Detector Concepts

Fritz-Herbert Heinsius (Universität Freiburg)

- Target/Luminosity
- COMPASS detector
- New proposals
  - STORS (I.Savin)
- Additions:
  - Recoil detector
    - protons
    - neutral particels
  - Electromagnetic calorimeter
  - Particle Id?
  - Acceptance?
  - Trigger?

Target and Luminosity

- Unpolarized:
  - 2.5m LH_2: $\mathscr{L}=1.3\ 10^{32}\ cm^{-2}s^{-1}$
  - 2.5m LD_2: $\mathscr{L}=3.0\ 10^{32}\ cm^{-2}s^{-1}$

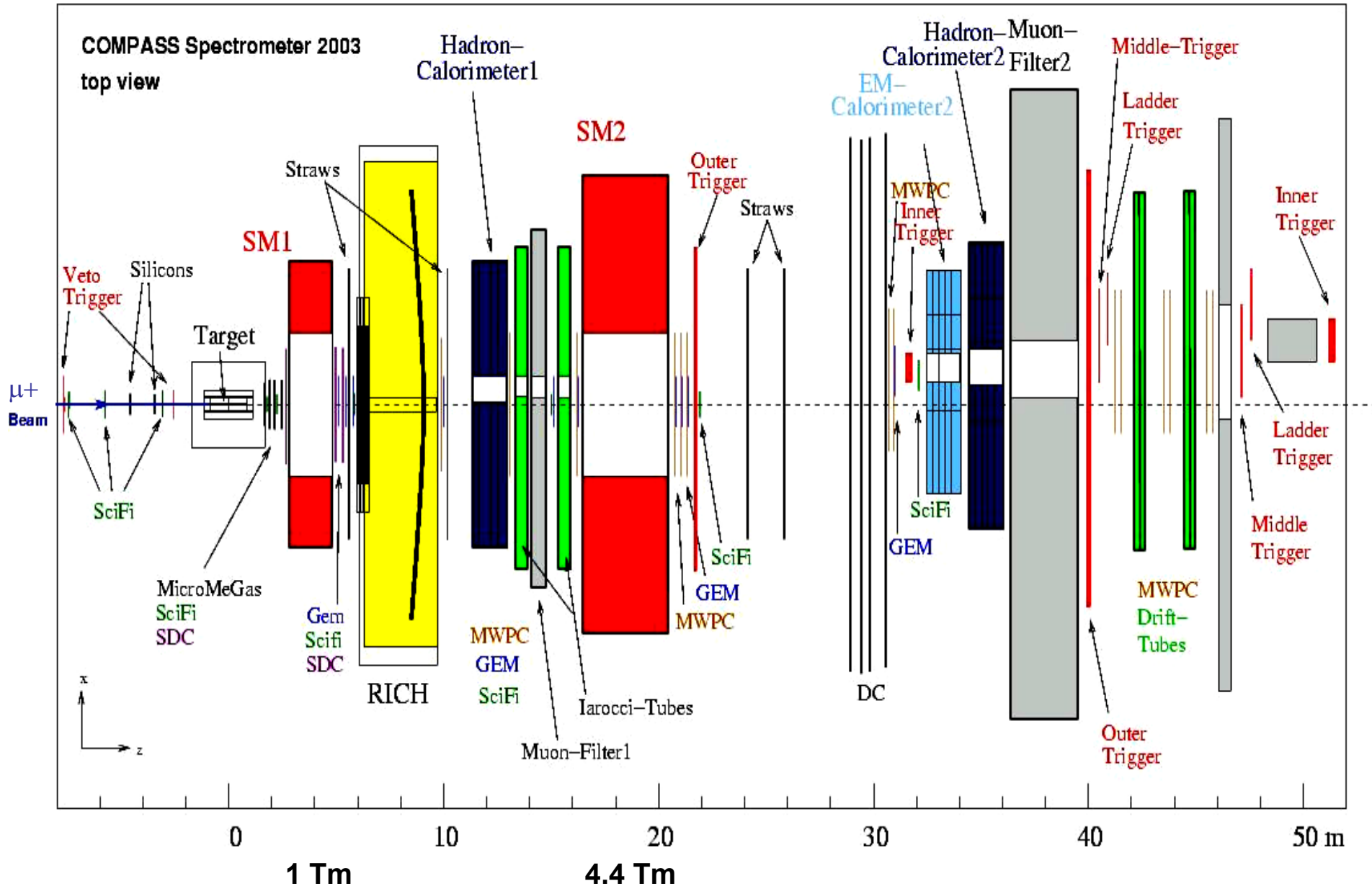
  - 8 cm Cu: $\mathscr{L}=5.0\ 10^{32}\ cm^{-2}s^{-1}$

- Polarized ($f=0.4$, $P_b=0.8$, $P_t=0.5$, D(y)):
  - 1.2m ^6LiD: $\mathscr{L}=5\ 10^{32}\ cm^{-2}s^{-1}$ ($\rho=0.54\ g/cm^3$)

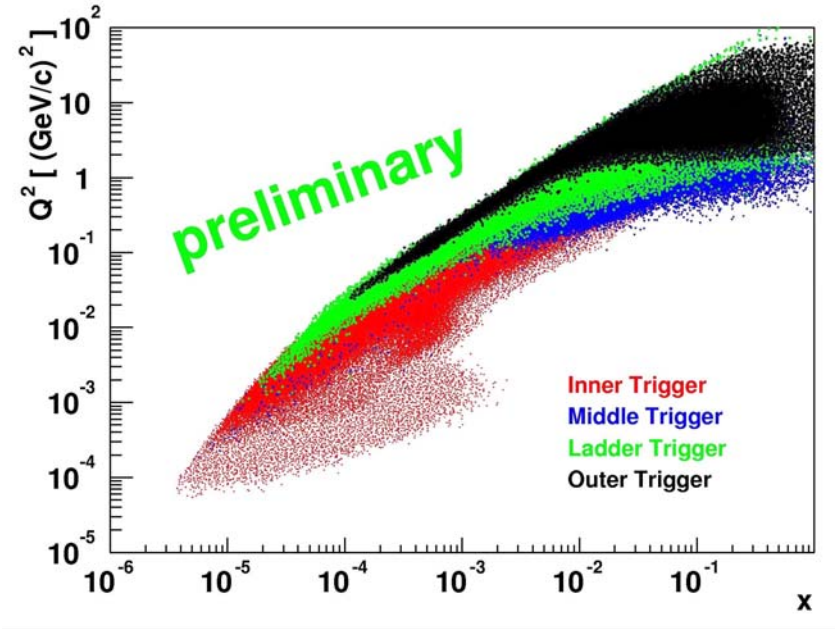
- Assuming $2\ 10^8$ μ per burst (16.8s cycle)

- Absolute luminosity determination: 1% ?

COMPASS Spectrometer 2003/04

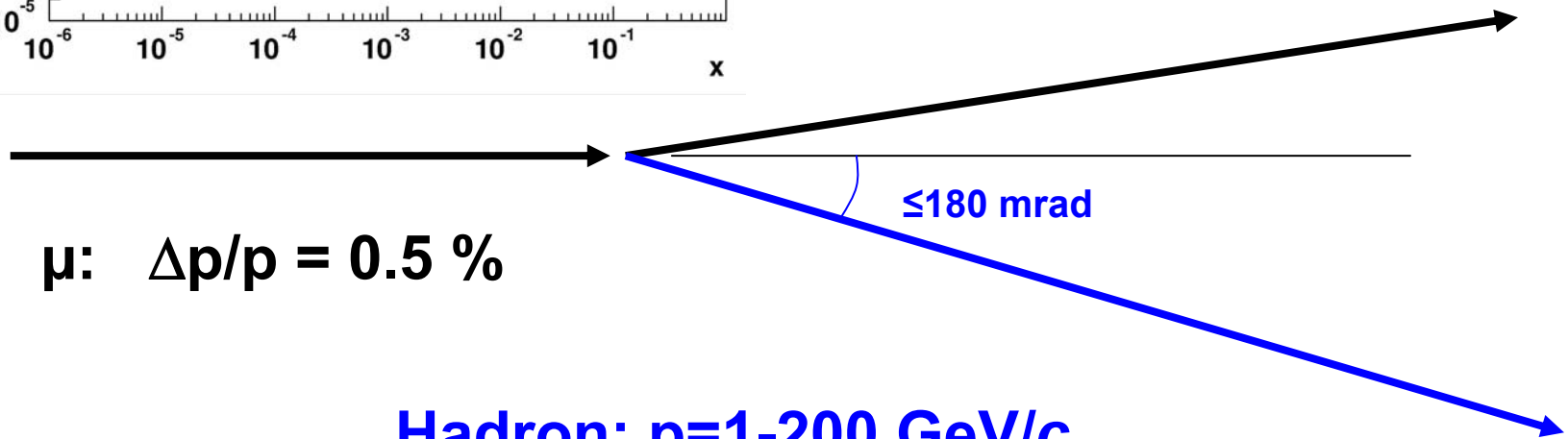


Resolution and acceptance



μ´: $Q^2 = 10^{-4}$ – 100 GeV$^2/c^2$

$x = 10^{-5}$ – ~0.4 (1)

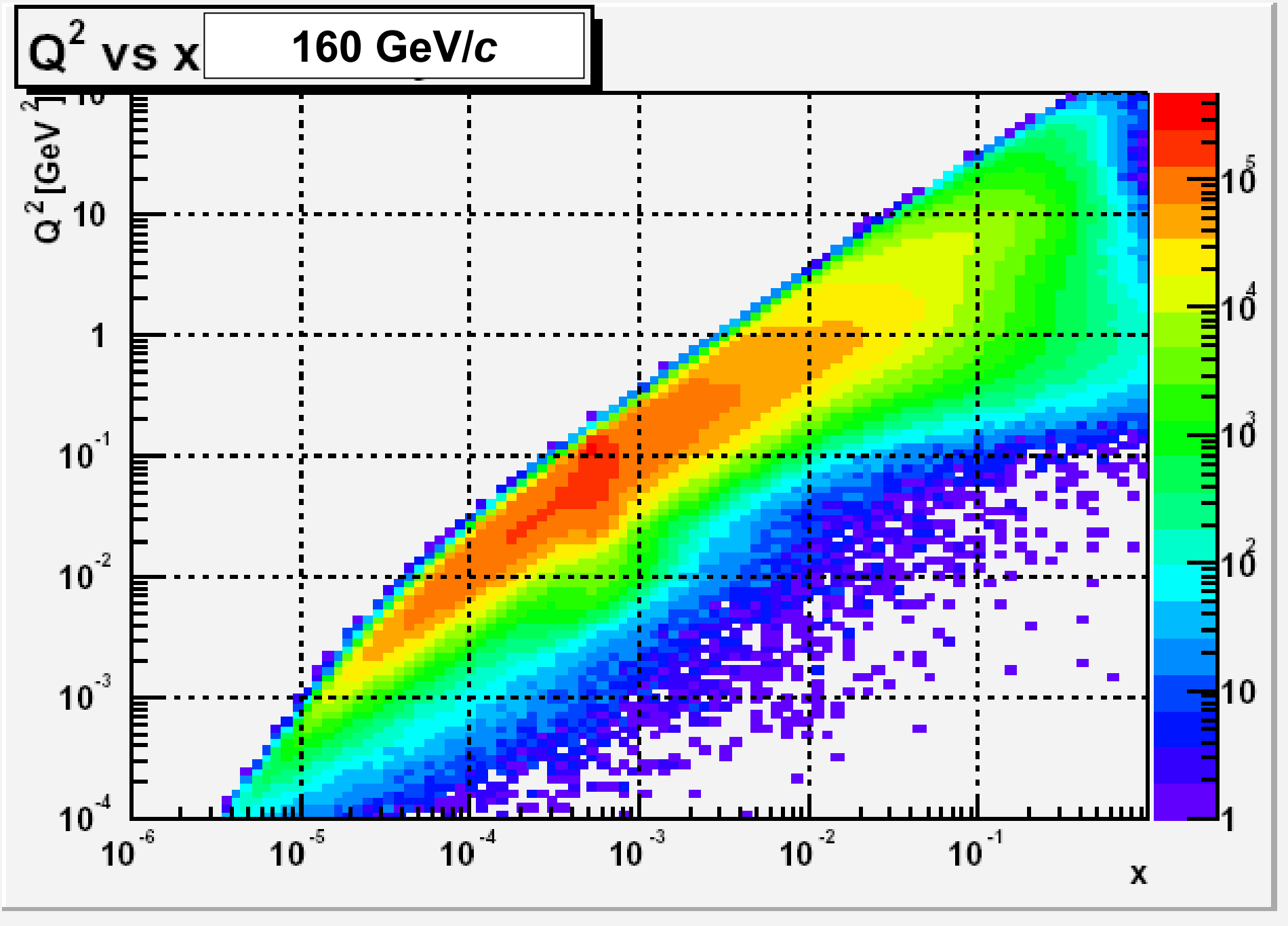


μ: $\Delta p/p$ = 0.5 %

Hadron: p=1-200 GeV/*c*

$\Delta p/p$ ~ 0.5 % at 15GeV/*c*

K/π: 9 – 40 GeV/*c*


Q² vs x
160 GeV/c
Q² [GeV²]
10
1
10⁻¹
10⁻²
10⁻³
10⁻⁴
10⁻⁶
10⁻⁵
10⁻⁴
10⁻³
10⁻²
10⁻¹
x
10⁵
10⁴
10³
10²
10
1

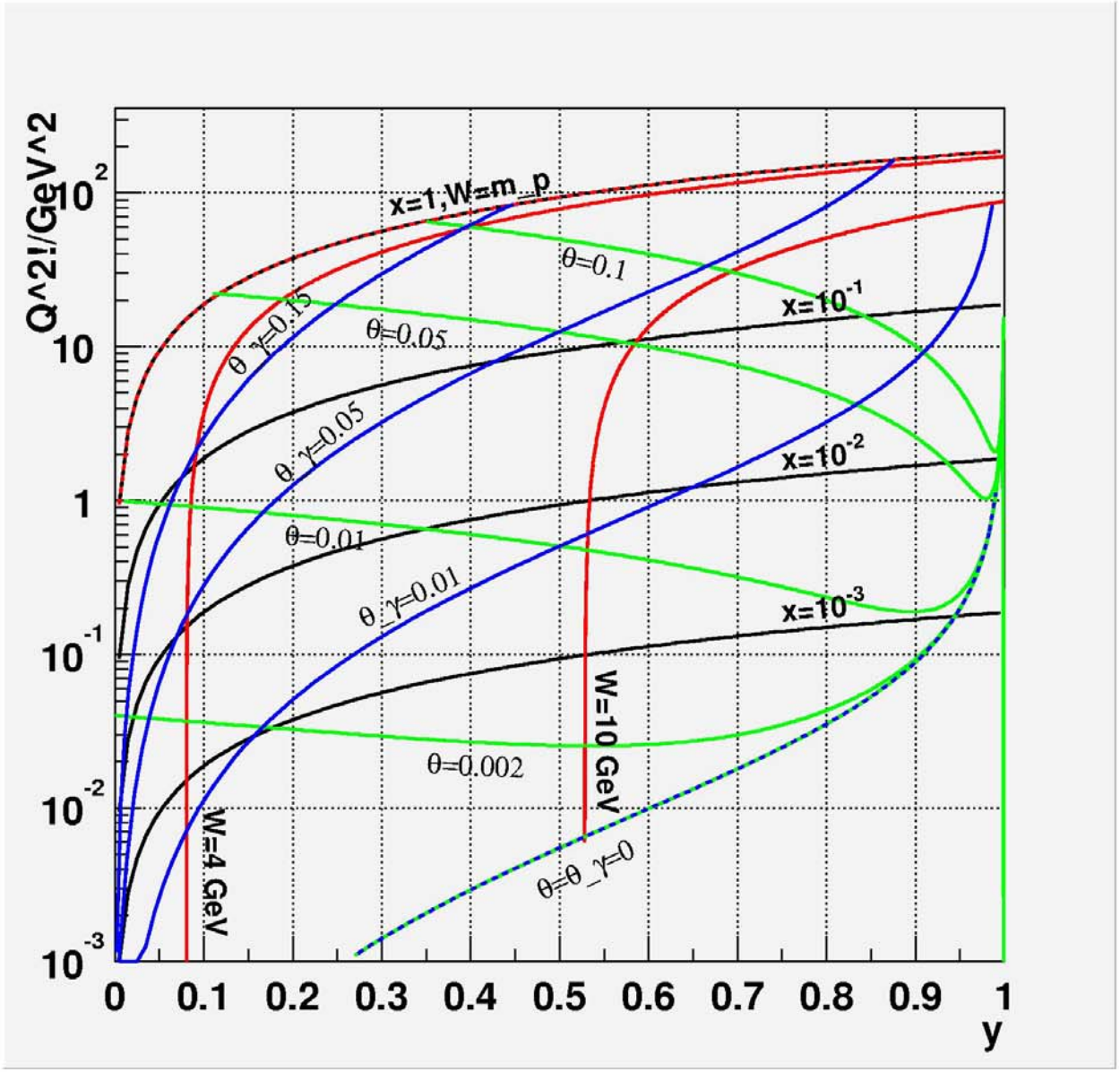


Figure 1: The kinematically allowed region in Q^2 and y for an beam energy of 100 GeV. The different lines show lines of constant x (black), W (red), θ (green) and θ_γ (blue).

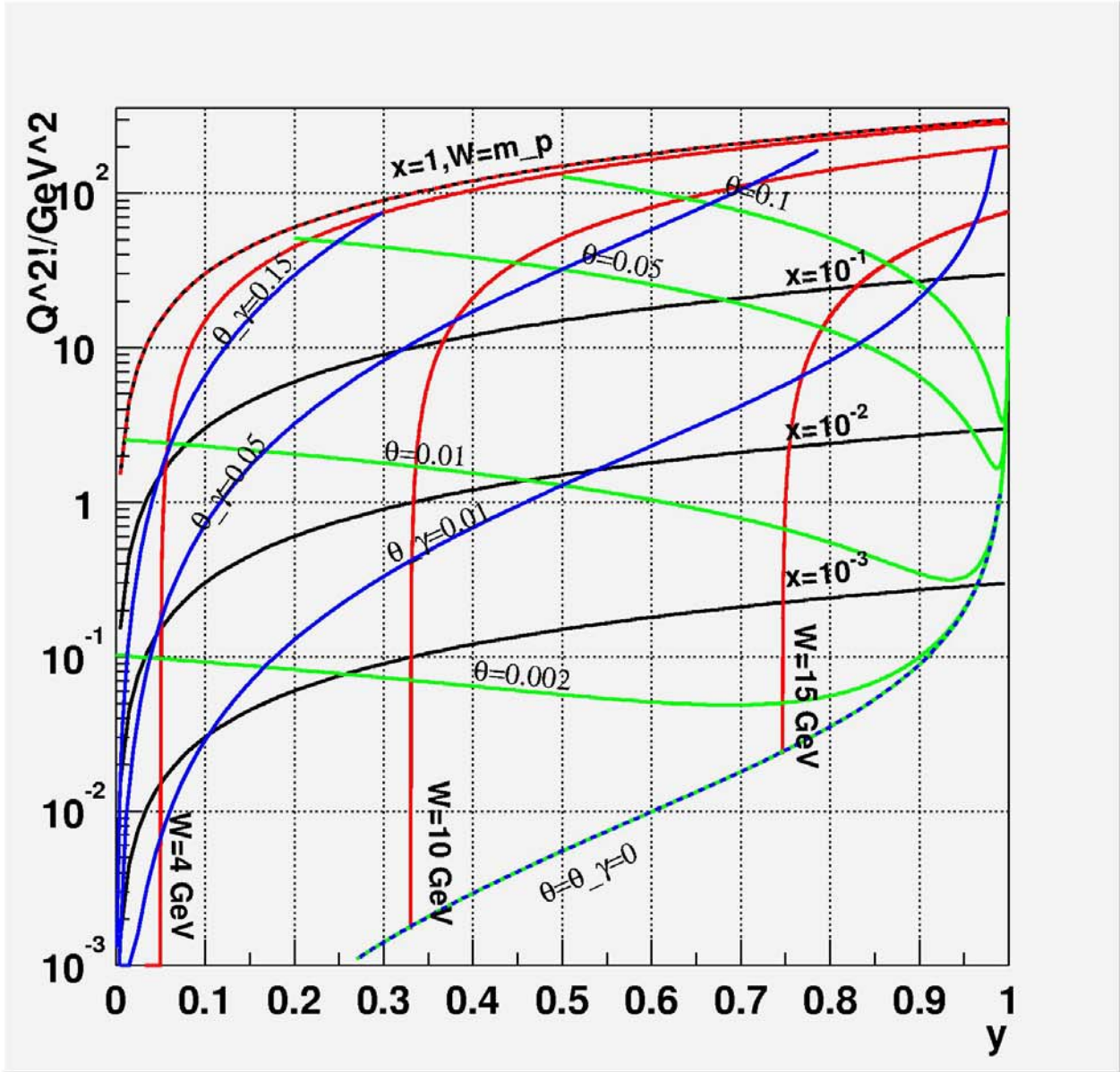


Figure 2: The kinematically allowed region in Q^2 and y for an beam energy of 160 GeV. The different lines show lines of constant x (black), W (red), θ (green) and θ_γ (blue).

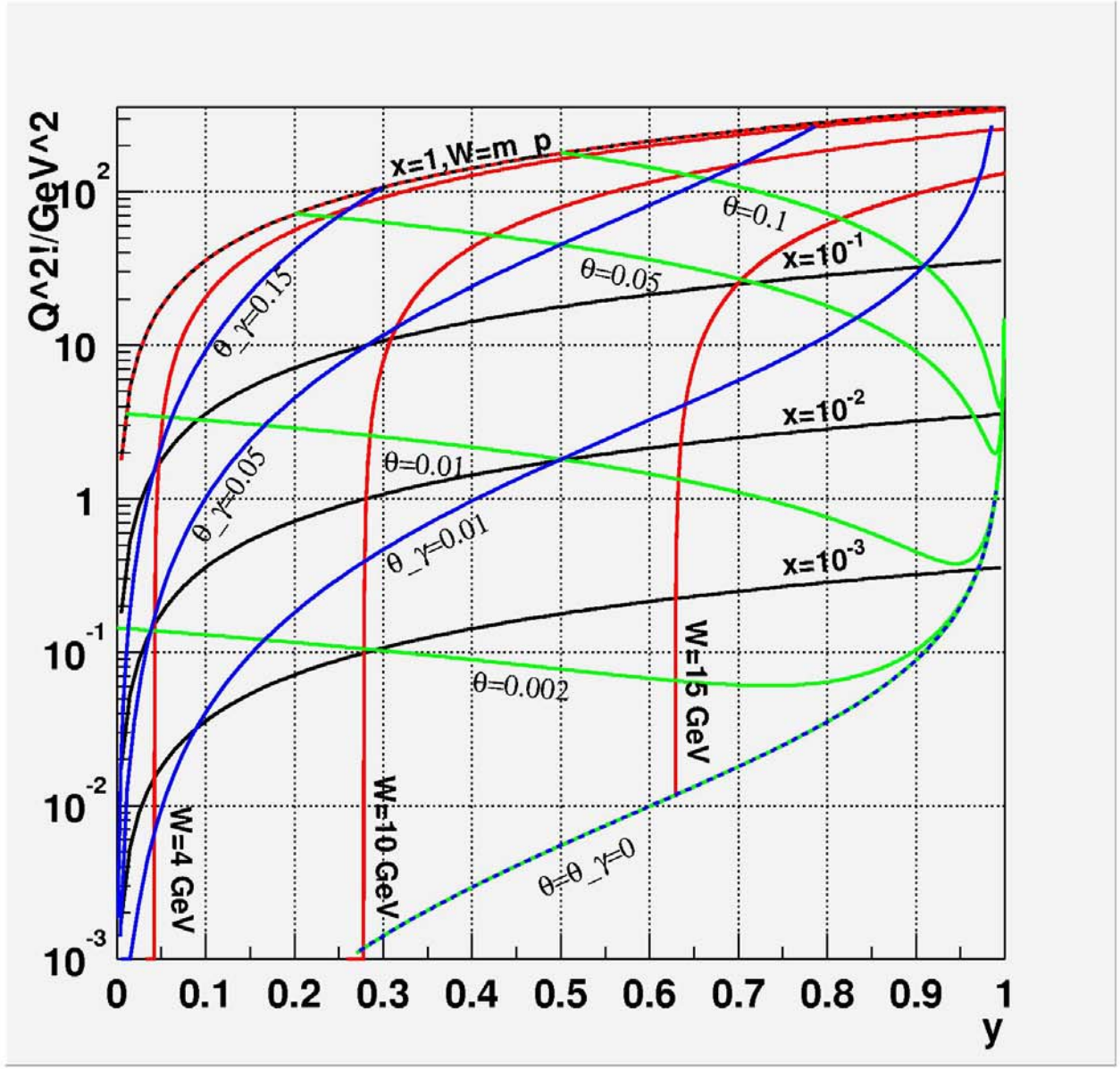
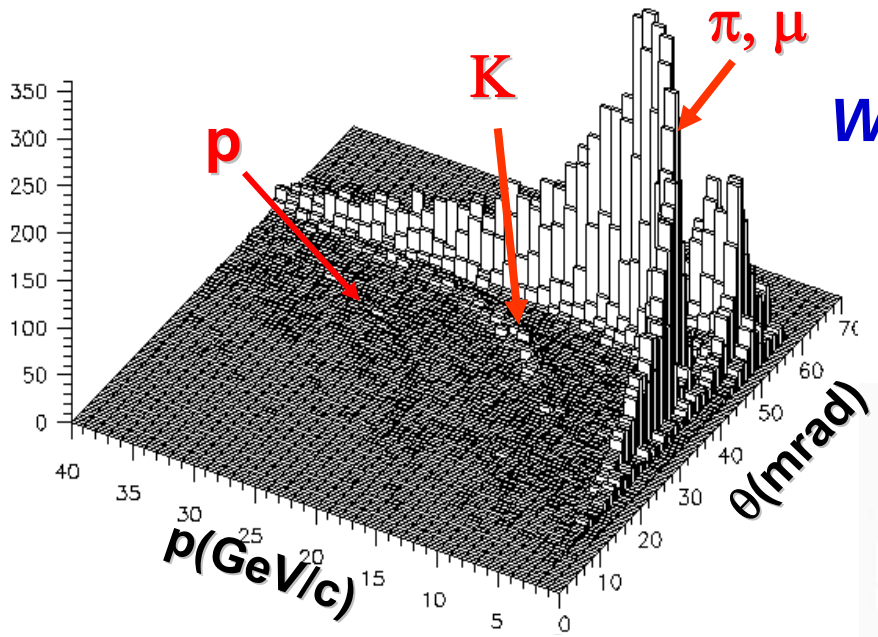


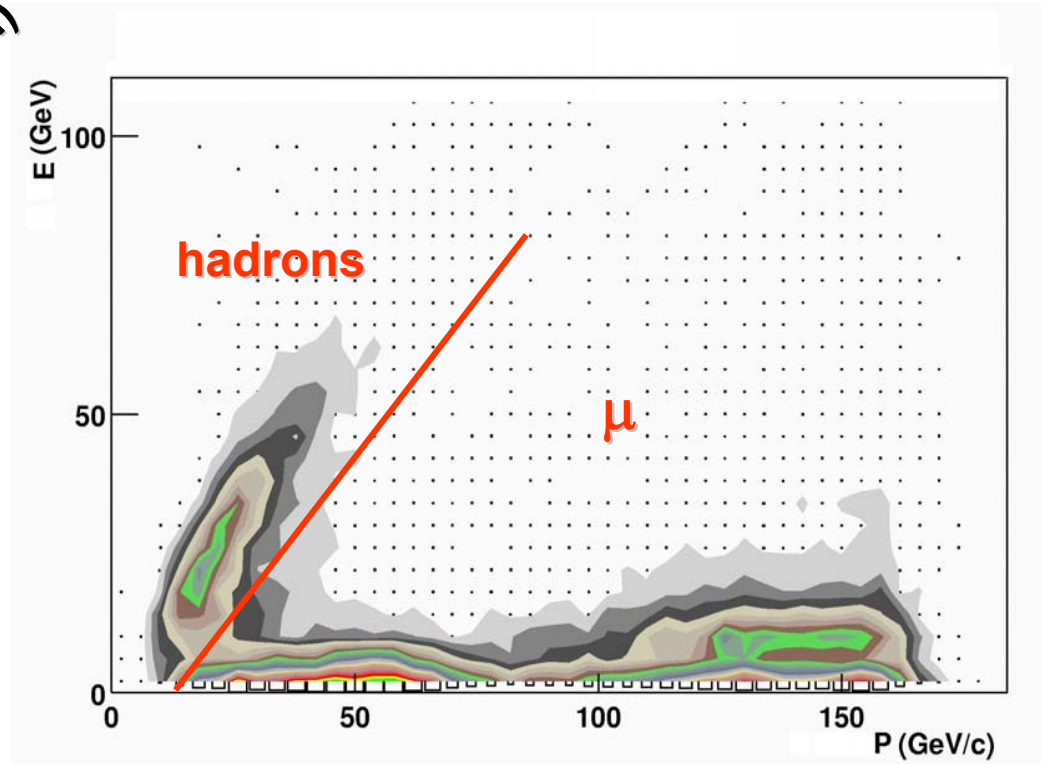
Figure 3: The kinematically allowed region in Q^2 and y for an beam energy of 190 GeV. The different lines show lines of constant x (black), W (red), θ (green) and θ_γ (blue). Good luck if you don't have a color printer.

Particle Identification



With RICH

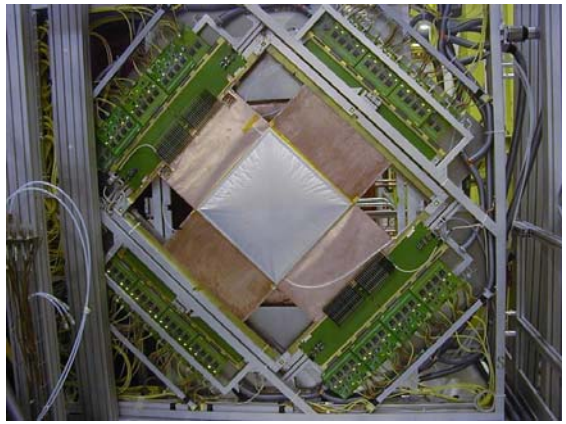
and hadron calorimeters



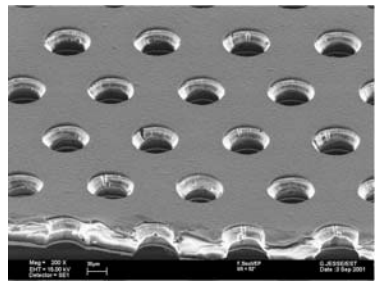
Essential for reconstruction of D-Mesons

New Technologies for Tracking and Particle ID

Scintillating fiber trackers

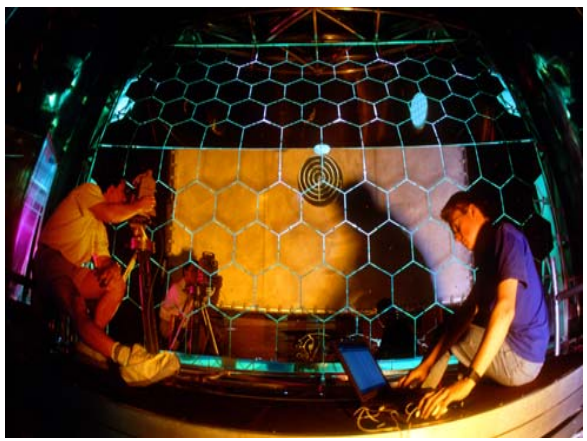


MicroMegas

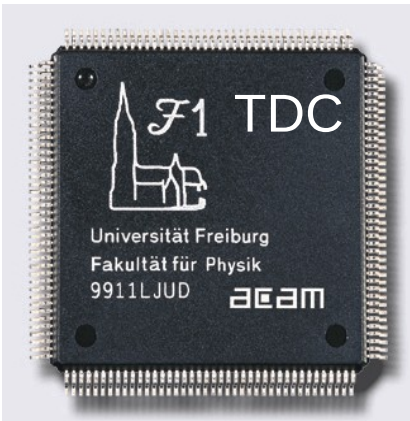


GEM

Large area
drift detectors

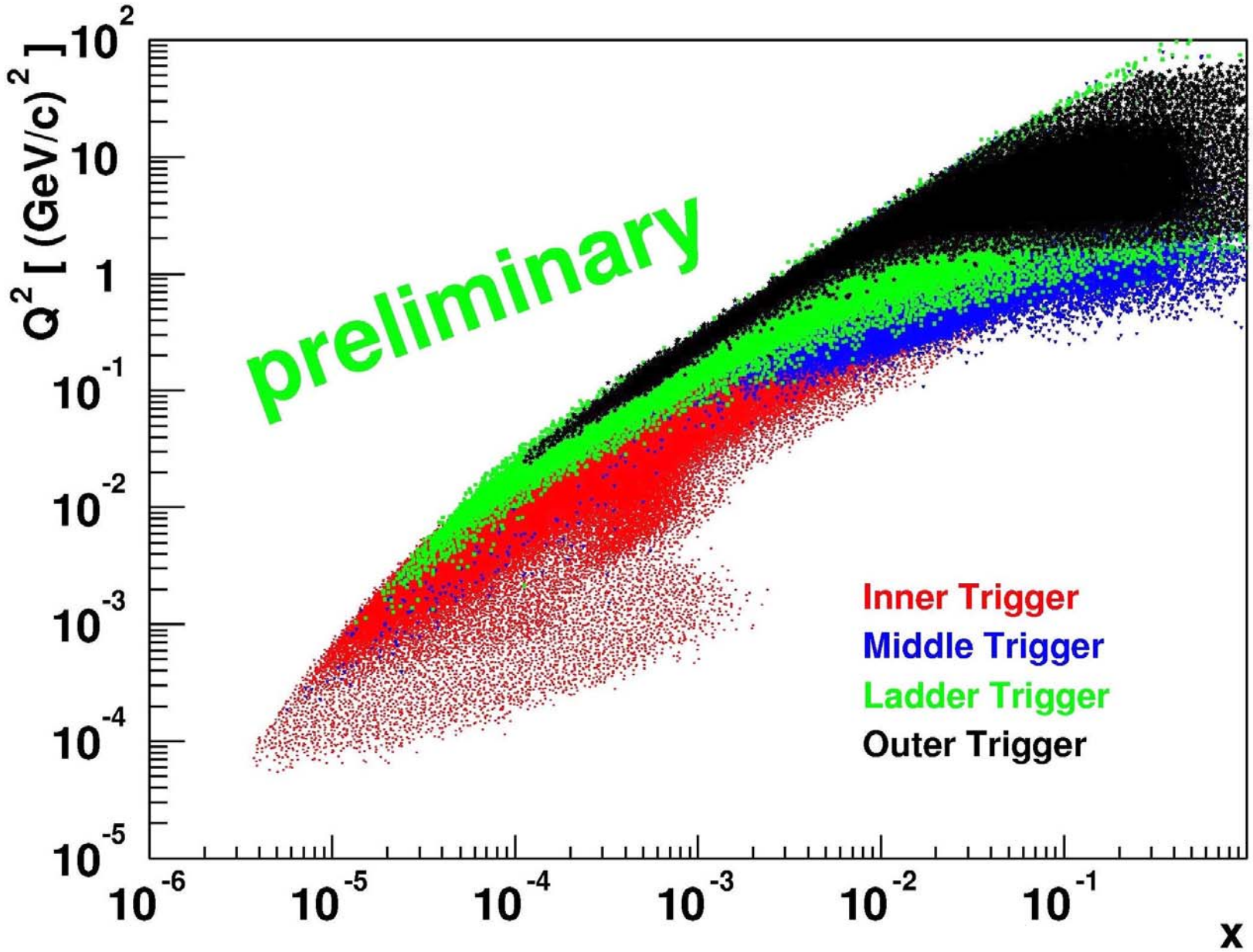


RICH
CsI & MWPC readout
Radiator: C_4F_{10}

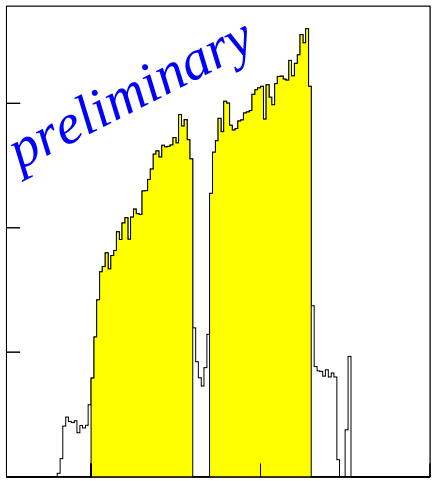


Readout electronics

COMPASS Acceptance

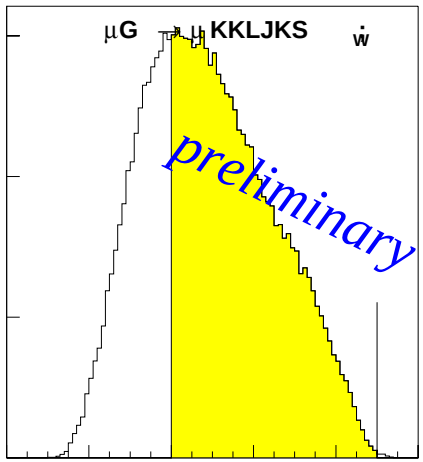


High p_T cuts



G1G]

]>FP@



G1G\

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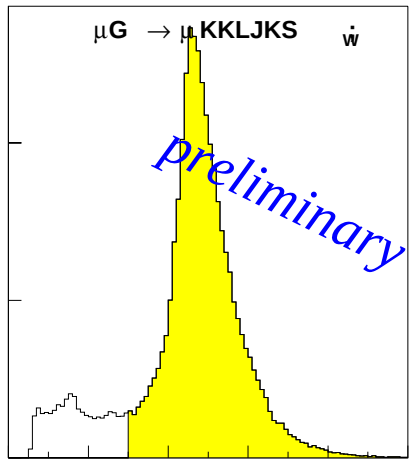
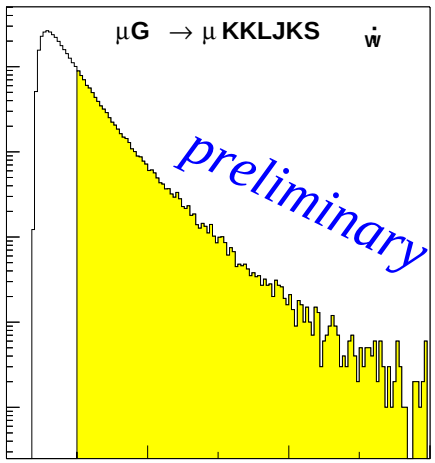


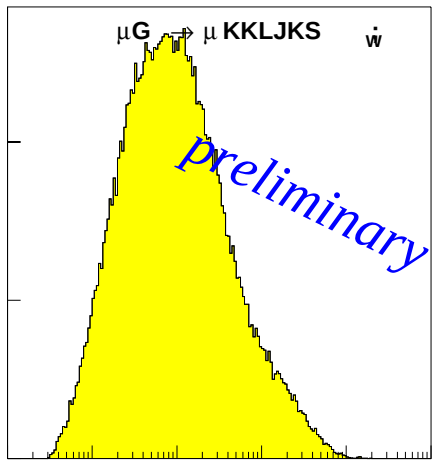
G1GP

P>*H9F @



G1GS 7

$\sum$S 7 >*H9F @



G1G4

4 >*H9F @