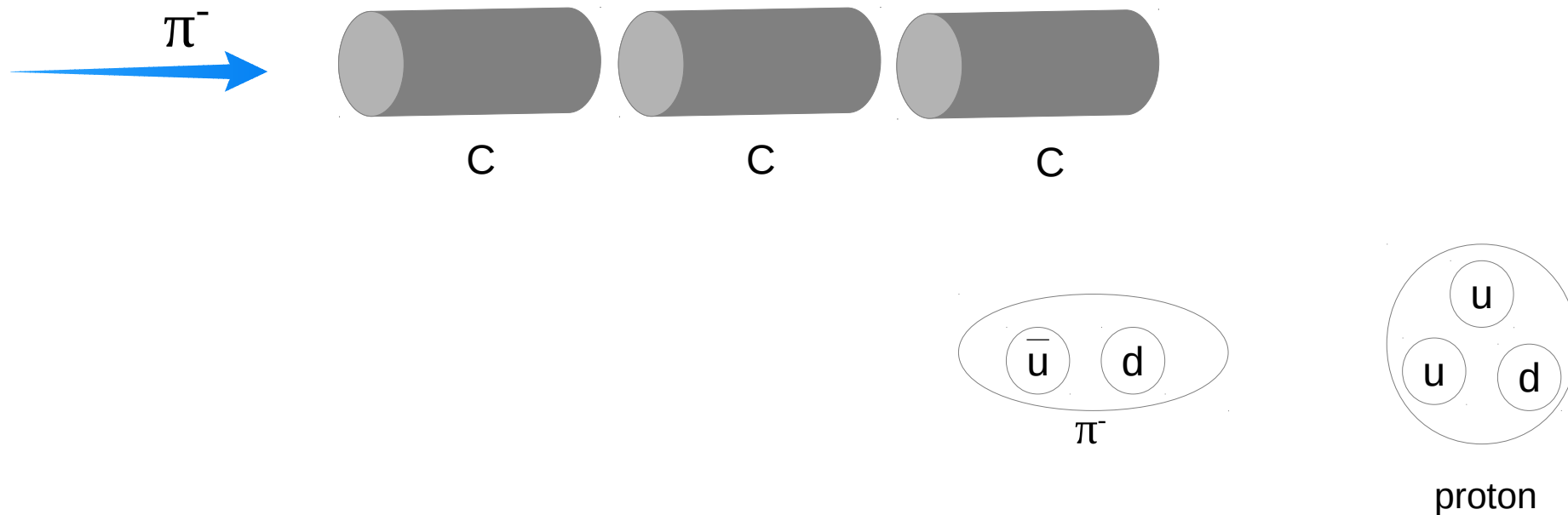


AMBER- Physics Simulations for a new experiment at CERN

Supervisor: Catarina Quitans

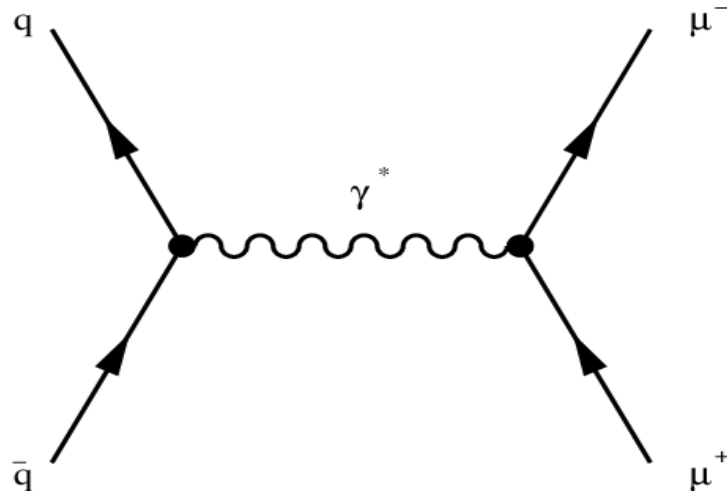
Rita Silva- LIP Summer Students

Experimental Apparatus



Drell-Yan

- It is a very rare process;
- Consists in the annihilation of a quark and an anti-quark, producing a virtual photon, which will decay into a pair of muon and anti-muon.

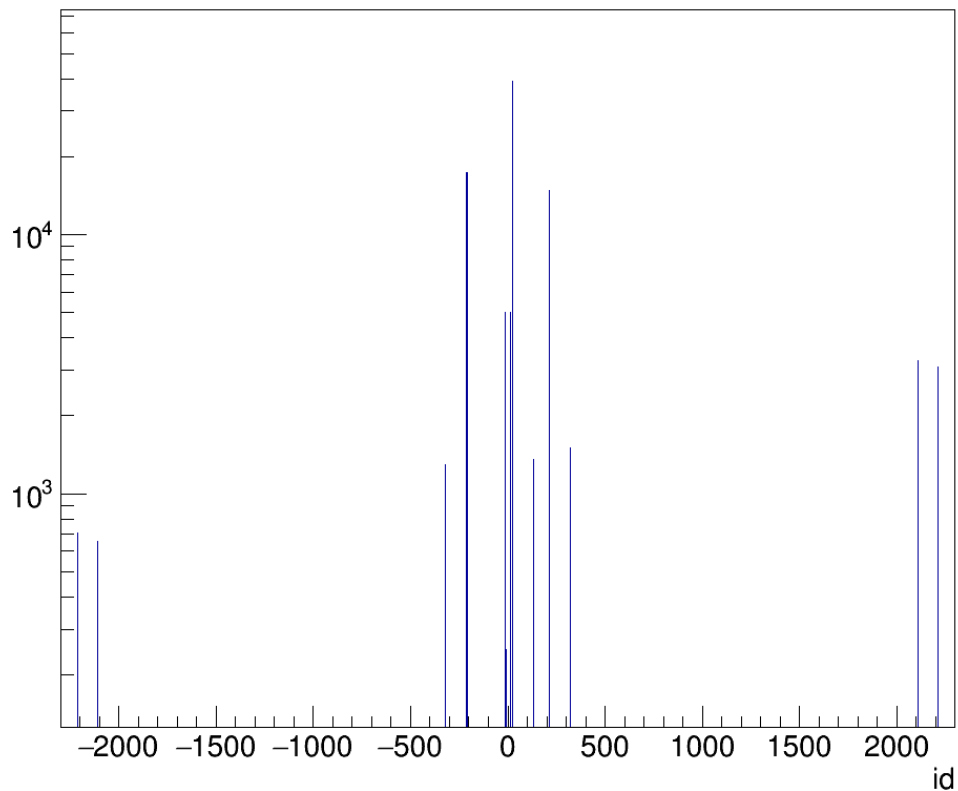


Pythia

- Simulates the Drell-Yan Process;
- A pion with 190 GeV collides with a nucleon (with zero momentum);
- It is selected only the γ^* which decay into a pair of muon and anti-muon;
- Selects the mass of the dimuon obtained from 4 to 9 GeV/c².

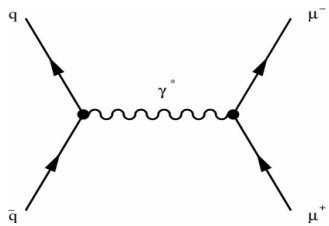
Final State Particles

Id of final state particles



| | |
|----------|-------|
| γ | 42.7% |
| π^- | 18.0% |
| π^+ | 15.2% |
| n | 3.4% |
| p | 3.4% |

Cross Sections

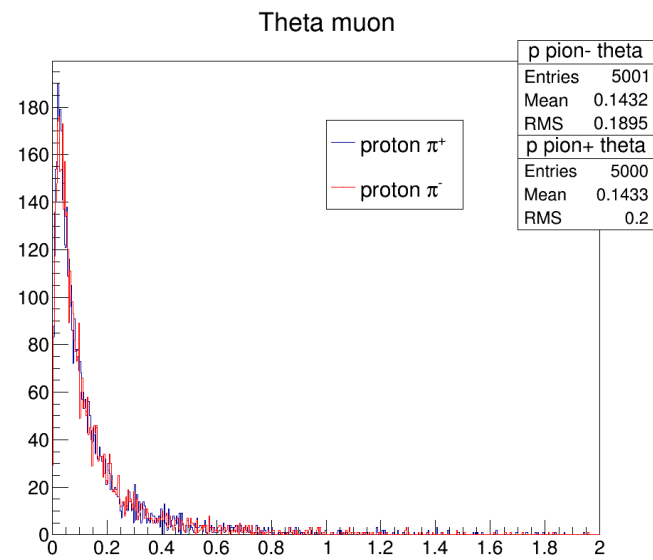
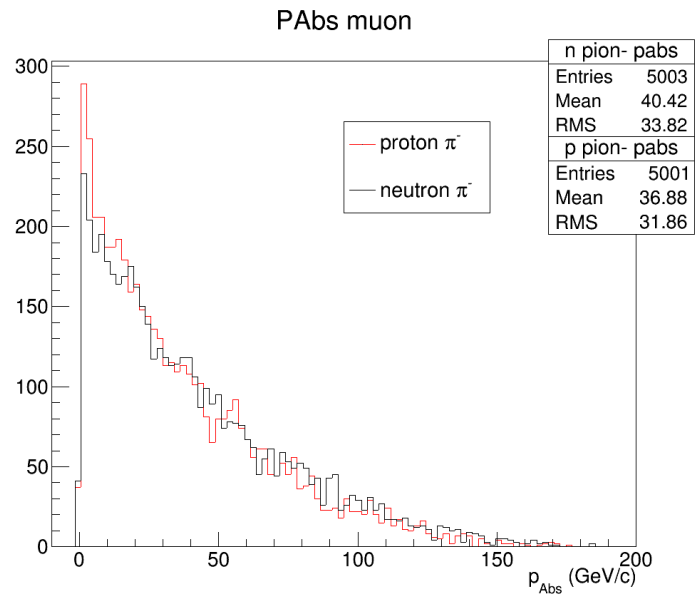
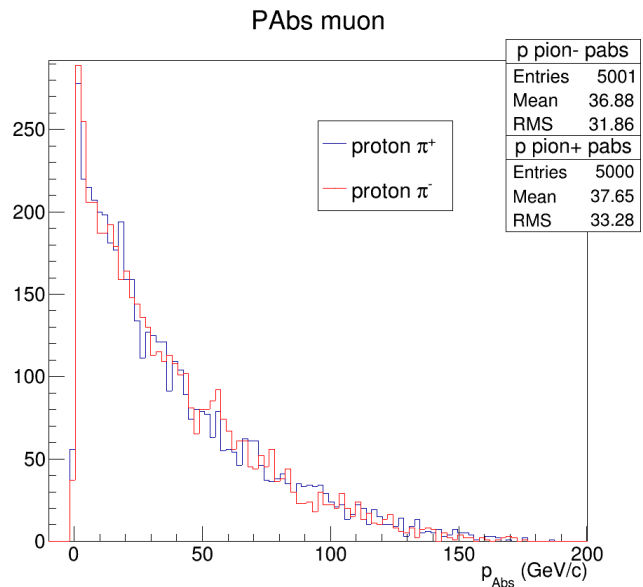


Leading Order

| | | target | | (nb) |
|------|--------------------|----------|----------|------|
| | | uud p | udd n | |
| beam | $\bar{u}d$ π^- | 0.1460 | 0.07531 | |
| | π^+ | 0.03494 | 0.05141 | |

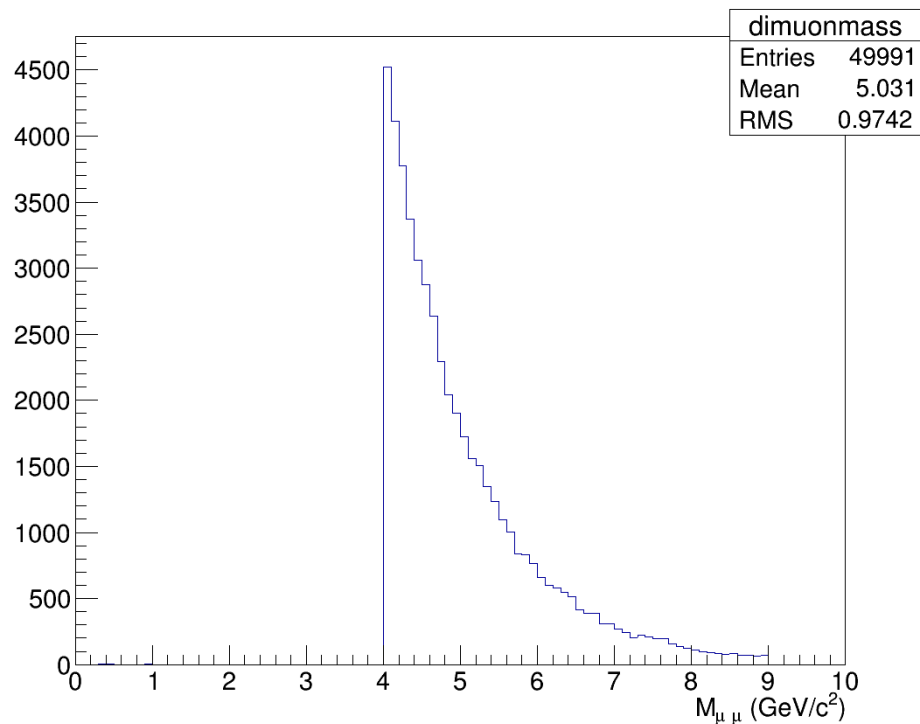
- The cross sections measured experimentally come with a factor of 2.

Produced Pair

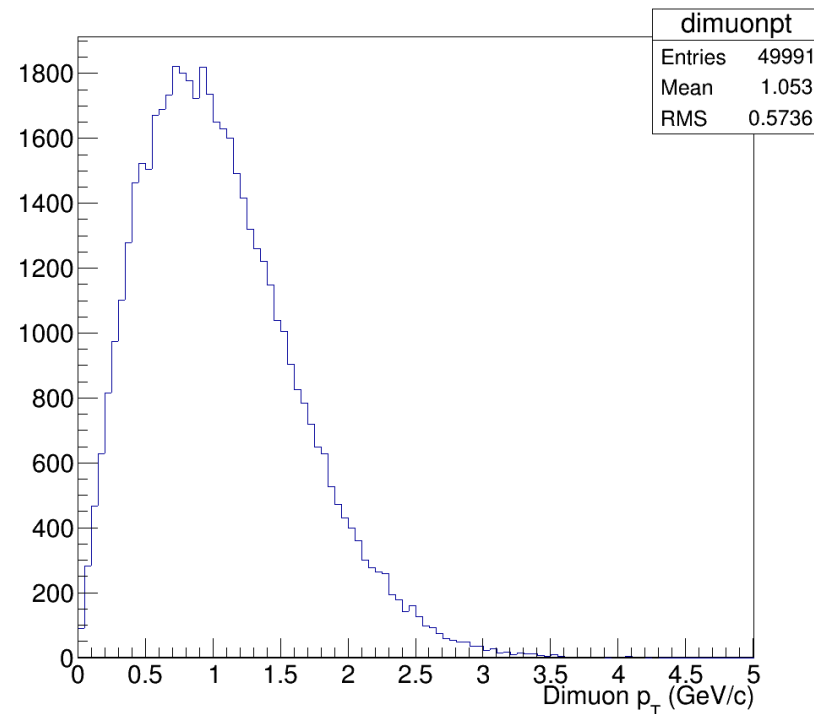


Invariant mass of the Dimuon

Dimuon Invariant Mass



Dimuon Pt



What comes next

- Studying the Bjorken x distributions, which corresponds to the fraction of momentum of the quark annihilated with respect to the hadron (pion or nucleon);
- Studying the effect of pion misidentification by a proton;
- Dimensions of the detectors in order to assure an acceptance of 50%.