

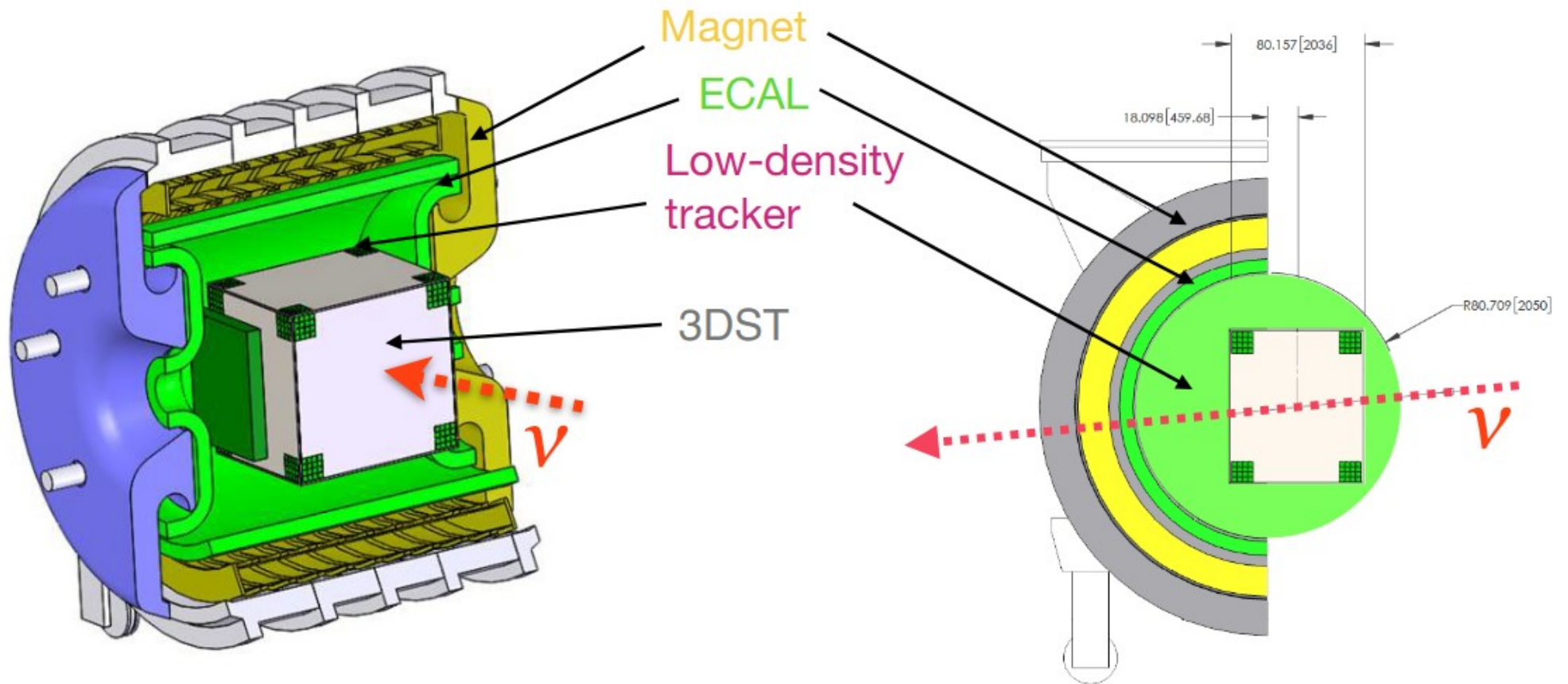
Beam monitoring with E-CAL inside KLOE only?

Guang Yang

Introduction

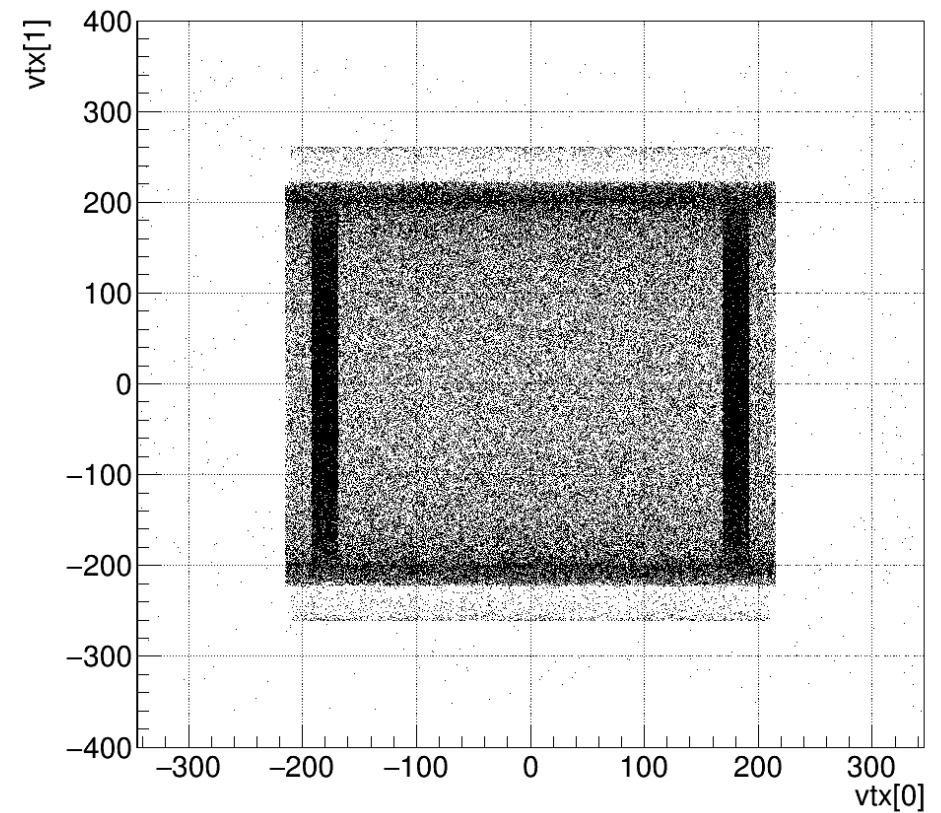
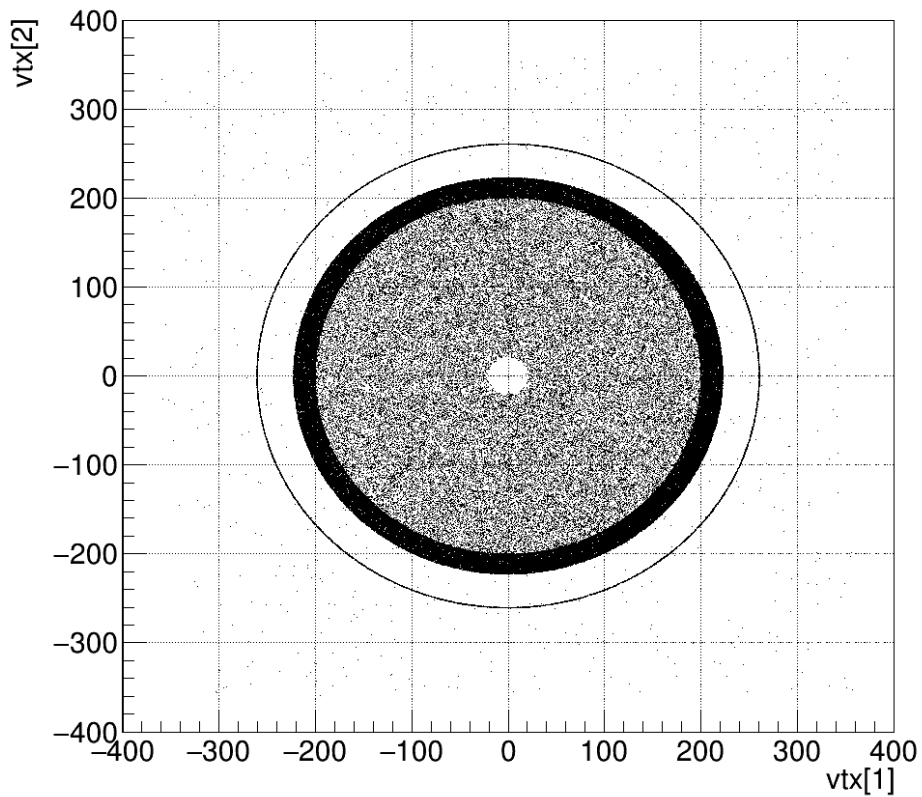
- I was told that stage 1 in LBNC's mind might be only KLOE+ECAL.
- Question: Can we do beam monitoring with ECAL-only?
 - From a quick look, I would say pretty likely, no.

Full SAND reference design



Dedicated sample

- Interactions only in the ECAL in KLOE

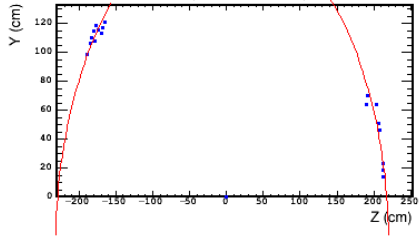


Processing

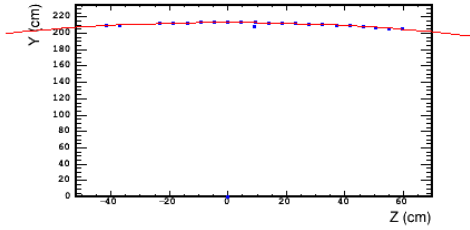
- On the YZ plane, assume 4.4 cm^2 square space cube (ECAL bar cross section size) and corresponding spatial resolution
- Applied 0.6 T B-field
- Looking at muon hits only
- Fit circle on the YZ plane
- Not considering any out-fiducial background (no muon tag, very optimistic)

Fitting the curves with those discrete hits

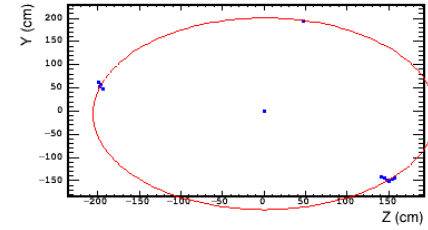
True mom. 730.3 MeV (radius 226.1)



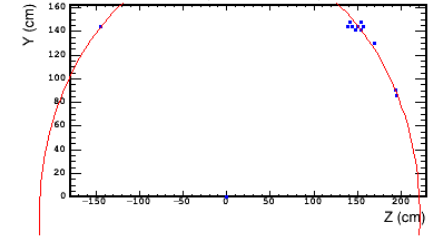
True mom. 2192.8 MeV (radius 221.0)



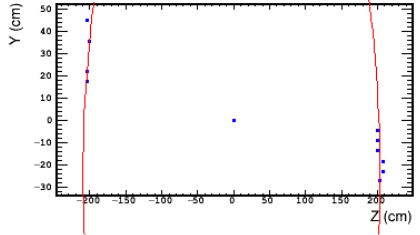
True mom. 1241.2 MeV (radius 206.5)



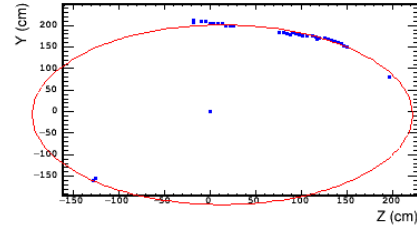
True mom. 579.8 MeV (radius 218.1)



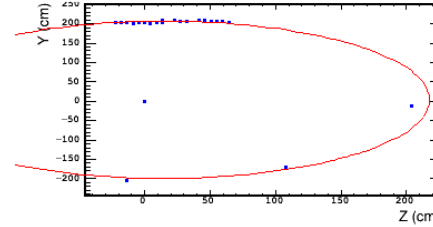
True mom. 8779.3 MeV (radius 206.4)



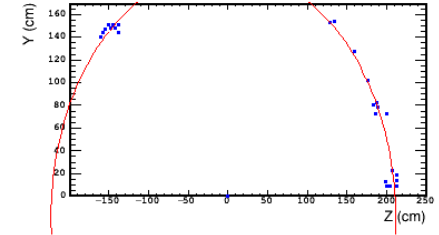
True mom. 703.2 MeV (radius 208.5)



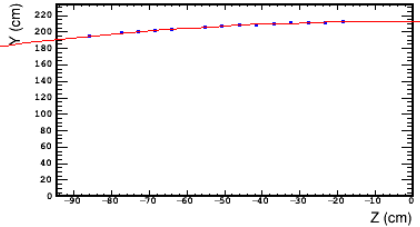
True mom. 7707.4 MeV (radius 202.9)



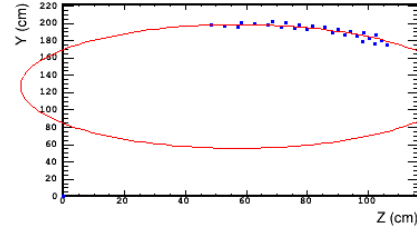
True mom. 18017.6 MeV (radius 217.2)



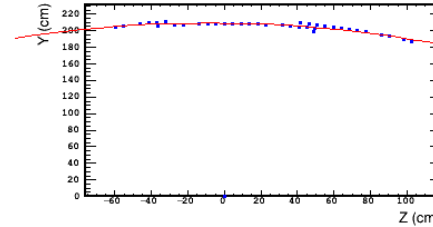
True mom. 2358.7 MeV (radius 213.2)



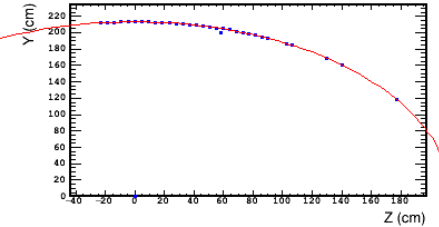
True mom. 9101.6 MeV (radius 71.6)



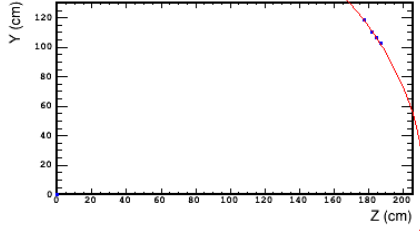
True mom. 26799.3 MeV (radius 322.8)



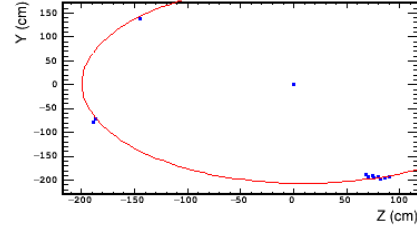
True mom. 10433.1 MeV (radius 214.0)



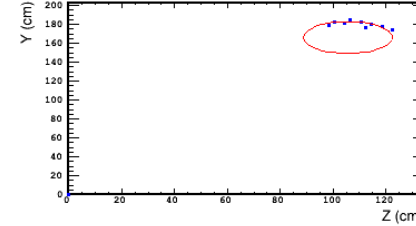
True mom. 25085.1 MeV (radius 205.2)



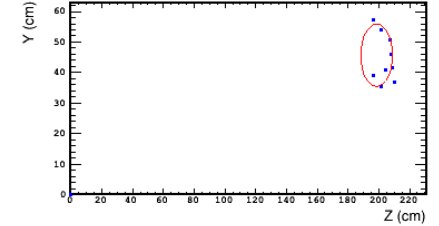
True mom. 657.7 MeV (radius 209.0)



True mom. 583.3 MeV (radius 16.8)

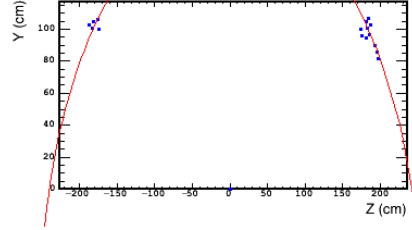


True mom. 5363.1 MeV (radius 10.2)

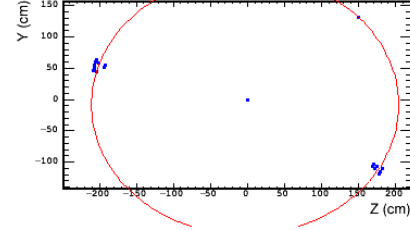


Fitting the curves with those discrete hits

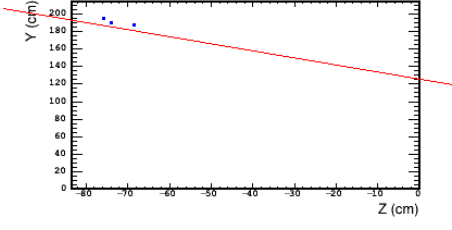
True mom. 1070.3 MeV (radius 251.7)



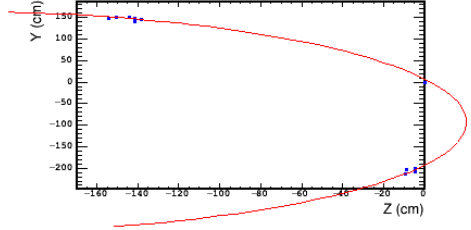
True mom. 438.2 MeV (radius 207.5)



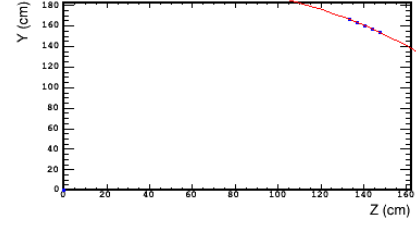
True mom. 8320.2 MeV (radius 57194.3)



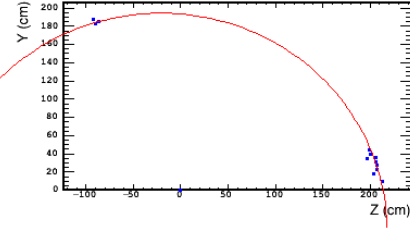
True mom. 694.2 MeV (radius 257.9)



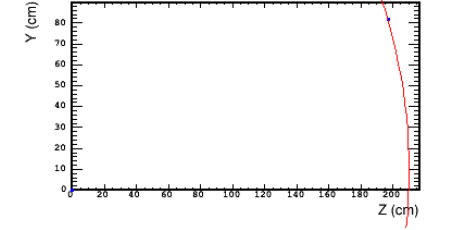
True mom. 750.8 MeV (radius 204.6)



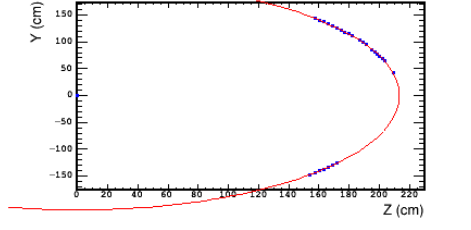
True mom. 1878.5 MeV (radius 238.6)



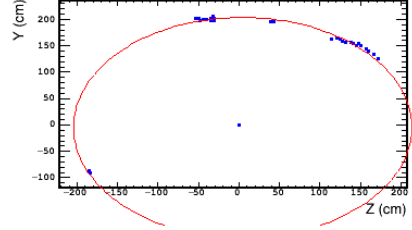
True mom. 1727.3 MeV (radius 204.9)



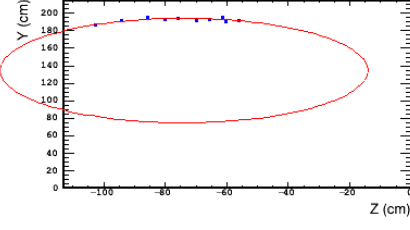
True mom. 959.4 MeV (radius 213.2)



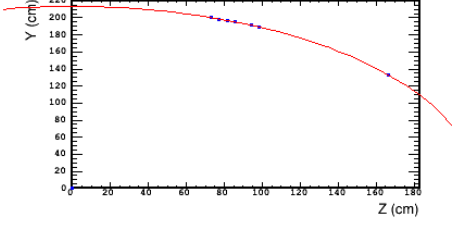
True mom. 2112.4 MeV (radius 208.9)



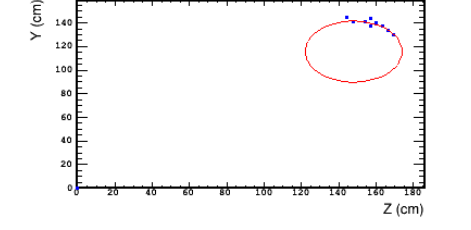
True mom. 1976.1 MeV (radius 59.7)



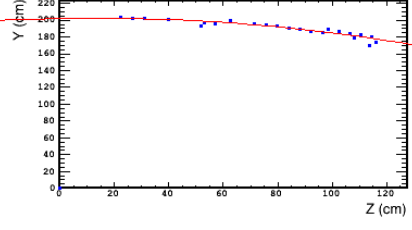
True mom. 115.1 MeV (radius 213.2)



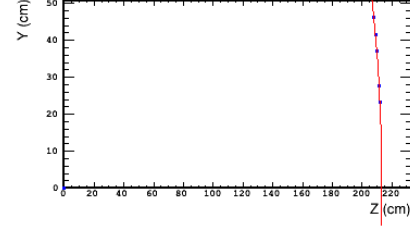
True mom. 2047.6 MeV (radius 26.0)



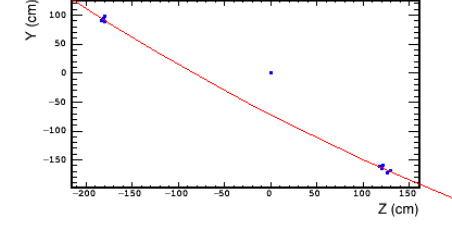
True mom. 7838.3 MeV (radius 232.7)



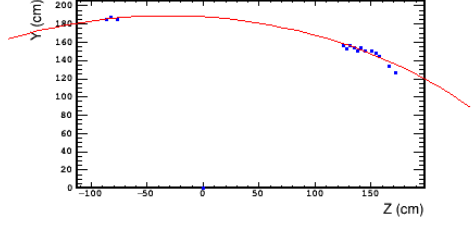
True mom. 717.8 MeV (radius 206.5)



True mom. 1096.7 MeV (radius 2338.0)

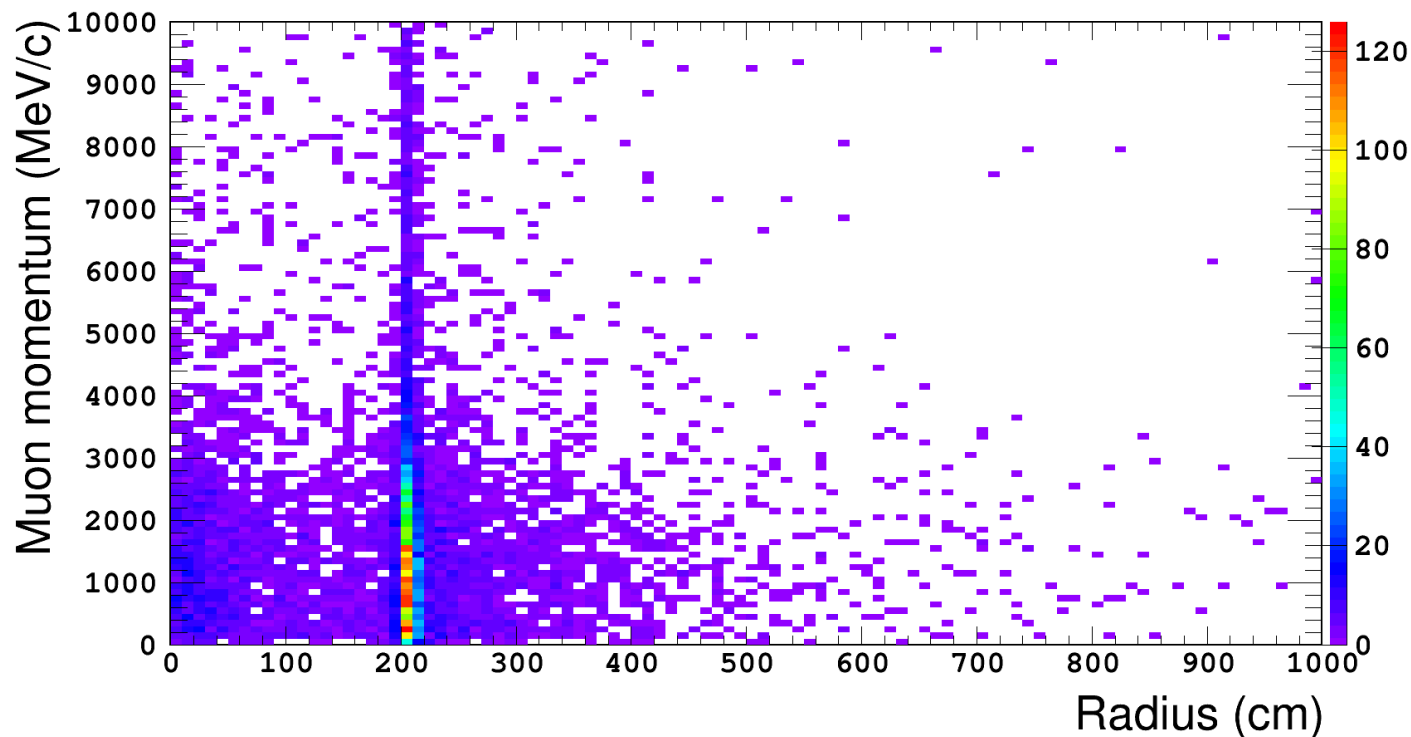


True mom. 7590.0 MeV (radius 415.4)



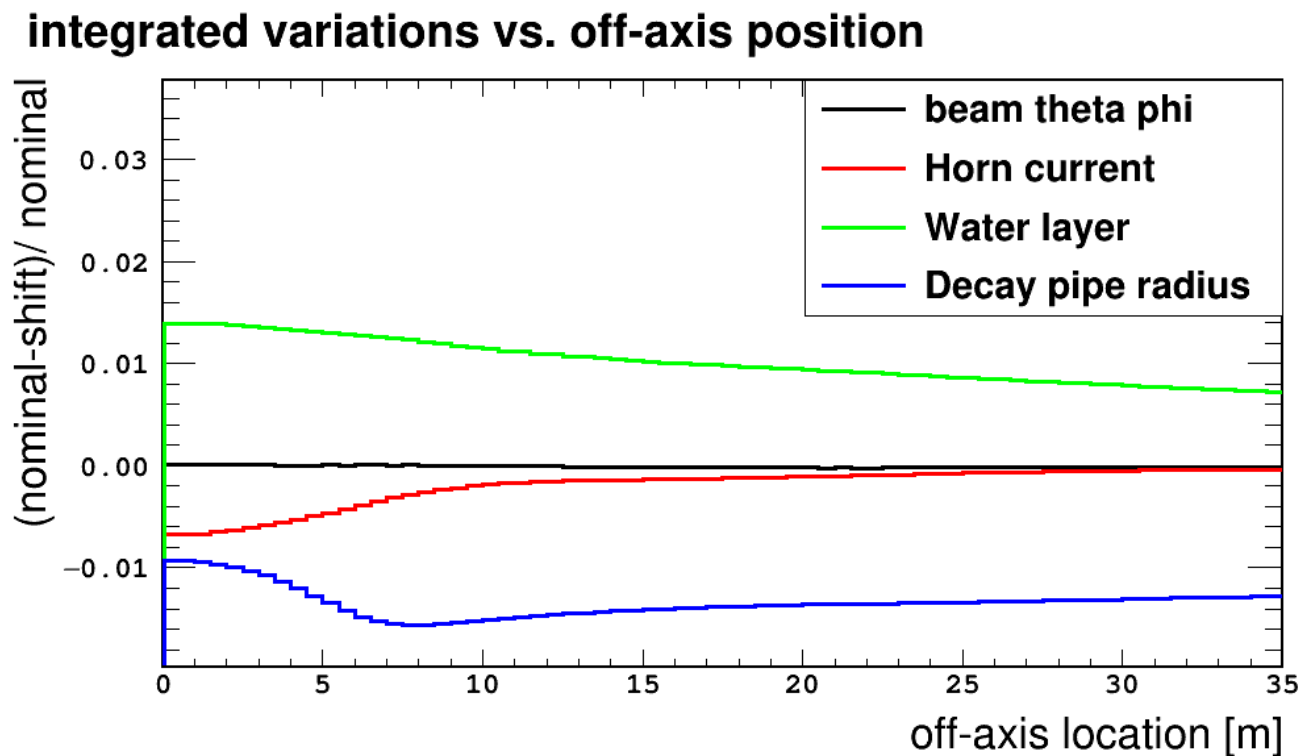
More events

- Once two clusters of hits appear, a result of 2 m radius is preferred.
- No correlation between momentum and radius observed.



Can we do rate-only?

- POT daily uncertainty could be 1-2%. (based on beam experts)
- All on-axis beam parameter variations are well within 2%.





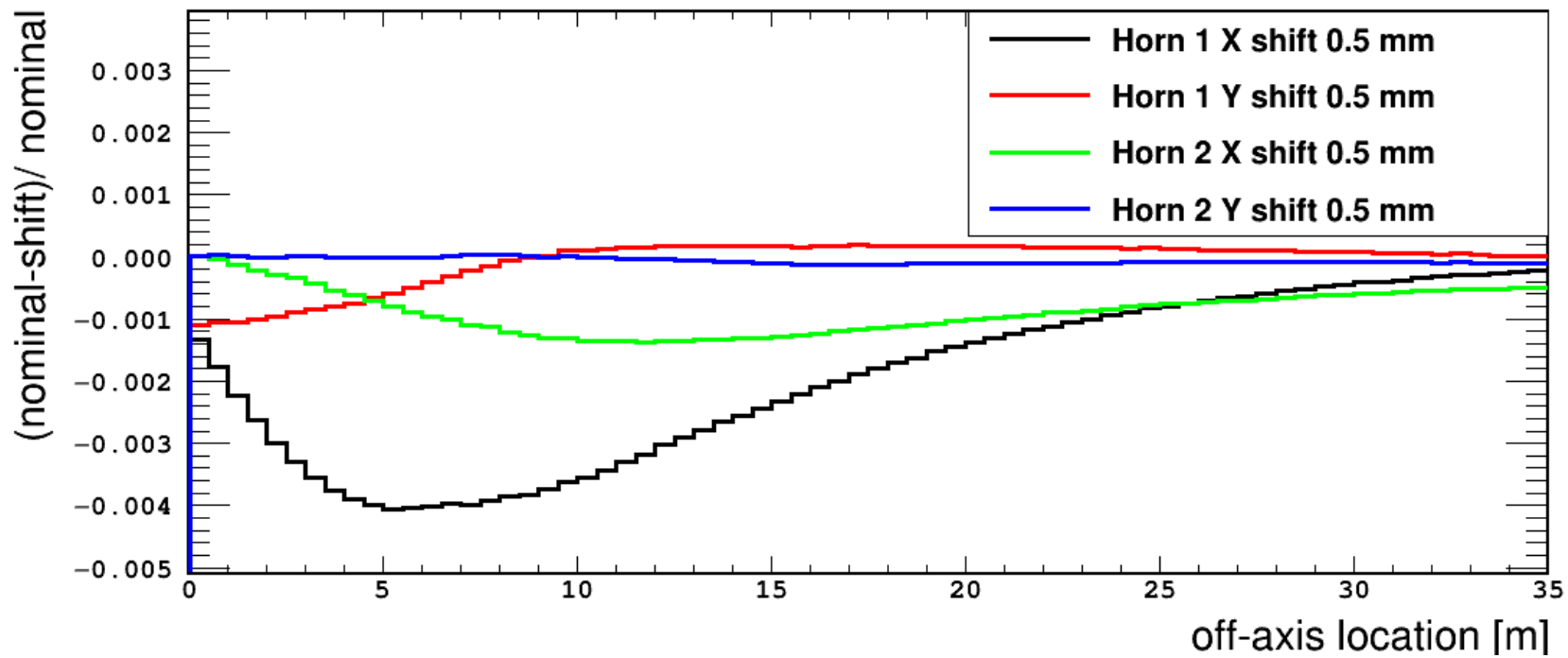
Summary

- From a simple circle fit, I don't see correlation between radius and muon momentum.
- If above stands, we can't do spectral monitoring with ECAL. We will have things inside KLOE.



Backups

integrated variations vs. off-axis position



integrated variations vs. off-axis position

