

CPS Meeting : Study of unpolarized TCS of proton and neutron

Camille ZINDY

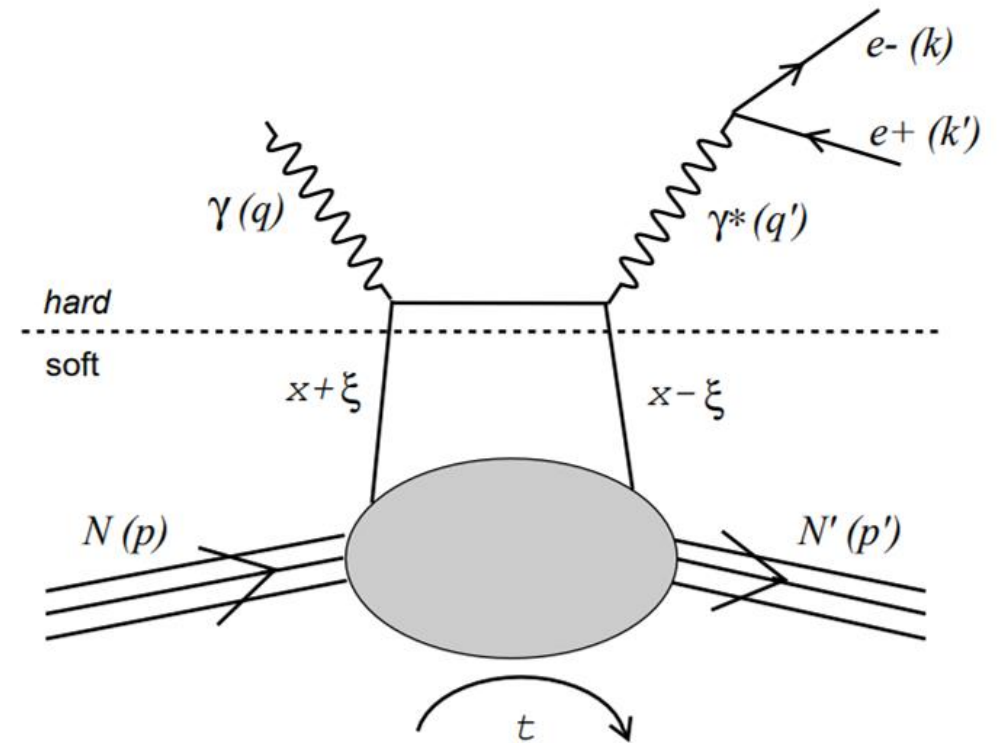
Comparison between protons and neutrons

Motivations

- Study the structure of the neutron and flavor separation of GPDs.
- Find the number of events we can measured on a neutron for the unpolarized TCS reaction.
- Compared it with the proton.

Motivations

- Data generated with the same model as for proton TCS : VGG model + DEEPGen generator.
- Data reconstructed by Vardan. First approximation : use the proton setup. Caveat : assume we will lose one order of magnitude, neutron harder to detect, magnetic field not fully realistic



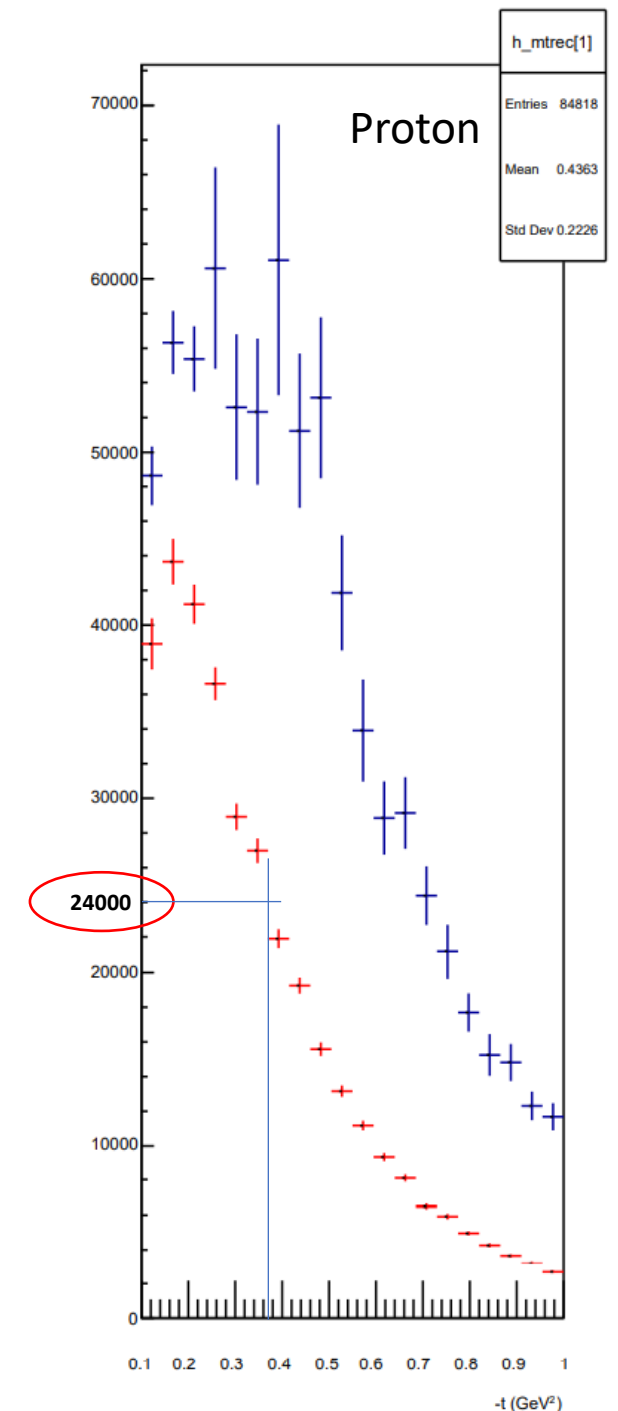
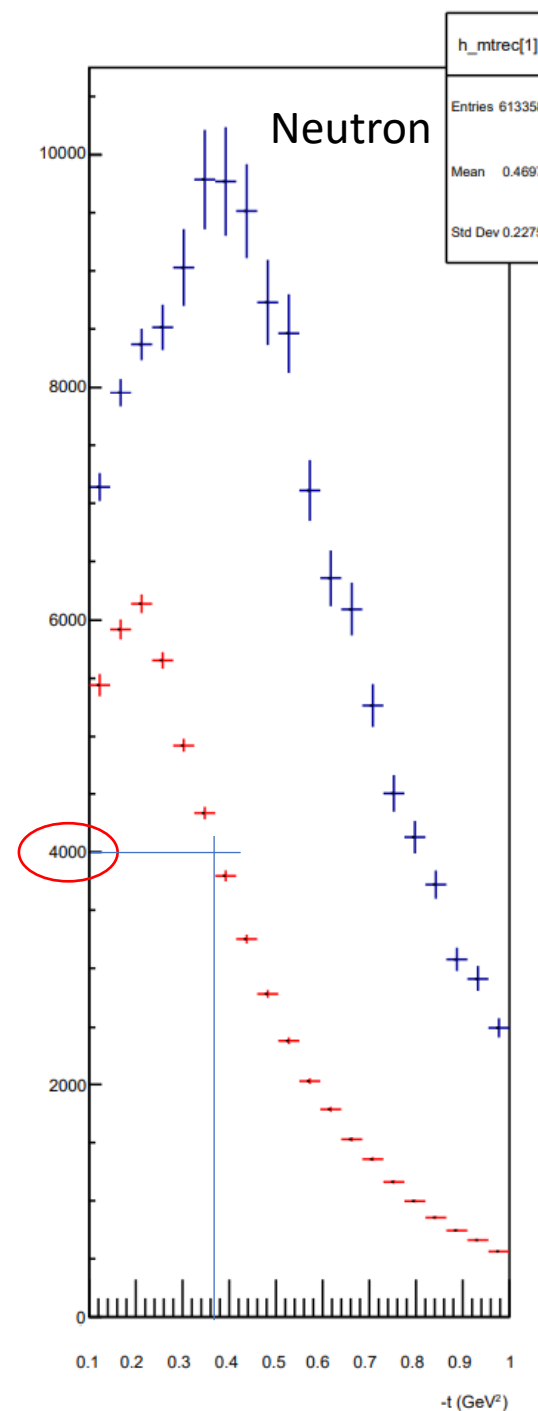
Feynman Diagram of TCS reaction

Number of reconstructed events measured for the TCS reaction depending on $-t$ weighted by the cross section

The data are normalized by counting rates.

Difference between proton and neutron:

- Measured : x6

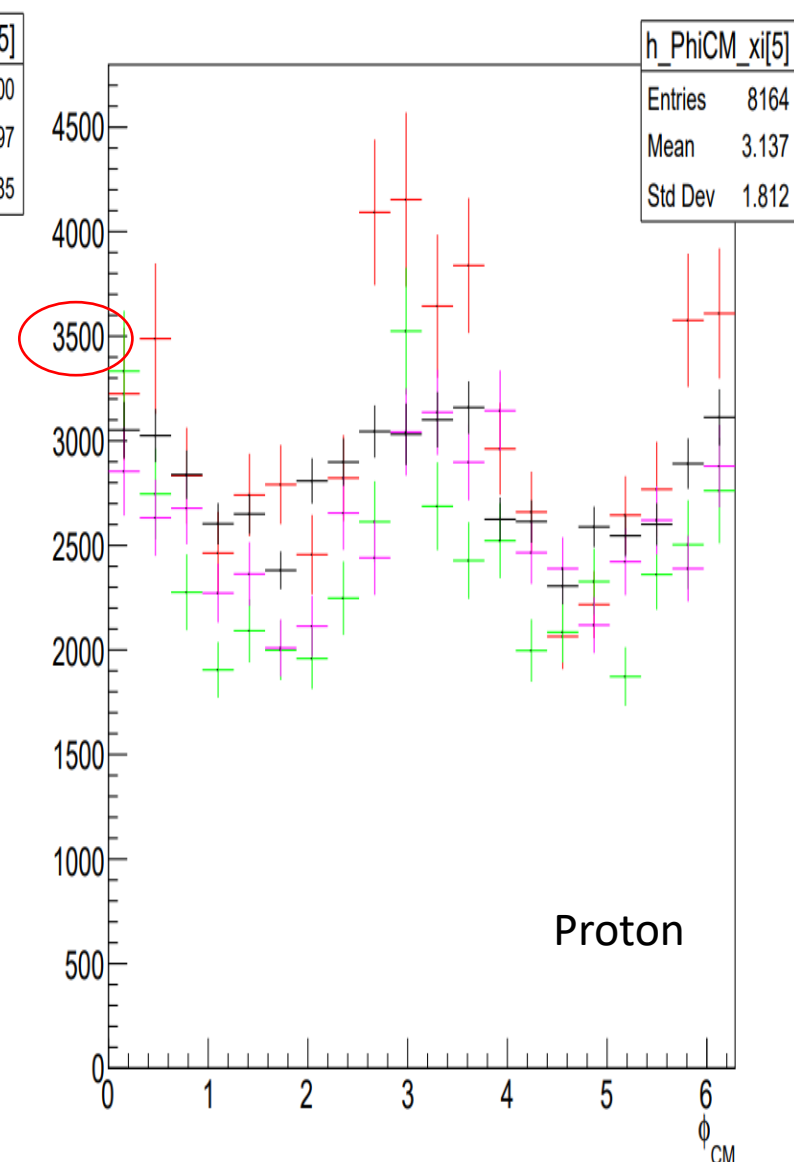
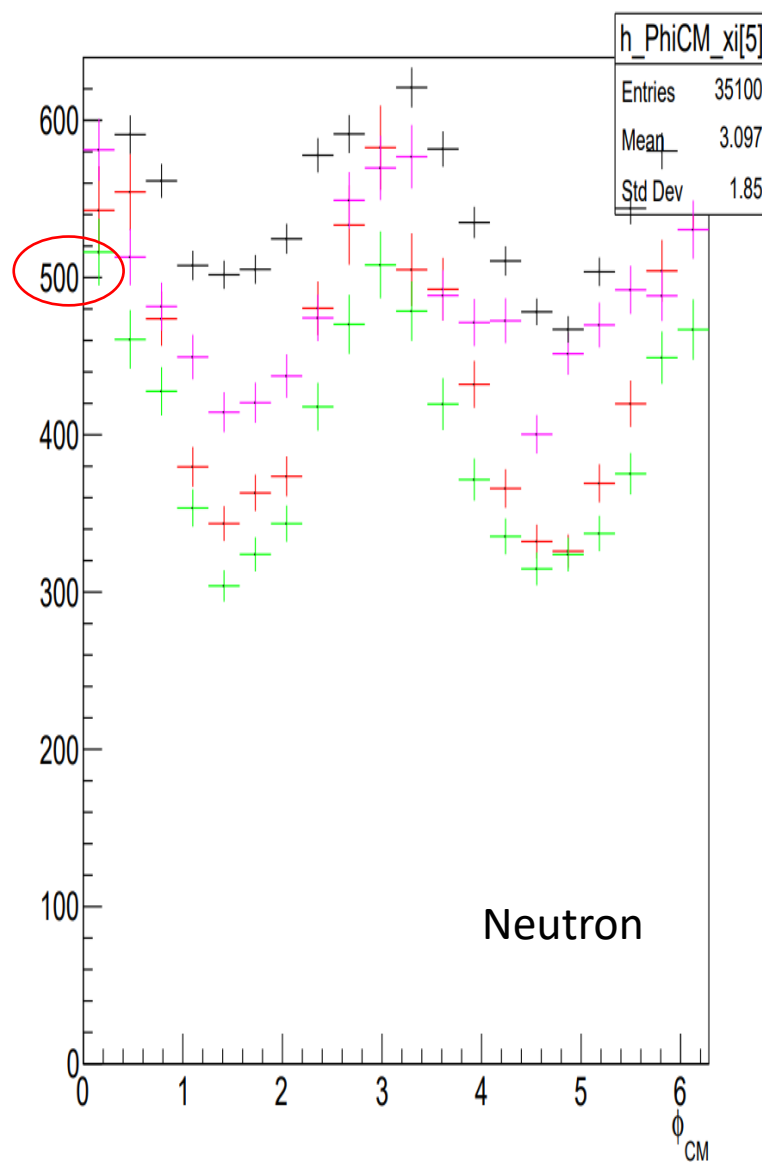


Number of reconstructed events measured for the TCS reaction depending on ϕ_{CM} weighted by the unpolarized cross section

The data are normalized by counting rates.

Difference between proton and neutron:

- Measured : x6



- Red : $0.1 \leq \xi < 0.16$ and $4 \leq Q^2 < 6 \text{ GeV}^2$
- Green : $0.16 \leq \xi < 0.19$ and $4.3 \leq Q^2 < 7 \text{ GeV}^2$
- Magenta : $0.19 \leq \xi < 0.35$ and $4 \leq Q^2 < 5.5 \text{ GeV}^2$
- Black : $0.19 \leq \xi < 0.35$ and $5.5 \leq Q^2 < 9 \text{ GeV}^2$

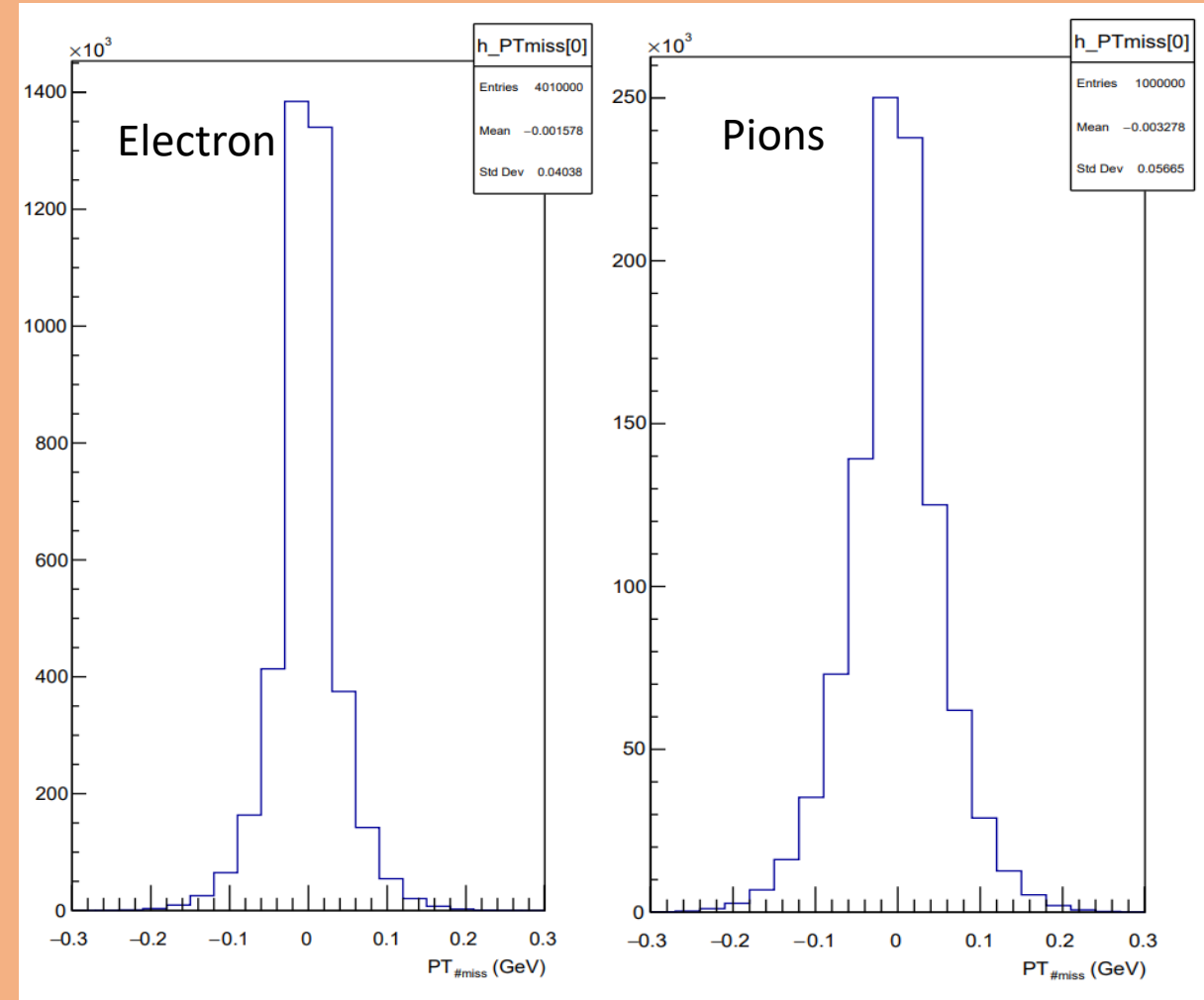
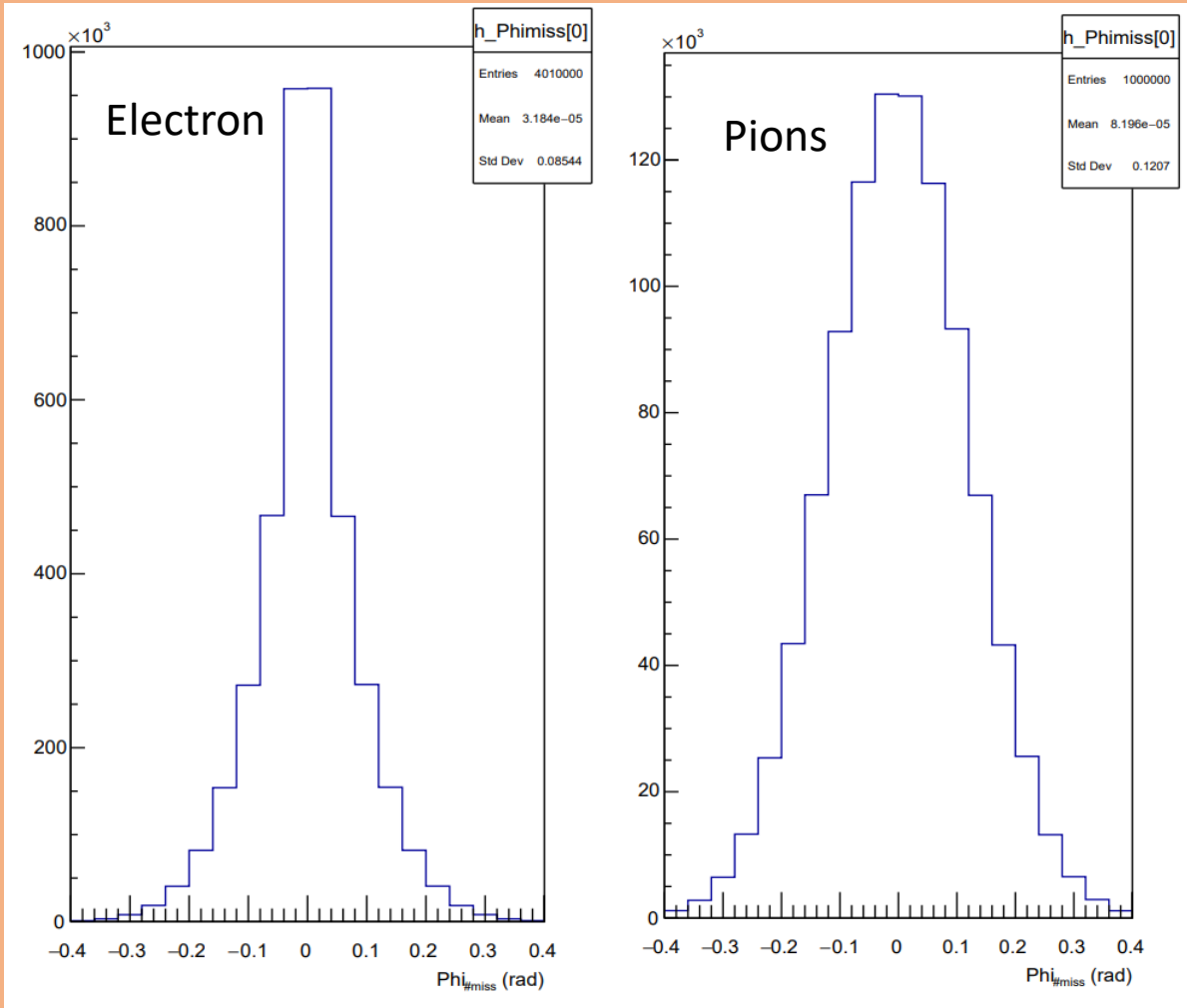
Conclusion

- Rates not much lower than for proton. We will be able to extract physics, assuming we still lose one order of magnitude for neutron detection.
- We still need to find a way to detect neutrons. Unpolarized LD2 + magnet or longitudinally polarized ND3.

Comparison between electrons and pions production

Motivation

- Reduce the background noise due to photoproduction of pions with exclusivity variables.
- I modified the generator in order to get pions' pairs.
- Pions' normalization not yet realistic.



Exclusivity variables : azimuthal angle (left) and transverse momentum balance (right)

Conclusion

- Exclusivity resolution wider for the pions but we will still select lots of the pions' pairs after cuts.
- It is possible to cut some of the pions' pairs for the remaining ones we need a better model to estimate their rate.