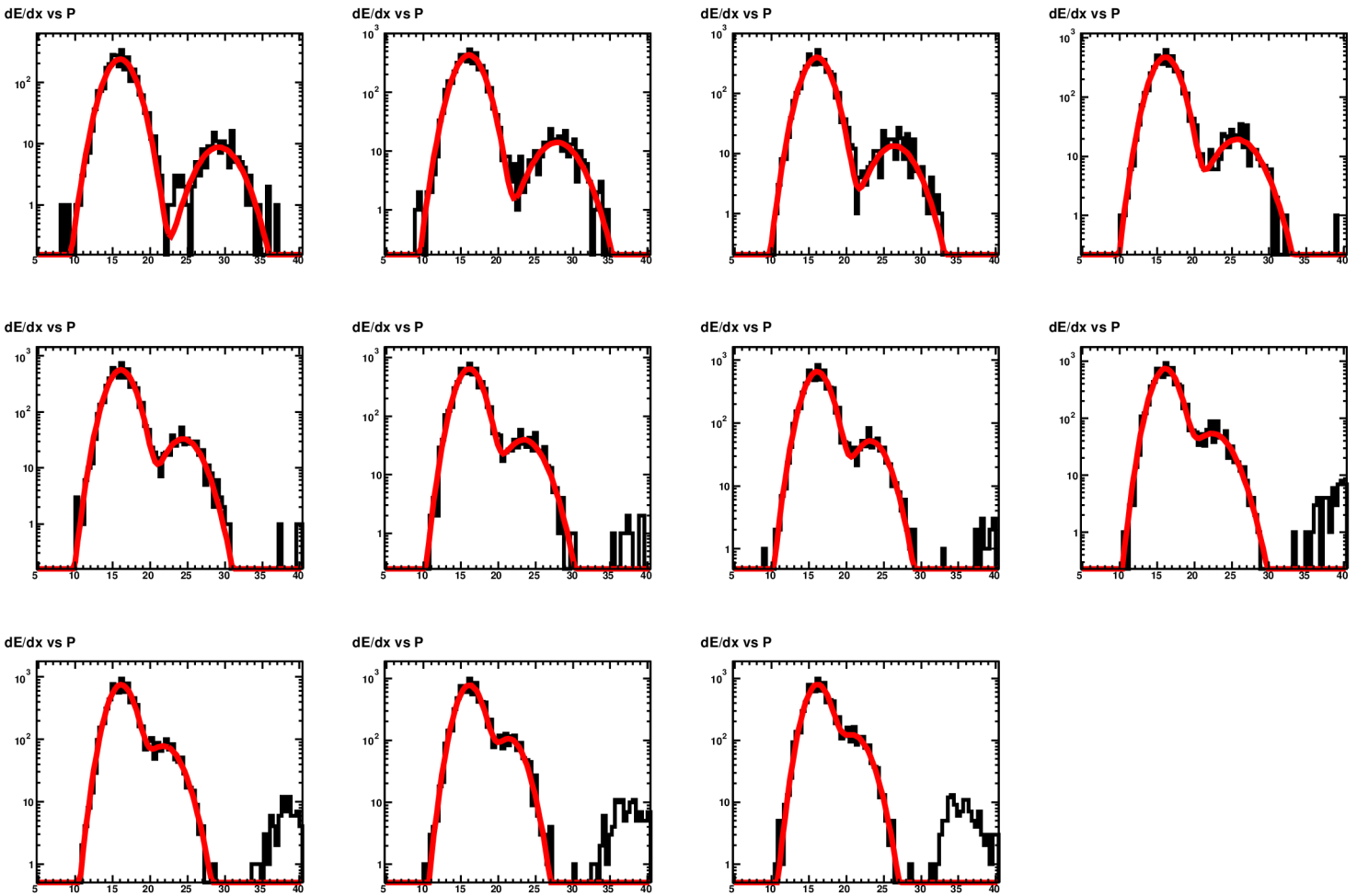
K+K- and K0sK0s spectra to come

We calculate χc → K+K-, π+π- limits.

We ask for blessing, to present at DIFF2012 (Sept 11th). Request GPs, draft paper (JHEP) in September, to submit in 2012.

Next paper will be 4-track exclusives: 4 prompt (e.g. ρ-ρ, K*Kπ) 2 Vees (K0sK0s, ΛΛbar) and 1 vee 2 prompt (eg K0sKπ,ΛpK,).

Thank you


dE/dx vs P
dE/dx vs P
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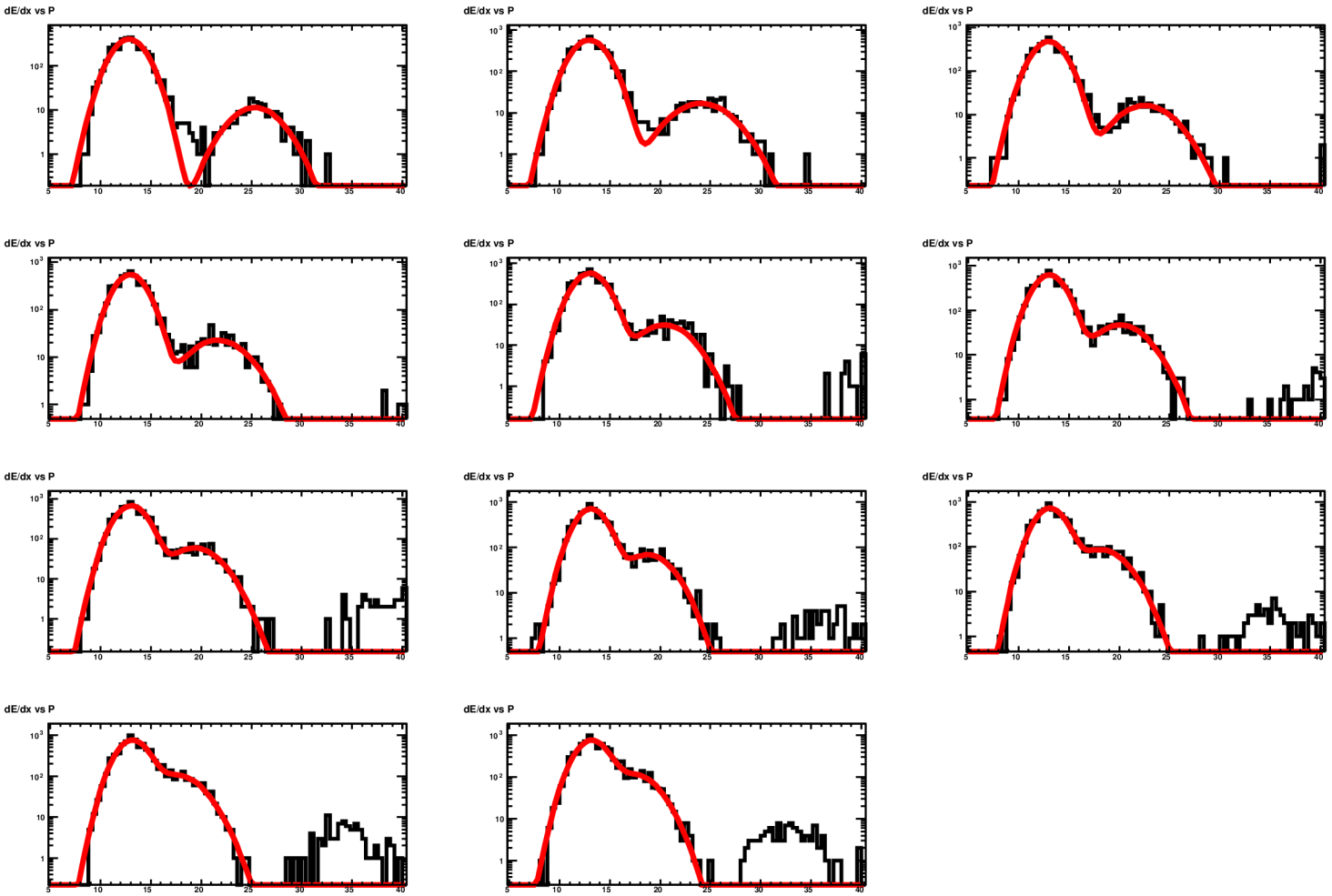
dE/dx vs P