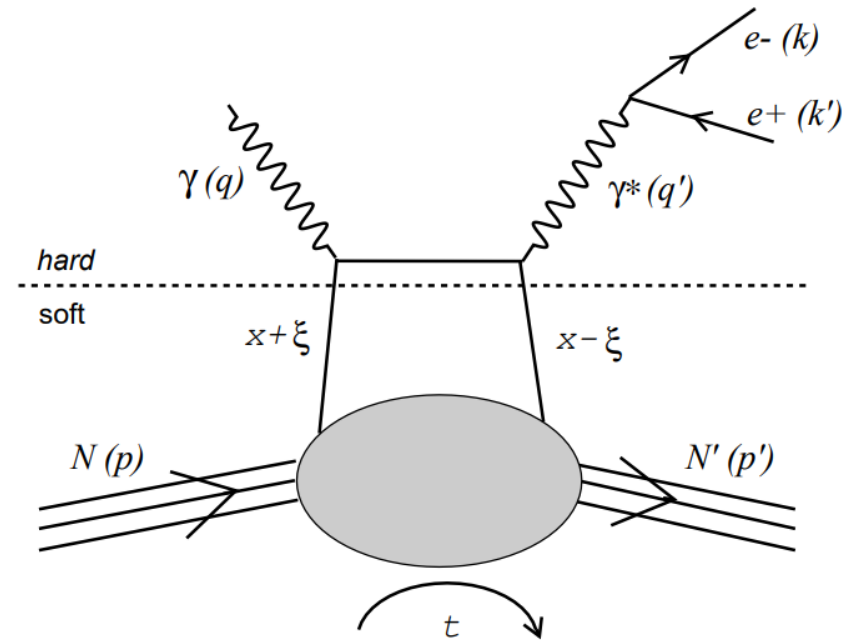


Unpolarized TCS studies with C12-18-005 experiment

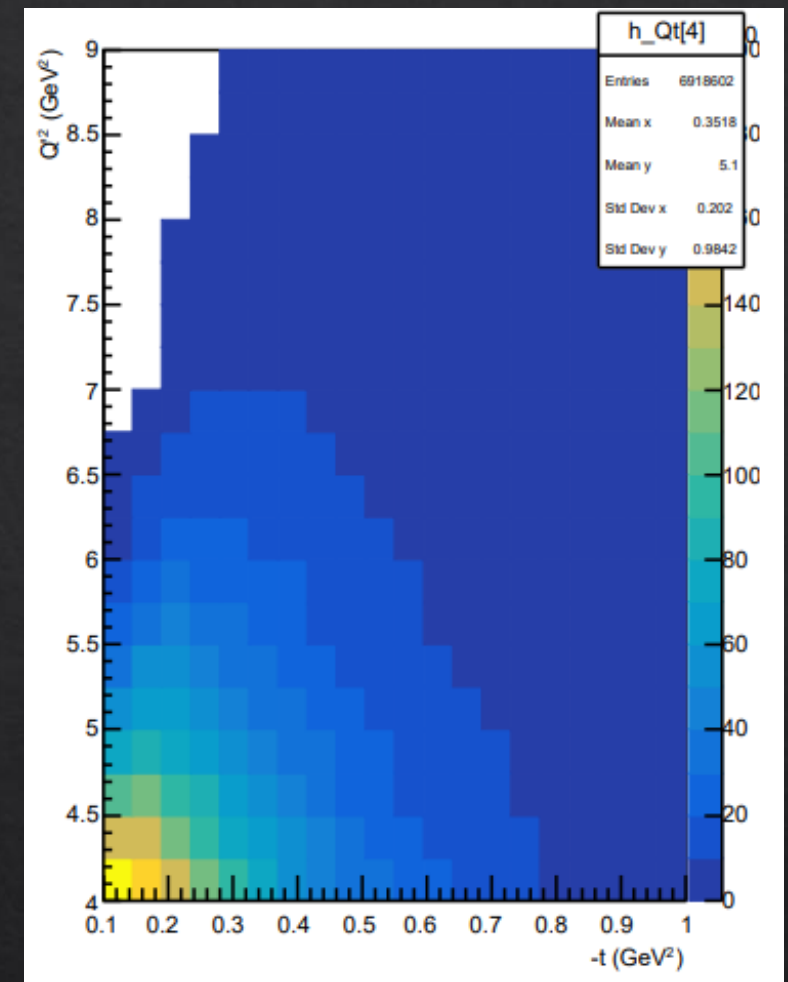
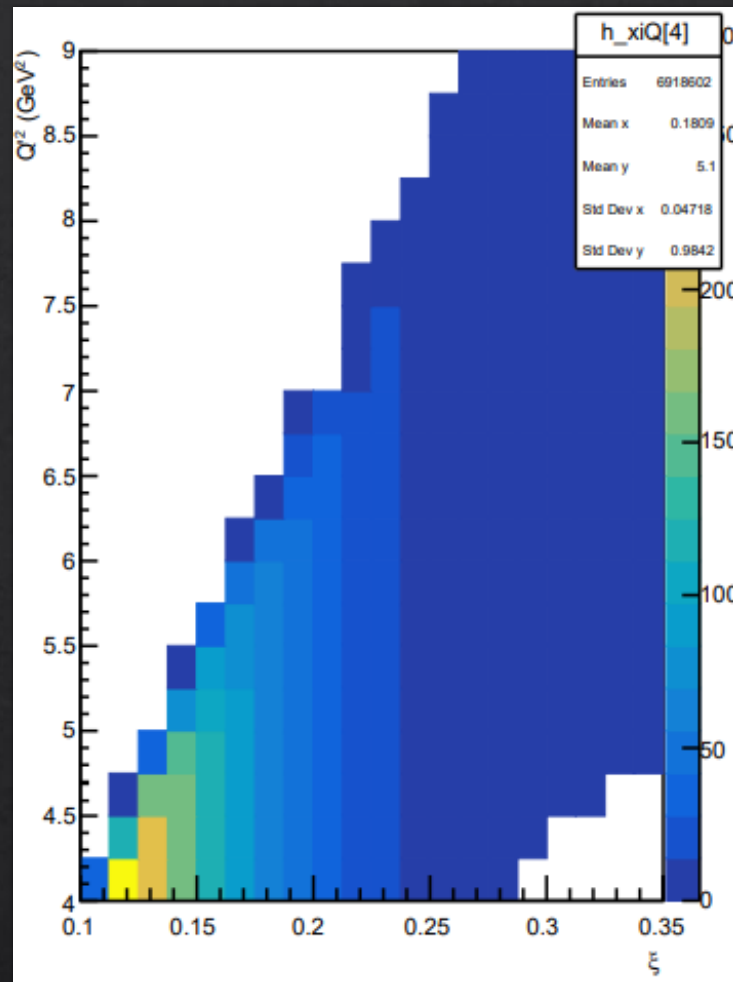
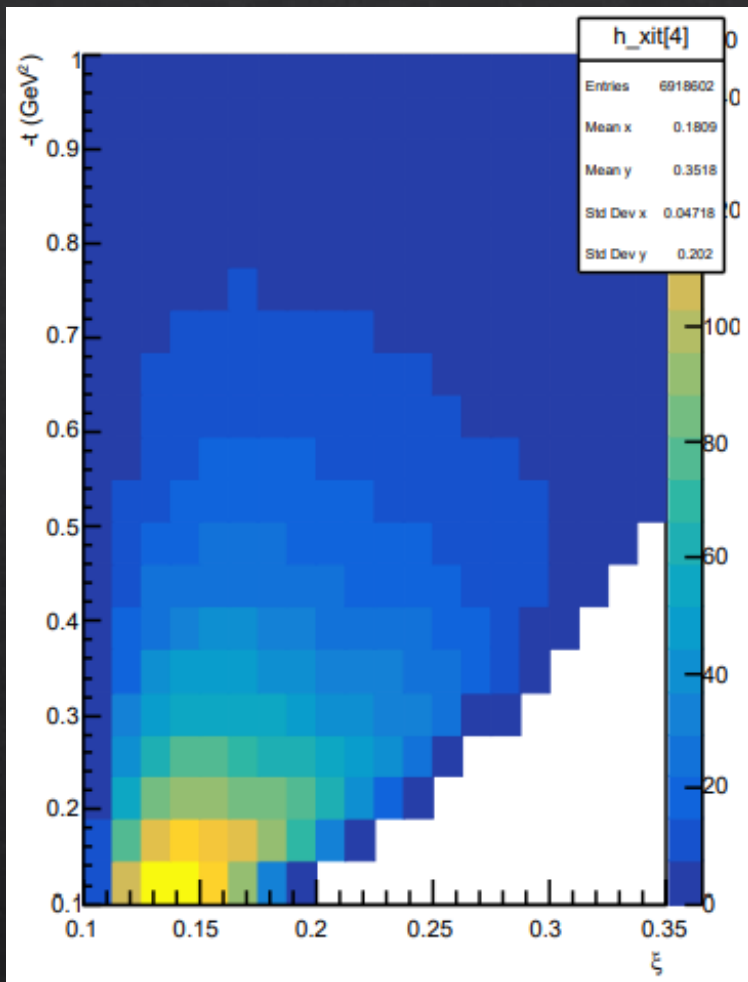
Introduction

- Physical motivation : Understand the proton's structure
- We can do it by the way of the TCS reaction.
- Goals: unpolarized events statistics and Q^2 evolution, look at low Q^2 events, fiducial cuts and signal lost.

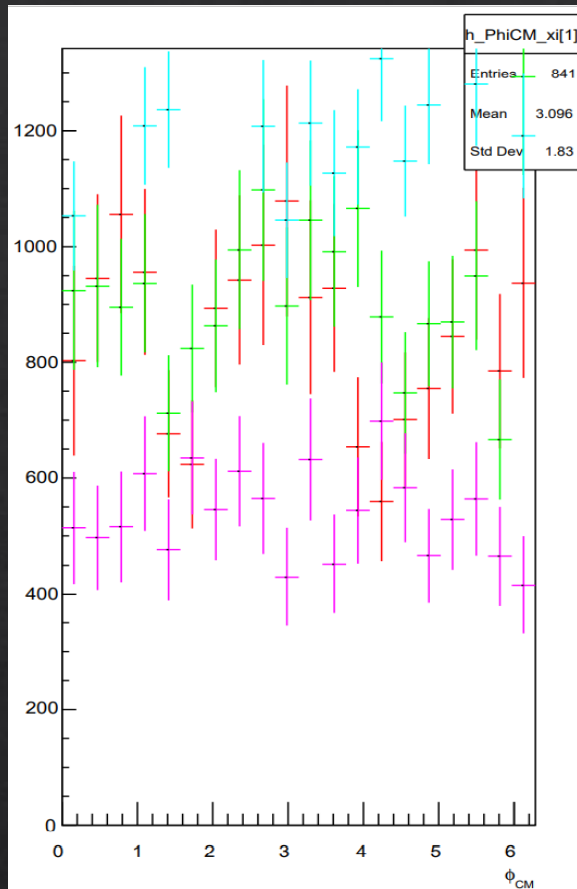


Feynman diagram of TCS

Analysis of the angle ϕ_{CM}

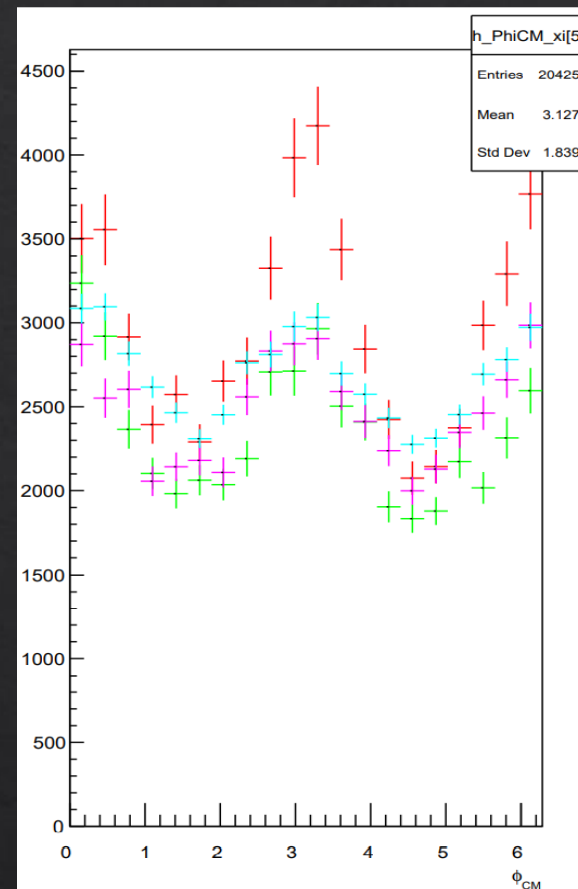


Two-dimensional graphs representing the number of events measured depending on two variables (Q^2 , ξ or $-t$) weighed by the cross section.



$$0.1 \leq -t < 0.2 \text{ GeV}^2$$

- ◇ Red: $0,1 \leq \xi < 0,15 \text{ GeV}^2$ and $4 \leq Q^2 < 4.3 \text{ GeV}^2$
- ◇ Green: $0,1 \leq \xi < 0,15 \text{ GeV}^2$ and $4.3 \leq Q^2 < 5.5 \text{ GeV}^2$
- ◇ Magenta: $0,15 \leq \xi < 1 \text{ GeV}^2$ and $4 \leq Q^2 < 4.5 \text{ GeV}^2$
- ◇ Cyan: $0,15 \leq \xi < 1 \text{ GeV}^2$ and $4.5 \leq Q^2 < 7 \text{ GeV}^2$



$$0.2 \leq -t < 1 \text{ GeV}^2$$

- $0,1 \leq \xi < 0,16 \text{ GeV}^2$ and $4 \leq Q^2 < 6 \text{ GeV}^2$
- $0,16 \leq \xi < 0,19 \text{ GeV}^2$ and $4.3 \leq Q^2 < 7 \text{ GeV}^2$
- $0,19 \leq \xi < 0.35 \text{ GeV}^2$ and $4 \leq Q^2 < 5.5 \text{ GeV}^2$
- $0,19 \leq \xi < 0.35 \text{ GeV}^2$ and $5.5 \leq Q^2 < 9 \text{ GeV}^2$

Number of
events measured
depending on
the angle ϕ_{CM}
weighted by the
cross section

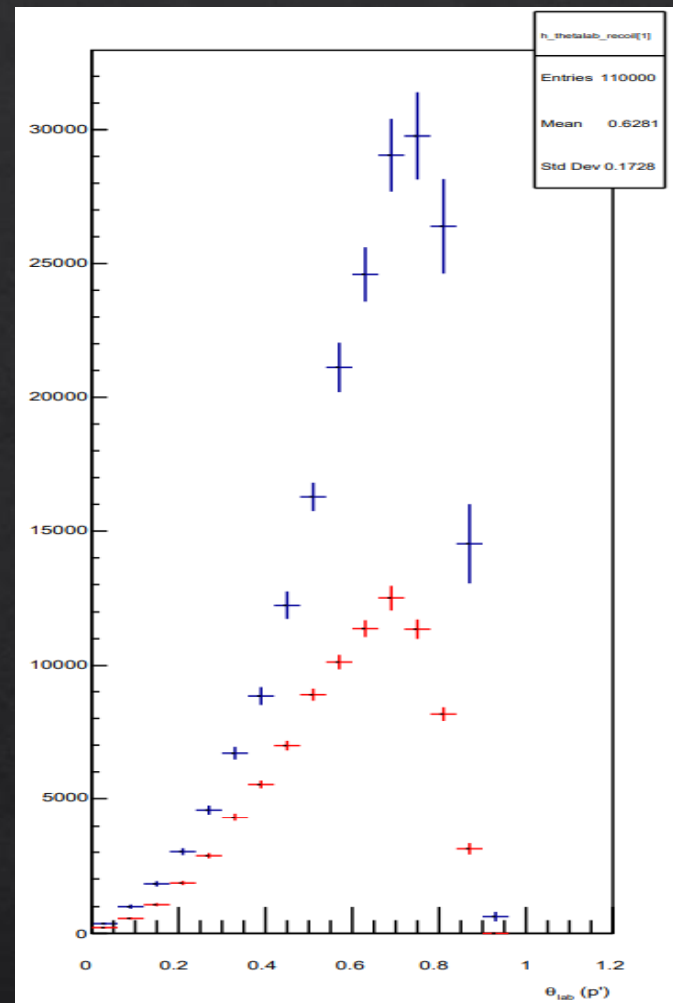
First look at low Q^2
data

Number of events measured for 30 days depending on the angle θ_{lab} from the proton

For high Q^2 : maximum events at 40° (0.7 rad).

For low Q^2 : maximum events at 54° (0.95 rad).

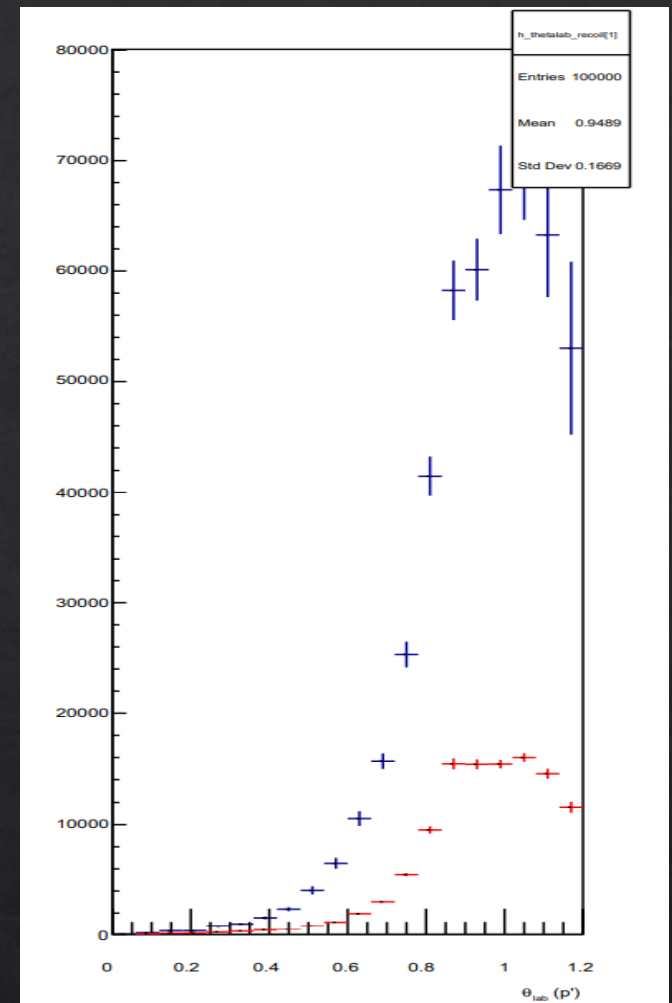
\Rightarrow We can measure only the lower θ_{lab} tail for the low Q^2 data set.



$$0,1 \leq -t \leq 1 \text{ GeV}^2$$

$$4 \leq Q^2 \leq 9 \text{ GeV}^2$$

$$0.1 \leq \xi \leq 0.35 \text{ GeV}^2$$



$$0,04 \leq -t \leq 1.54 \text{ GeV}^2$$

$$0.8 \leq Q^2 \leq 5.3 \text{ GeV}^2$$

$$0.01 \leq \xi \leq 0.35 \text{ GeV}^2$$

Reduction of the
background noise: how
much signal do we
lose?

Number of generated events measured for 30 days depending on $-t$ with cuts of θ_{lab} at 2° , 4° and 6° at vertex.

◇ Maximum number of events measured:

◇ $2^\circ : 600.10^9$

◇ $4^\circ : 525.10^9$

◇ $6^\circ : 400.10^9$

◇ Diminution:

◇ $2^\circ \rightarrow 4^\circ : 12\%$

◇ $2^\circ \rightarrow 6^\circ : 33\%$

