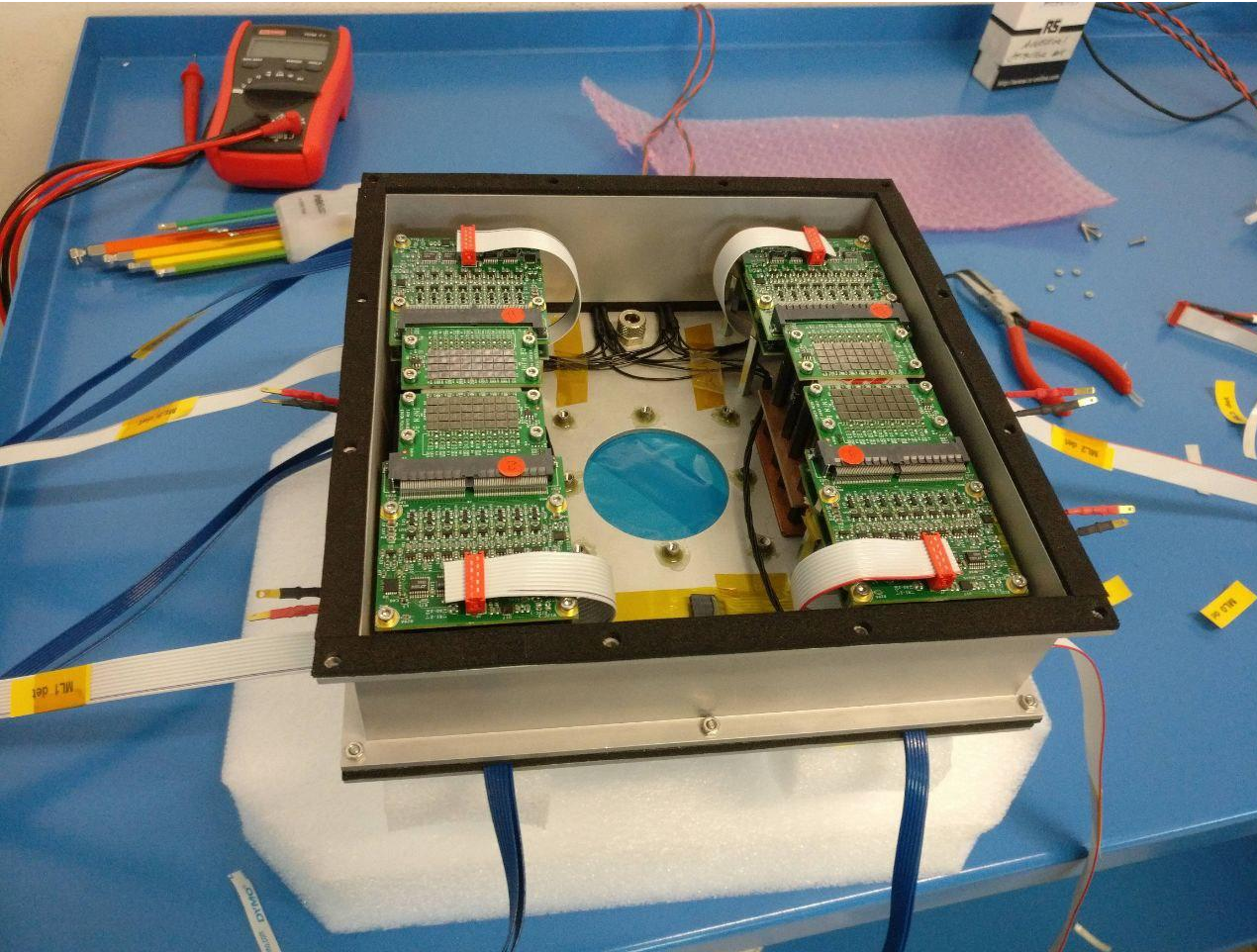


SiPM readout box

Roberto Preghenella

dRICH prototype SiPM readout box in Bologna



thanks to Luca the dRICH prototype SiPM readout box is in Bologna

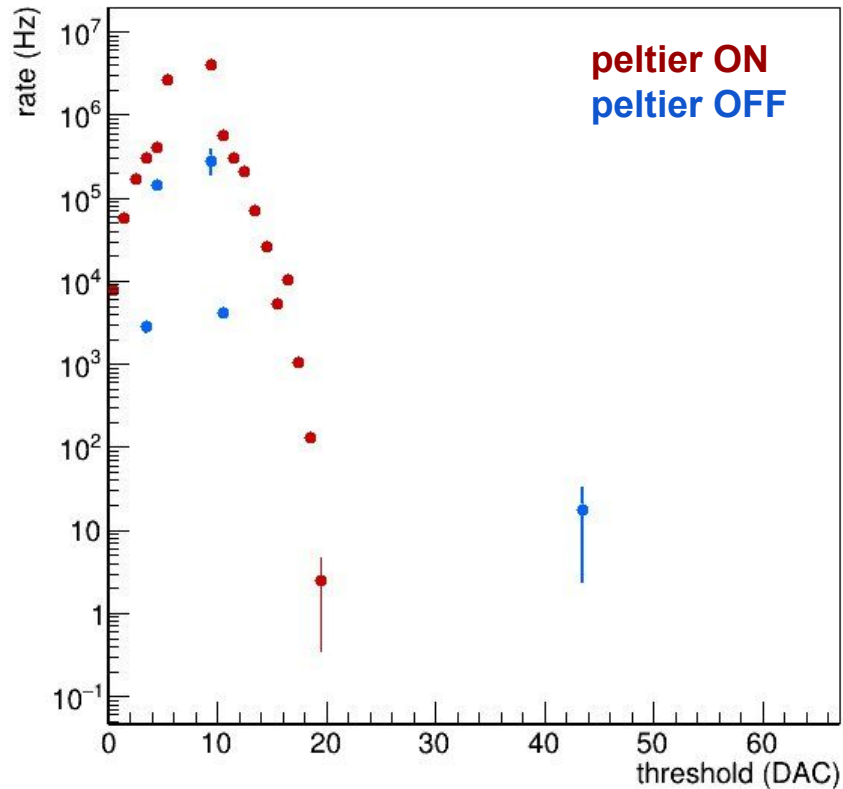
all services are available

- water
- dry air
- power
- computing

a new setup for operation of SiPM in realistic conditions in preparation for test beams

was expected to be fully operative by end of May
it is fully operative

Noise coming from the Peltier power boxes



seen with ALCOR threshold scan only
when Peltier boxes ON
apparently only Peltier-Box #4 causes
noise

this noise caused **troubles during PS
beam test**

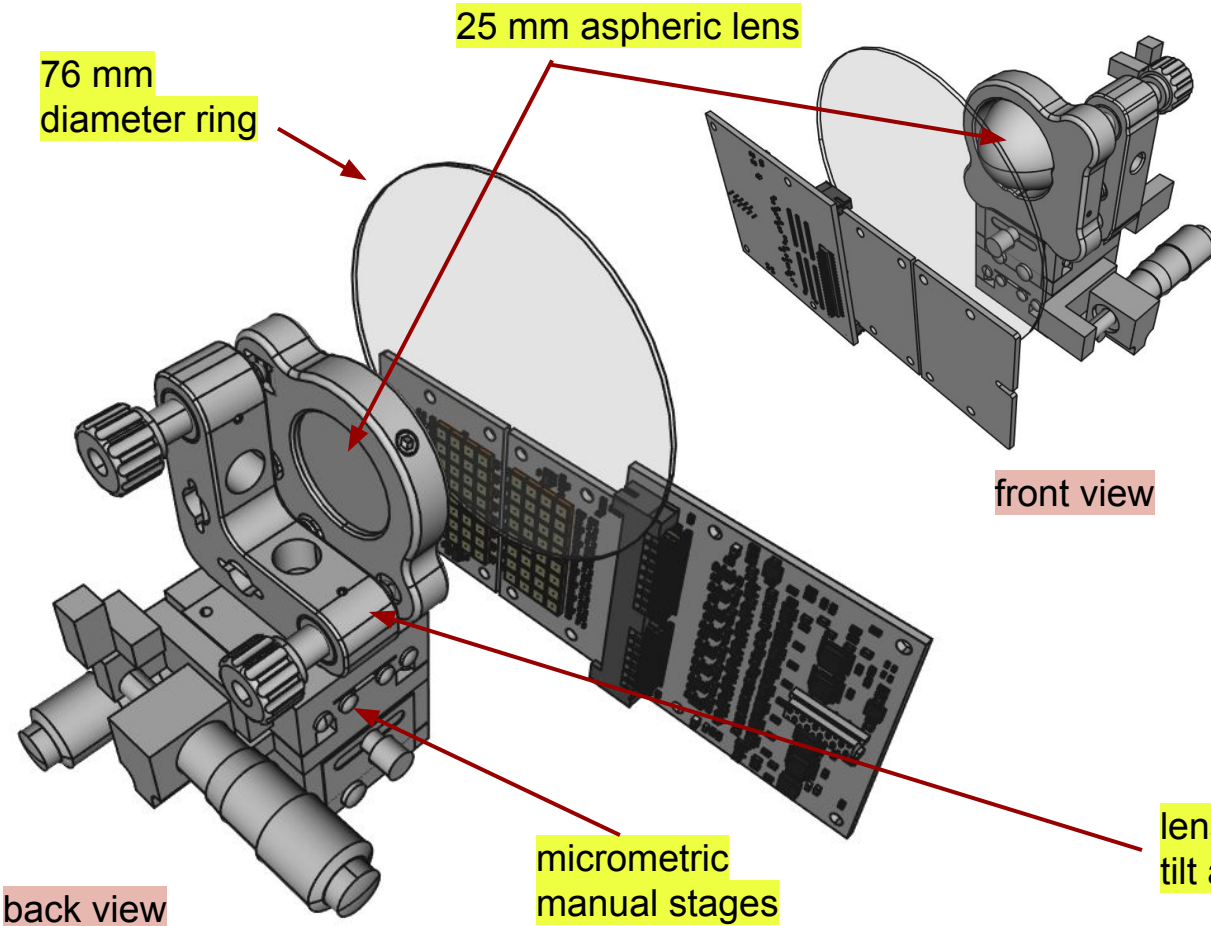
both boxes sent back to FE for deeper
investigation



now operating
Peltier power
with commercial
power-supply

we will test noise
levels ASAP

Aspheric lens as ring generator for SiPM test beam



the idea is to completely decouple SiPM tests from dRICH test to allow both to progress according to their needs

what radiator for SiPM ?

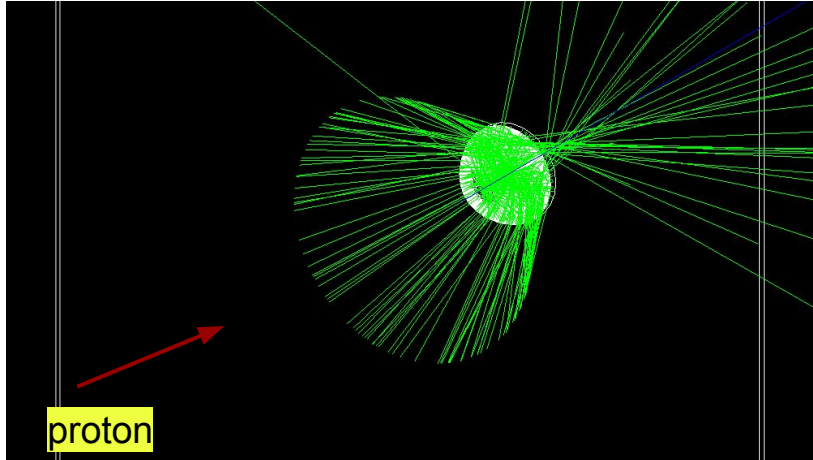
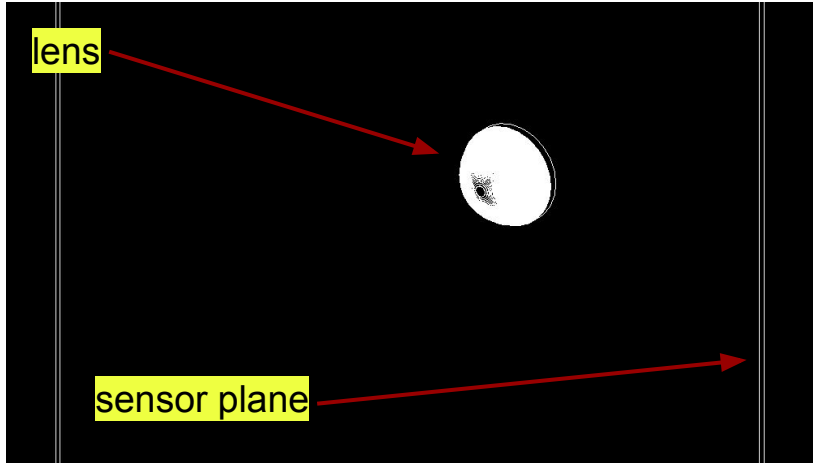
try an aspheric lens

good experience from LAPPD tests (and thanks to Alexander Kiselev for initial guidance)

studies ongoing to define best lens, best geometry and setup

it will take time, but things are already looking promising

GEANT4 simulation



GEANT4 code developed by Roberto

many details in the implementation of the lens

parameterisation from datasheet

complex shape, sliced into multiple conical section (with optimisation in slice thickness)

refractive index vs. lambda from literature

GEANT4 code allows to change

- lens parameterisation (different lenses can be tested)
- position of sensor plane (optimised radius / focus)
- particle energy

more details to be added for test beam analysis

- SiPM PDE
- actual sensor location
- ...

25mm Dia 0.63 NA Uncoated, UV Fused Silica Aspheric Lens

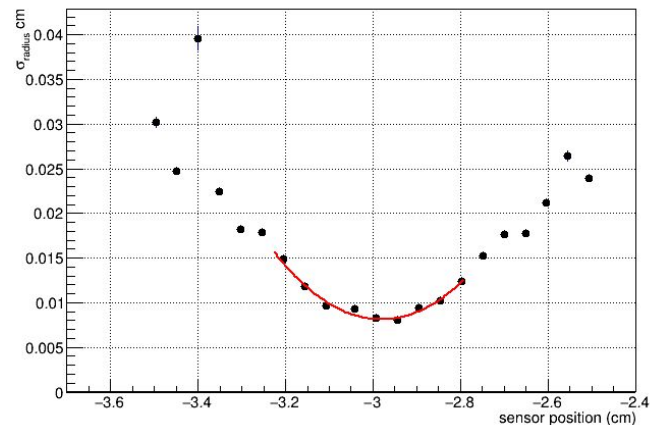
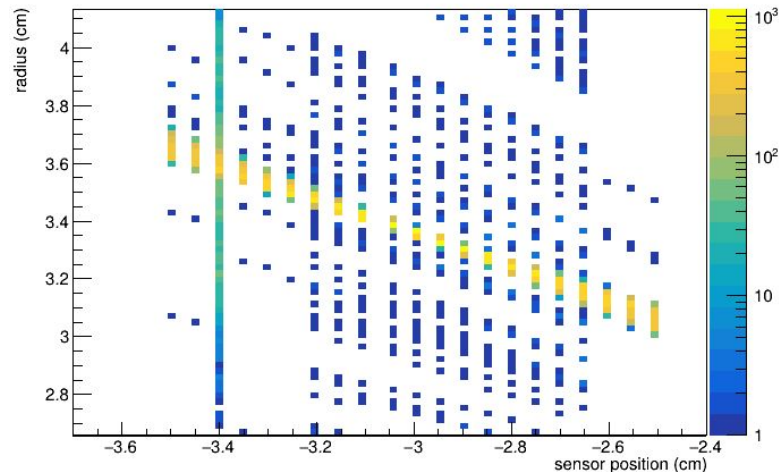
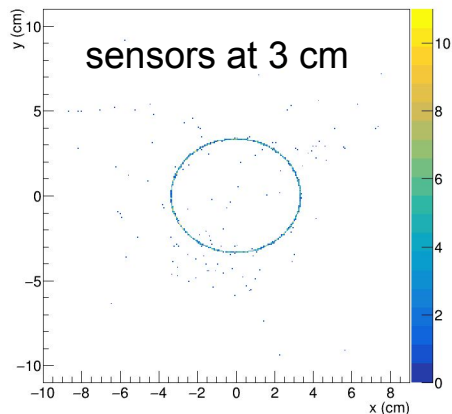


the lens used in 2021
LAPPD test beam

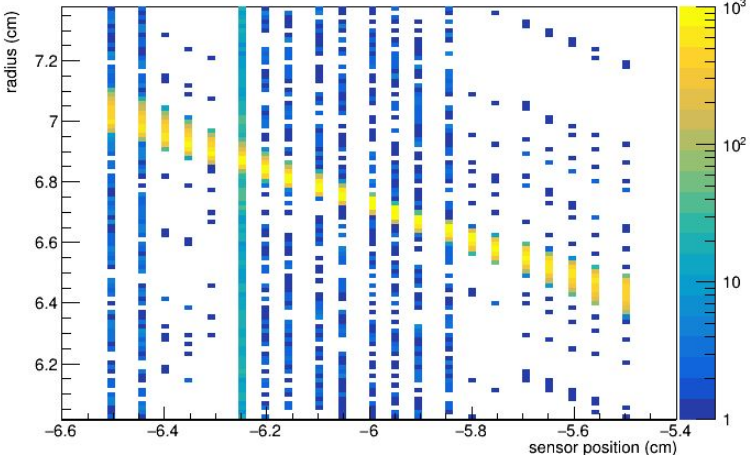
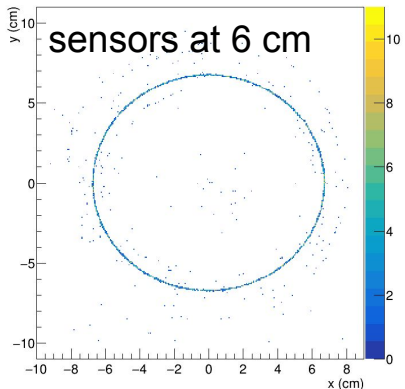
best focus is with sensor plane
~ 3 cm from the lens
better than 100 μm

ring radius is ~ 3.35 cm
too small for the current dRICH SiPM box

either we change lens
or we change the box



50mm Dia 0.63 NA Uncoated, UV Fused Silica Aspheric Lens

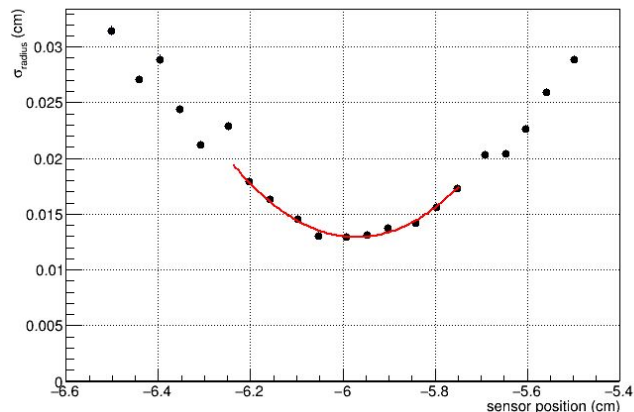


let's change the lens

best focus is with sensor plane
~ 6 cm from the lens
better than 150 μ m

ring radius is ~ 6.7 cm
maybe good for the current dRICH SiPM
box (waiting for CAD from Luca)

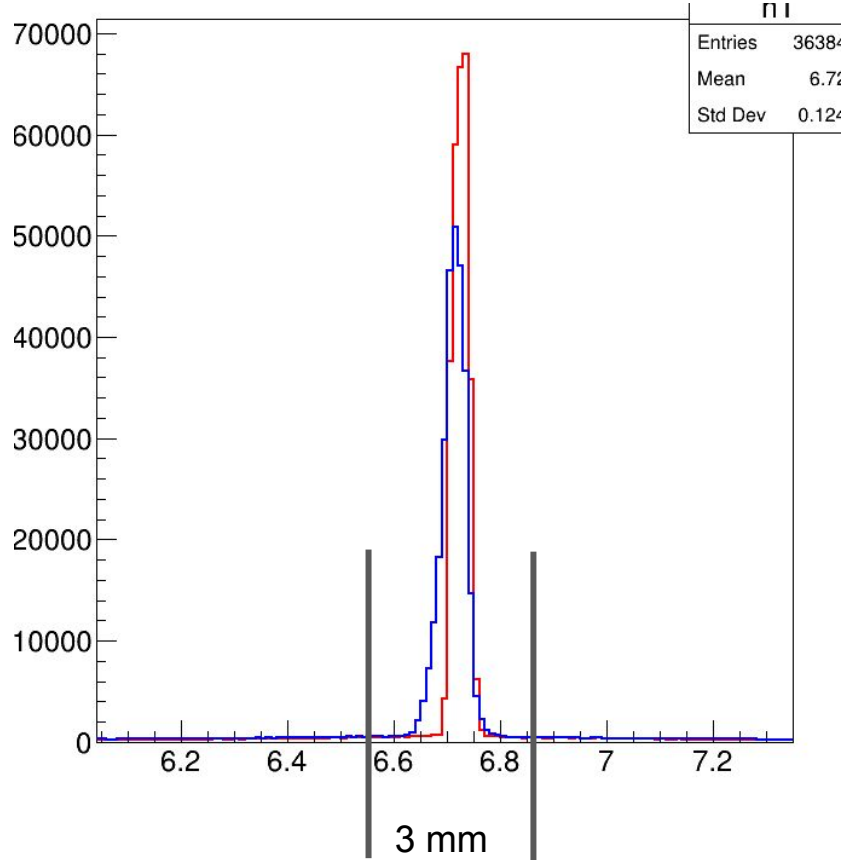
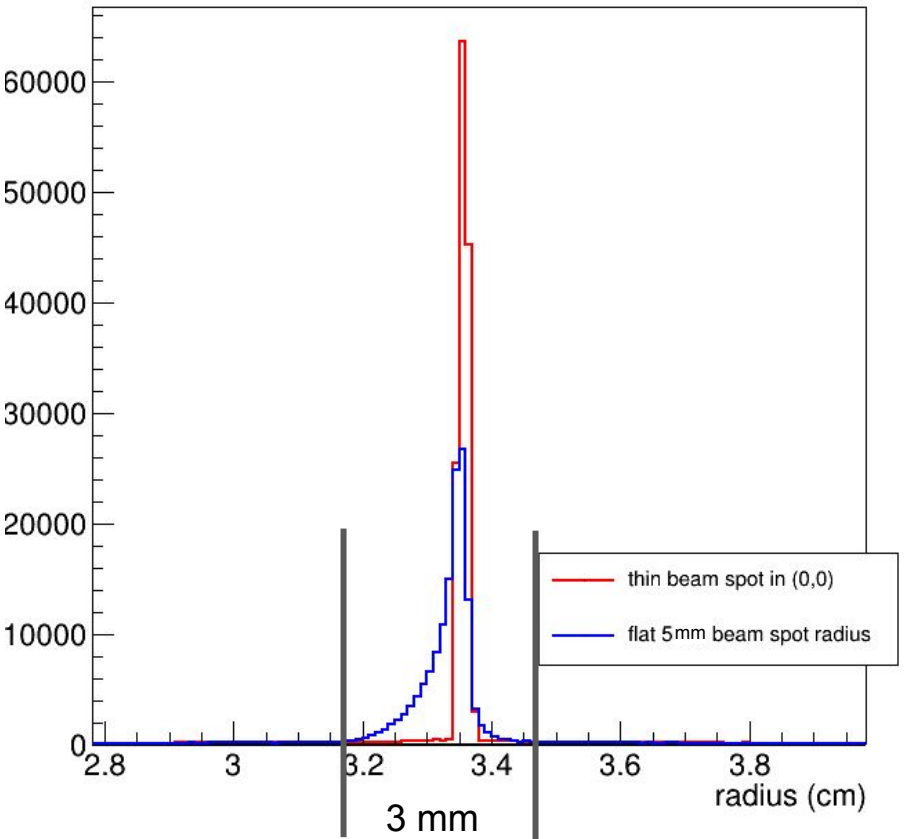
think about it seriously



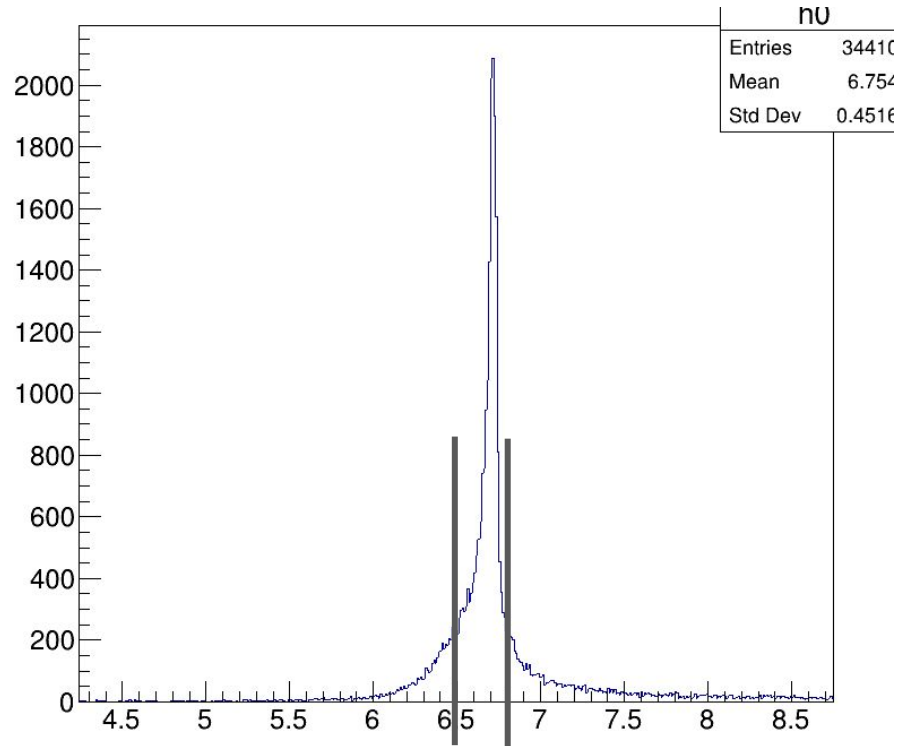
Beam spot size effects: need for tracking ?

tracking might not be strictly necessary provided system is aligned

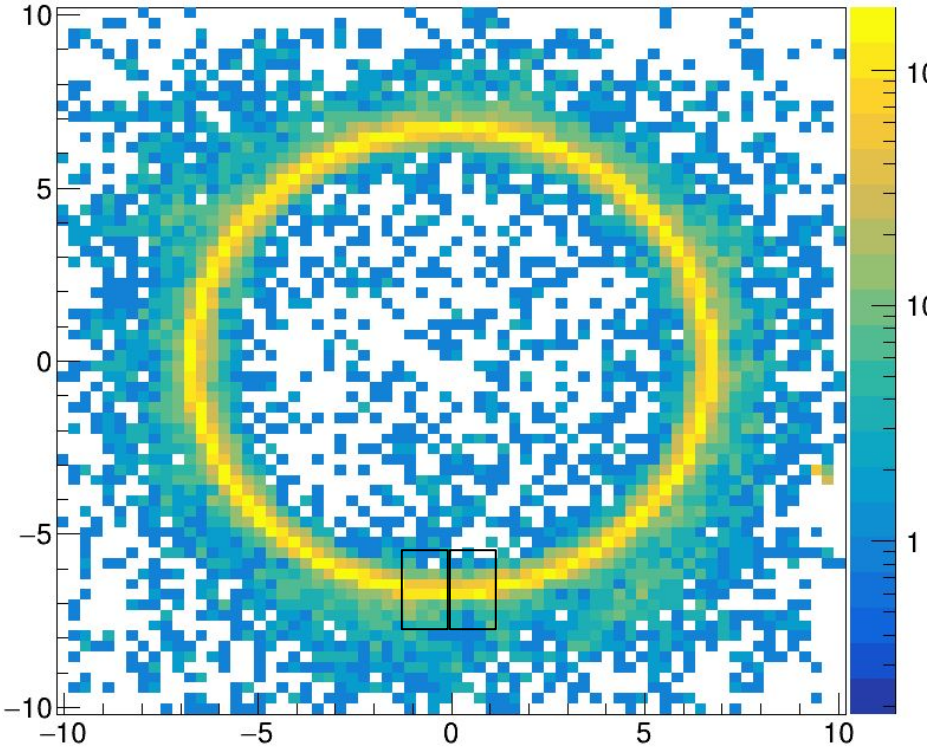
finger scintillators to define where the beam is passing in the lens might be needed, but with "large" lens it is less stringent



Beam spot size effects: need for tracking ?



3 mm



this one assumes that the beam hits the lens anywhere
no tracking, no trigger fingers
even in this condition we could see a ring