Mu2e projects

G. Pezzullo

Yale University

Welcome back :-)!

- A long time passed, and we are glad to be back
- We would like to have a weekly meeting altogether
  - report of the activities
  - short physics dissemination (?)
- I can meet with each of you once a week and always available on slack for questions

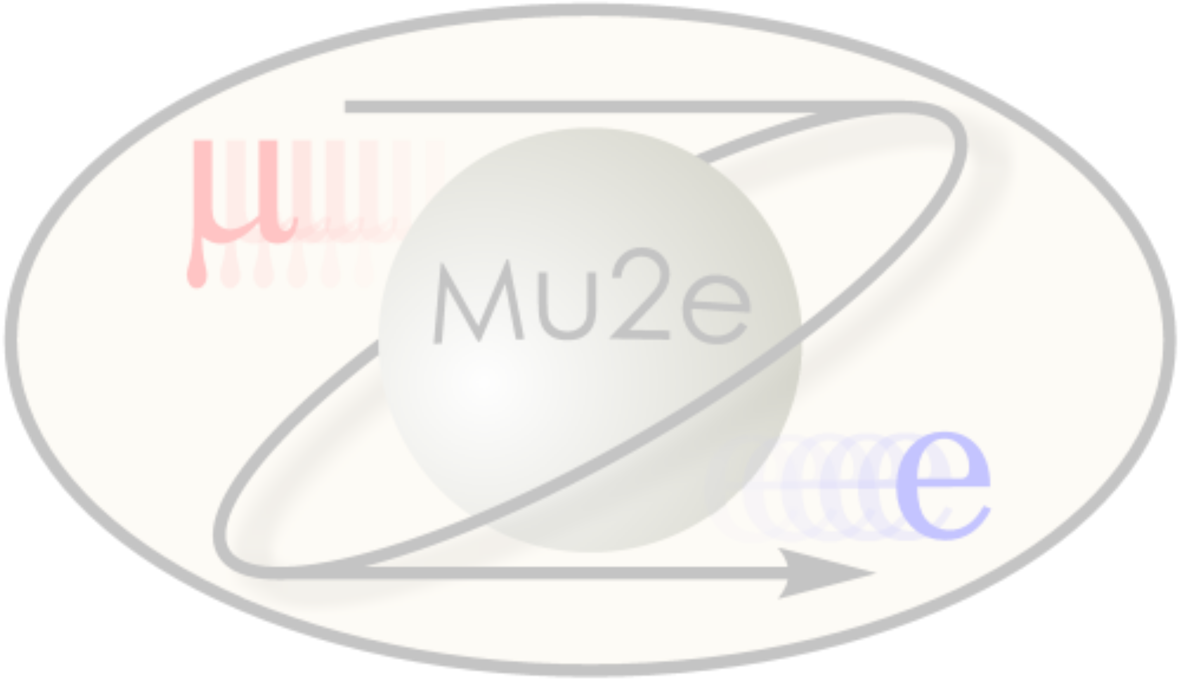
Projects list

- improve the current photon trigger
- characterize/improve/re-tune the e+ track trigger
- characterize/improve the low-p e- track trigger

} **New dataset available!**

- π+ -> e+ nu in the Inner Proton Absorber pattern recognition

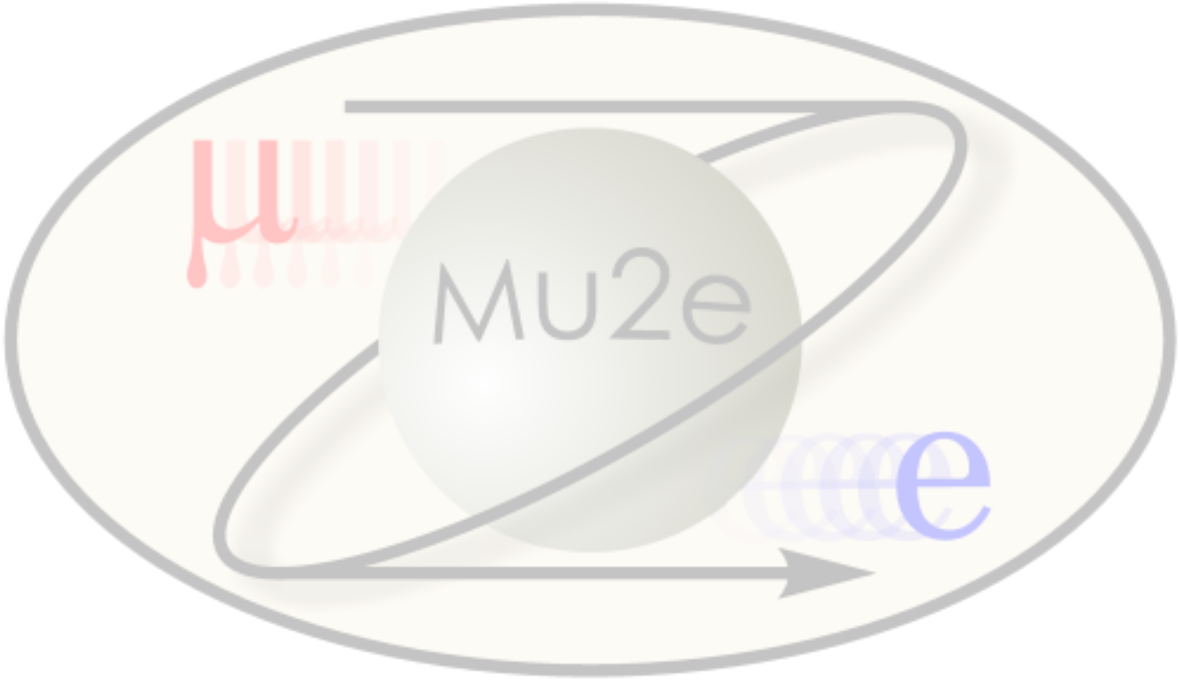
Photon trigger



Photon trigger

- We have a "pure" calorimetric Trigger developed by a former student, Heather Arrington
- We can improve it including also the helix information:
  - develop a procedure to match the helix with the calorimeter cluster
  - re-tune the current likelihood-based algorithm
  - evaluate the expected performance
- **Tools used**:
  - event display
  - analyzer module Mu2e framework (C++, ROOT)
  - ROOT/Py(thon)ROOT

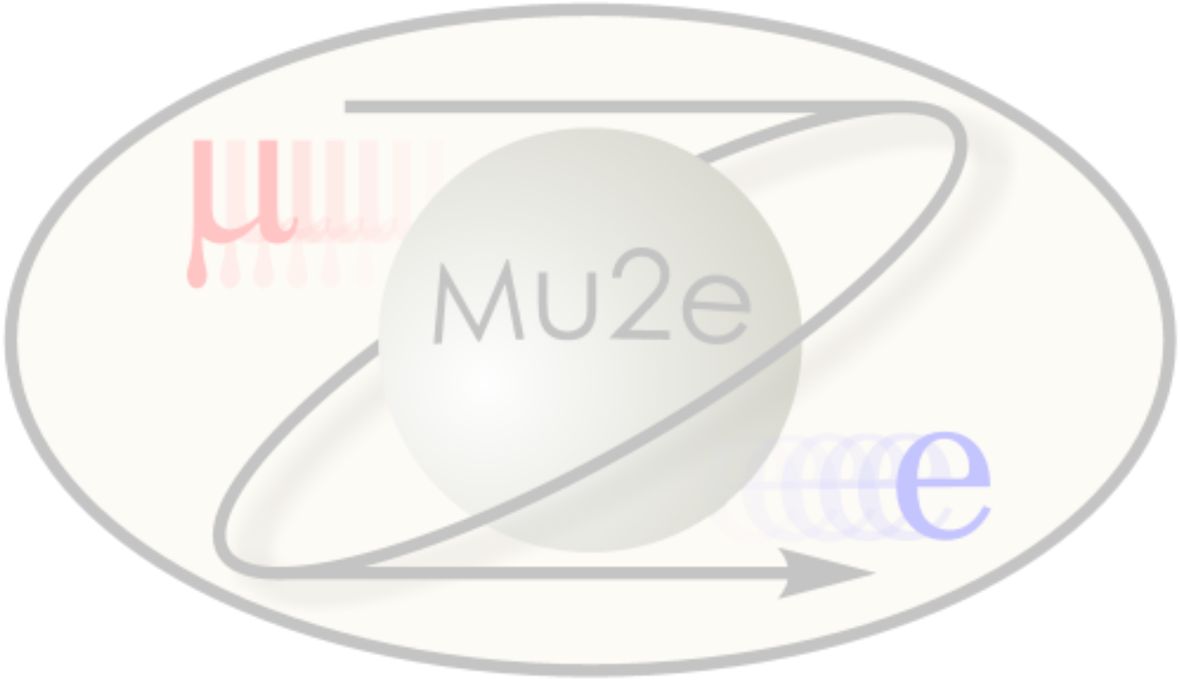
e+ track trigger



e+ track trigger

- We have a cut-flow based e+ track trigger, BUT:
  - its performance can be improved (the eff w.r.t. the Offline is lower than the e- case)
    - this imply re-optimize the cuts!
  - we have tracks at high momentum that we have been ignoring, BUT we need to characterize them (protons? deuterons?)
    - can we reject them with a "simple" logic (E/p)?
  - we need a full characterization of its performance!
- **Tools used**:
  - Event display
  - Mu2e framework + Stntuple (ROOT, C++)

low-p e- track trigger

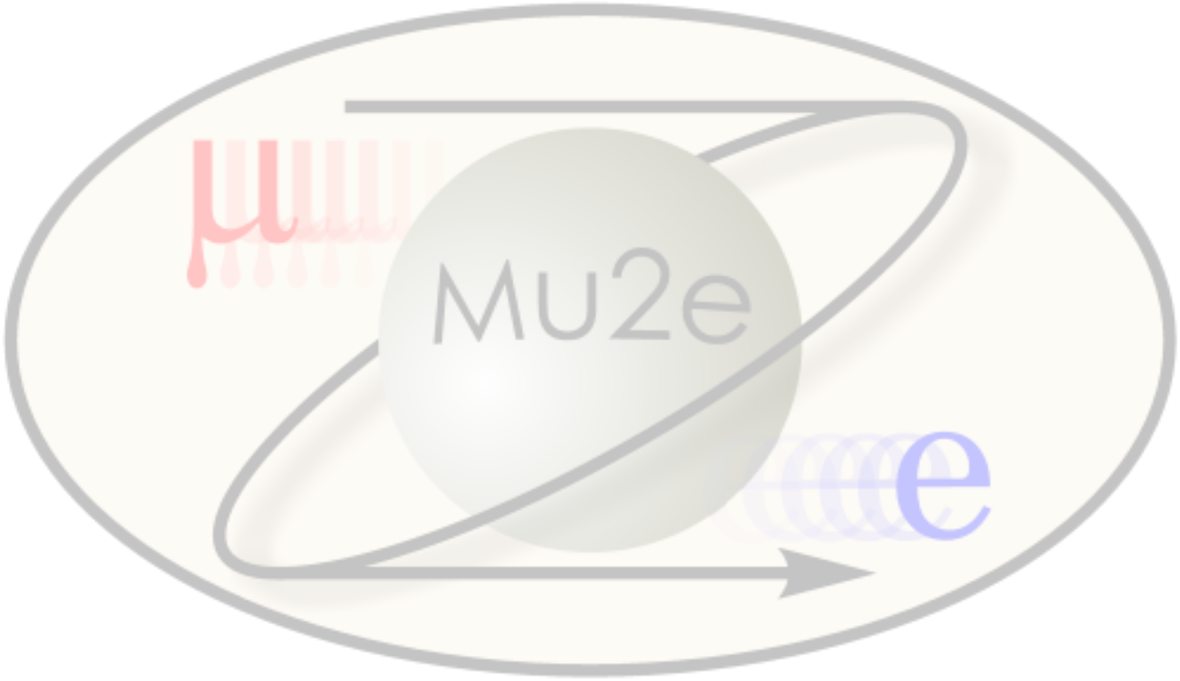


low-p e- track trigger

- low-p e- tracks at the trigger level are mostly DIO from the Stopping Target
- We are facing two issues in the low-p helix search:
  - the overlap between the two algorithms is small
  - one of the two algorithm makes some mistakes in a very few cases
- We will understand the expected performance and fix the bugs

- **Tools used**:
  - Event display
  - Mu2e framework + Stntuple (ROOT, C++)

π+ -> e+ nu pattern recognition



π+ -> e+ nu pattern recognition

- No-one so far tried to reconstruct the muonic decay of the π+ in the special calibration runs
- We can study it!
  - optimize the pattern-reco setup for optimizing the pattern recognition
  - study and characterize the performance of the full track reconstruction

- **Tools used**:
  - Event display
  - Mu2e framework + Stntuple (ROOT, C++)

Backup