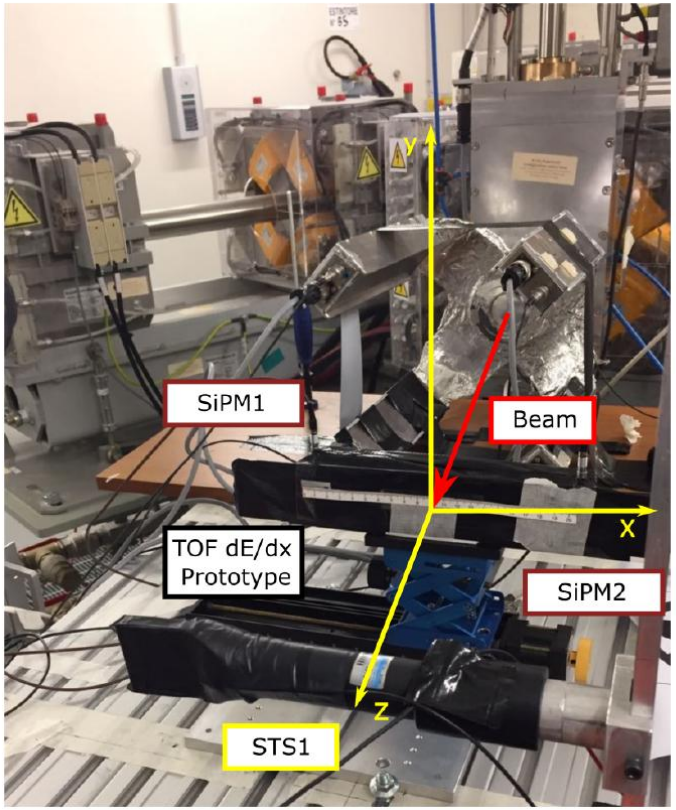
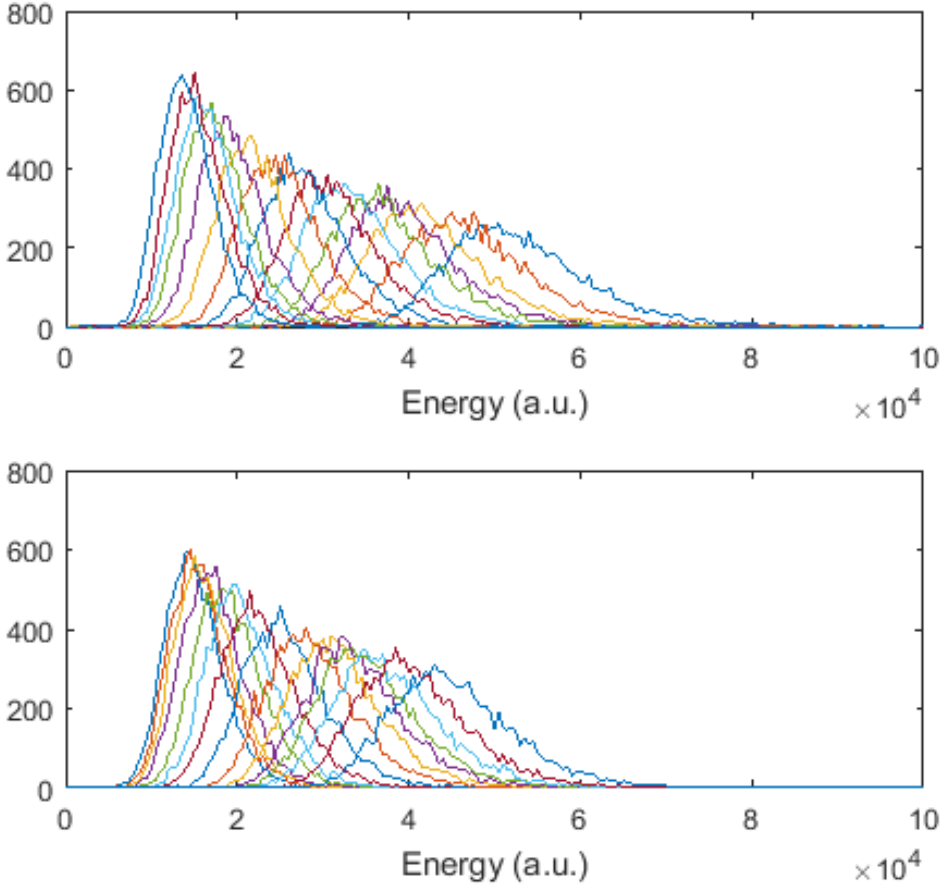
Scintillator detector performance update

05/10/2017

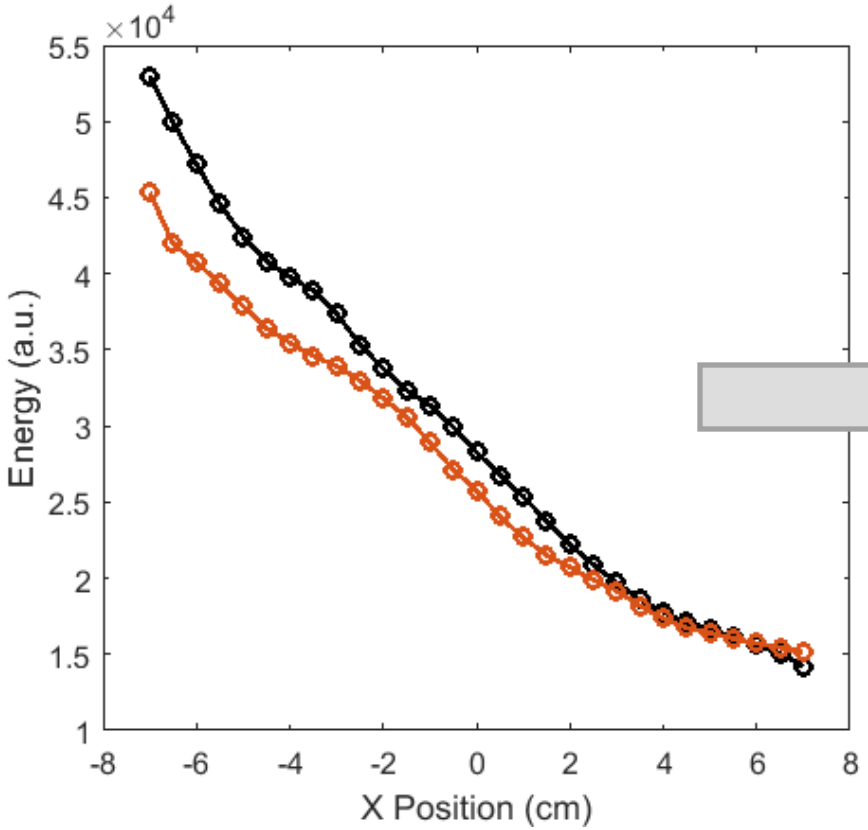
X scan Trento

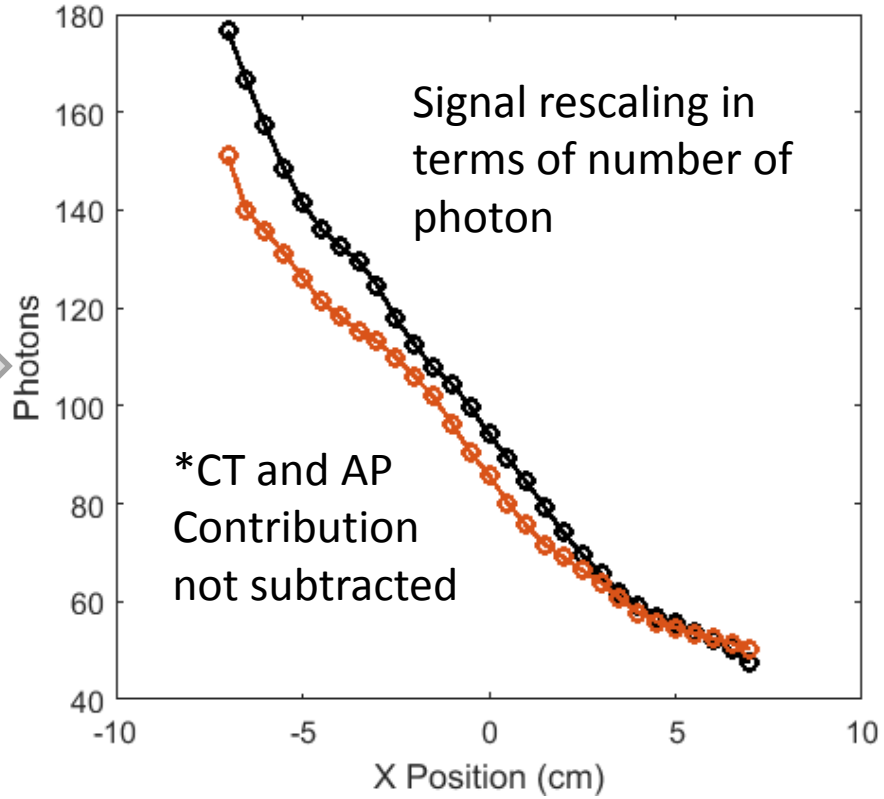


170 MeV proton beam (5 mm step)



Mean collected energy

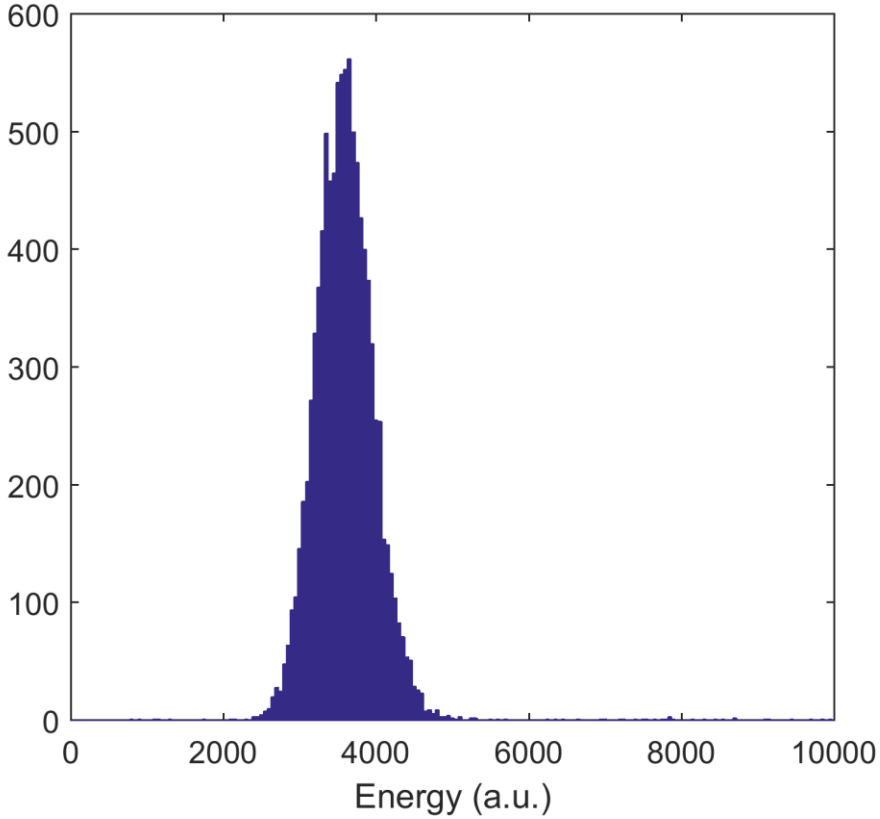


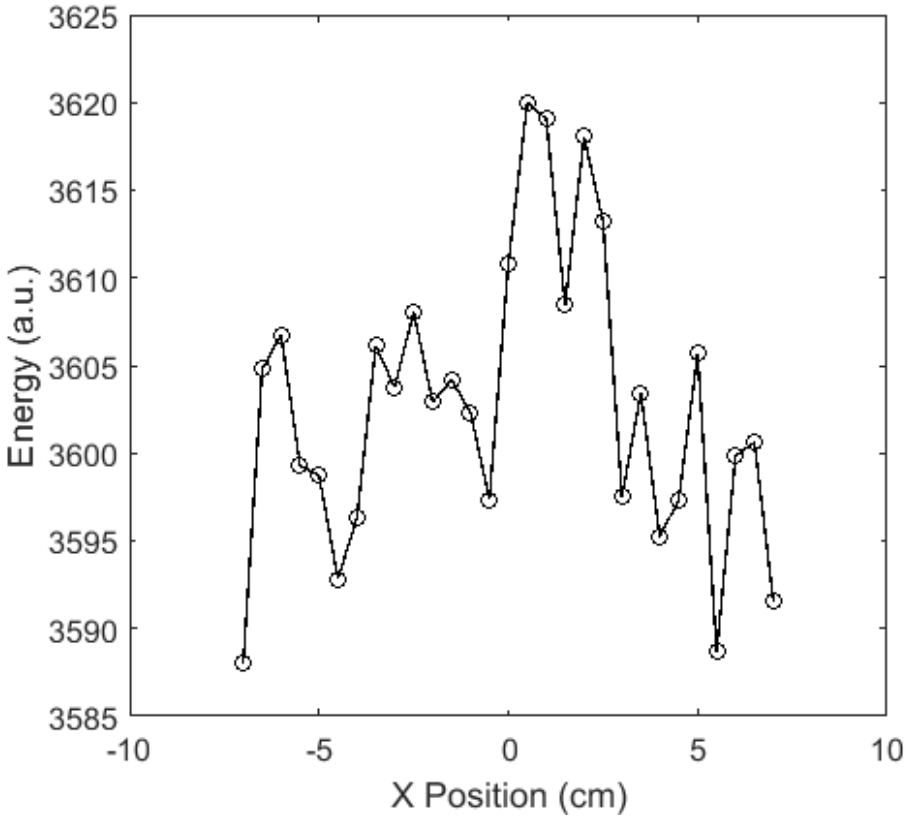


Each SiPM has 5625 microcells, a total of 11250 cells for each side were available

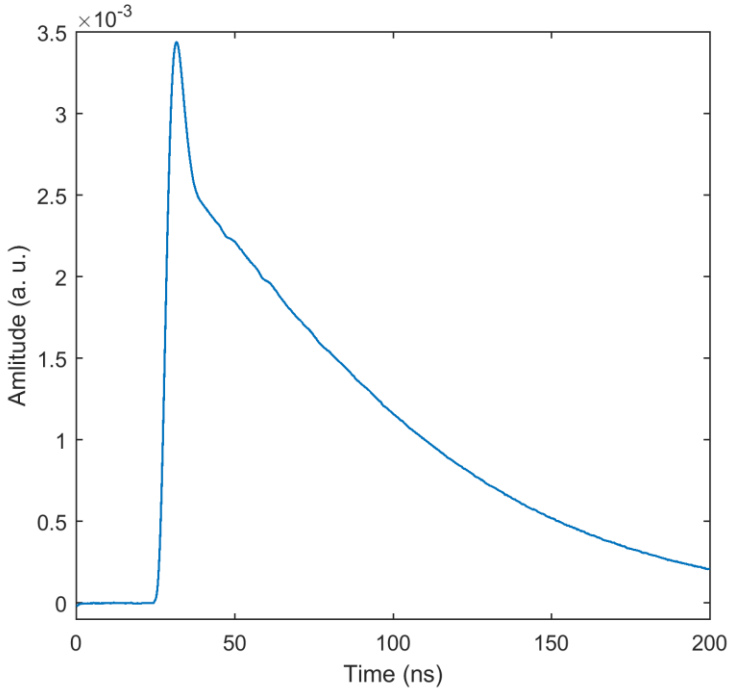
PMT energy distribution

Oscillations in the previous plot do not depend on beam changes

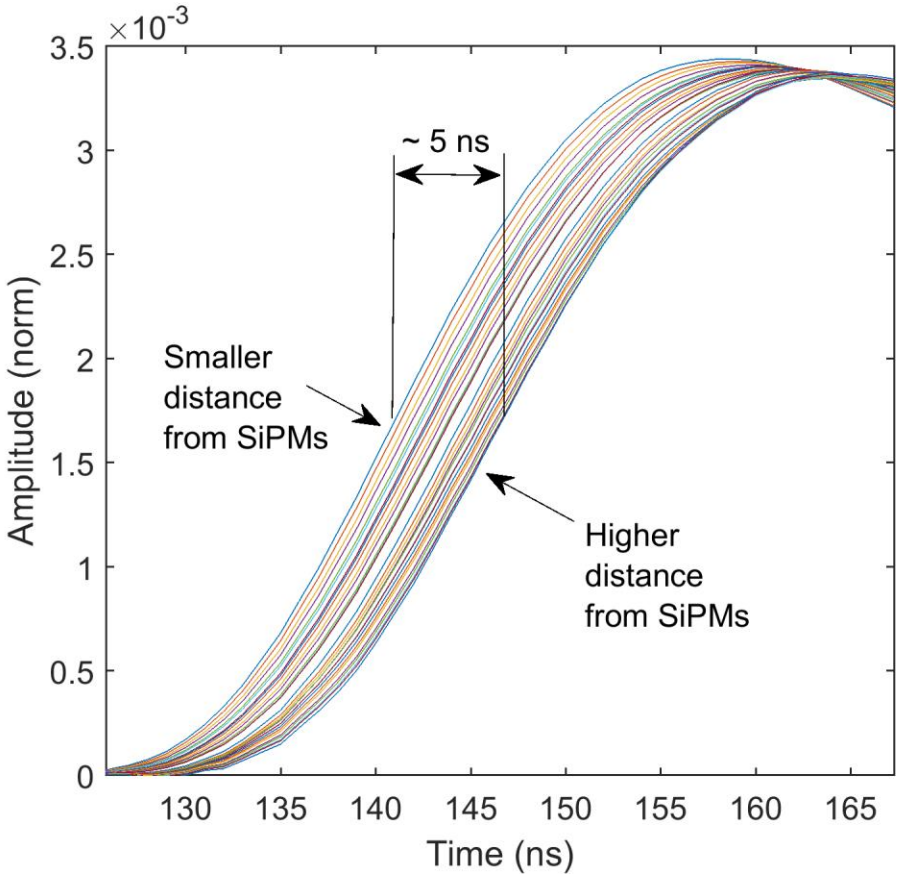




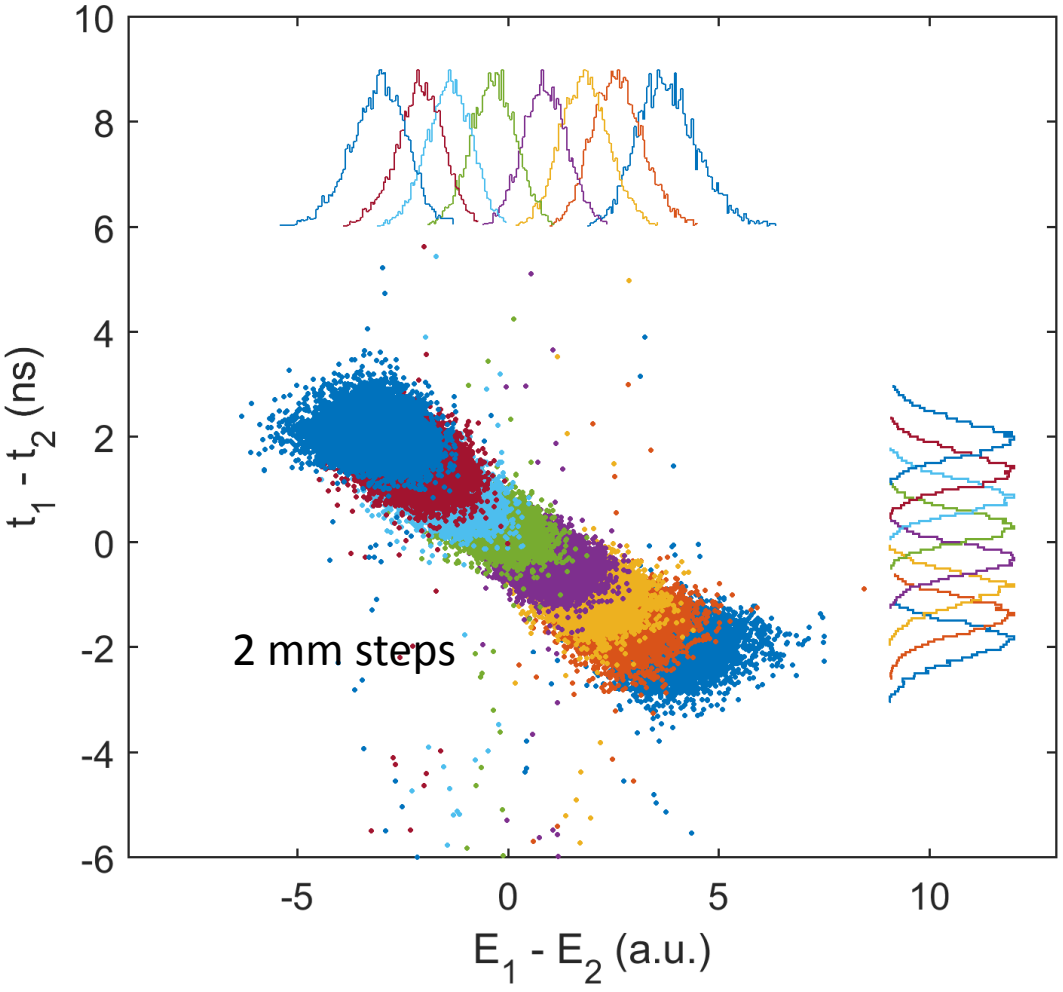
Time delay vs position



Time shift over 15 cm is about 5 ns



Interaction position determination

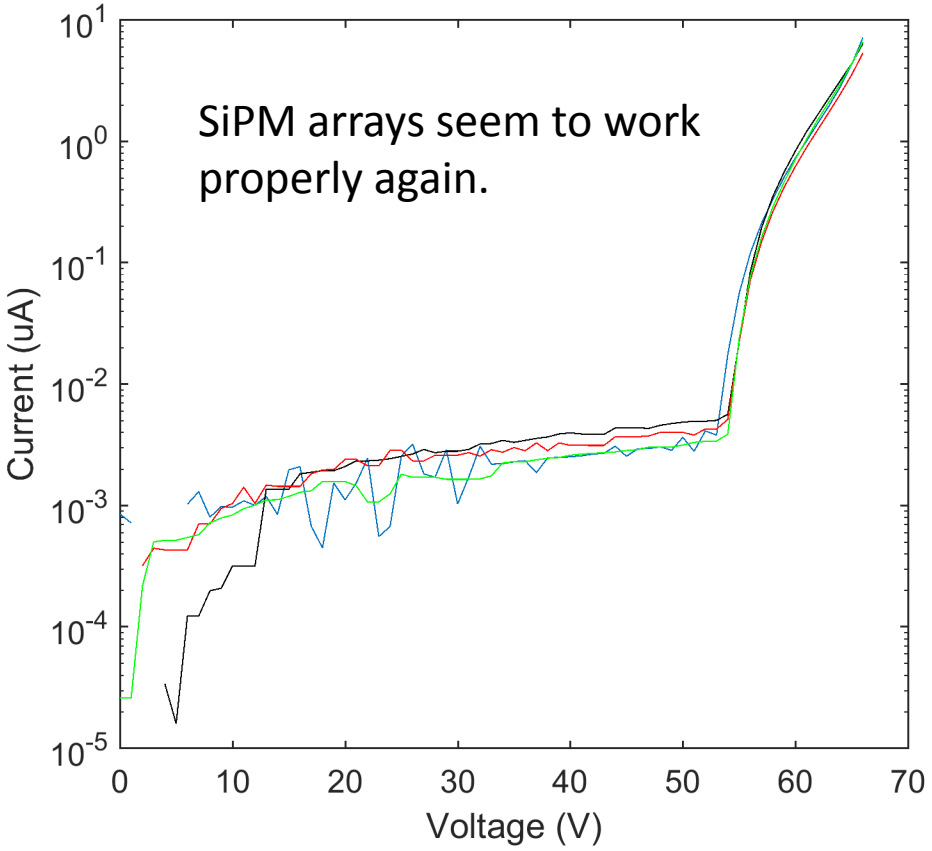


SiPM CURRENT ISSUE

Some problems with SiPM current were observed at LNS

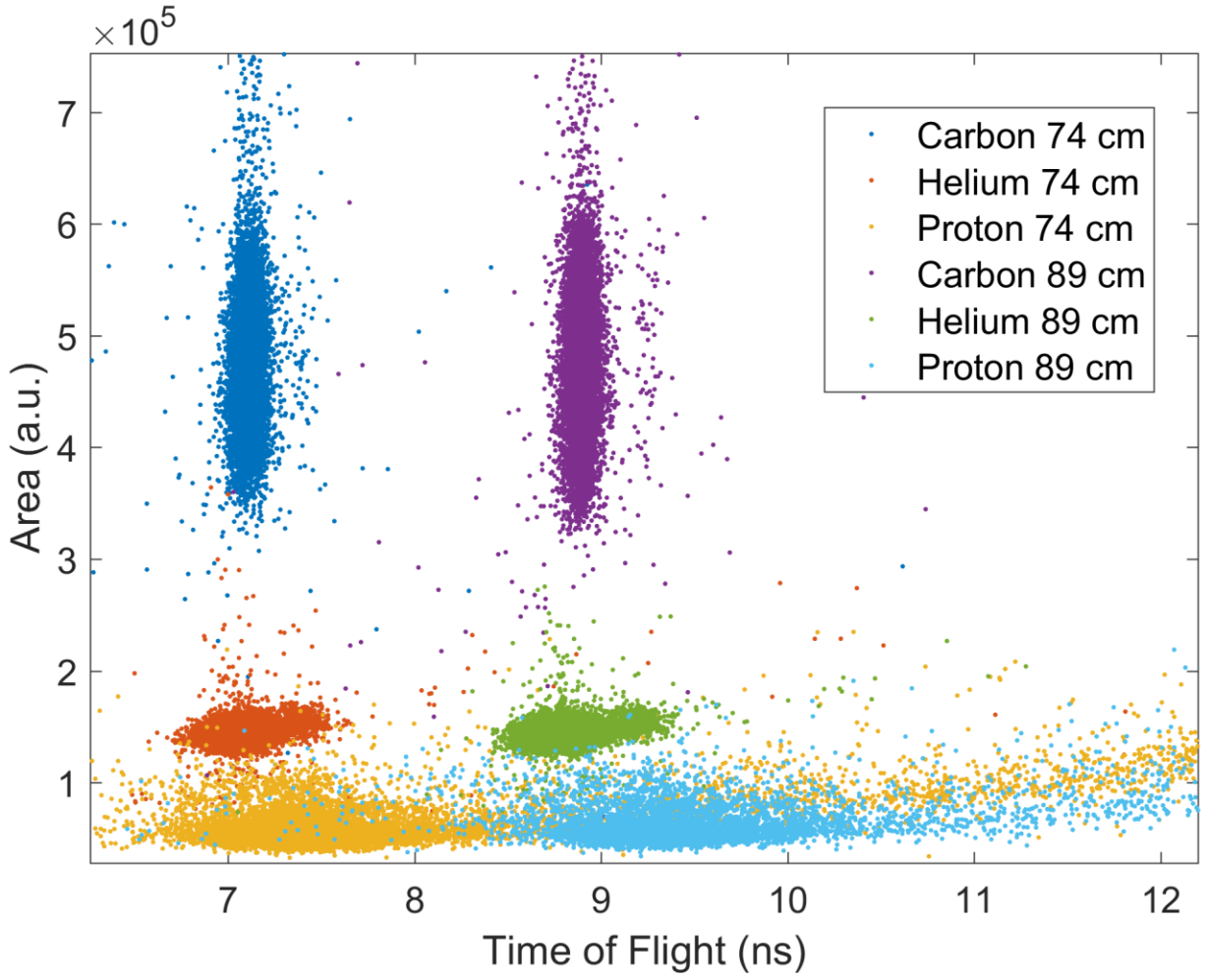
- Dark current increase after irradiation
- Dark current does not restore to its initial value the day after.

Some SiPMs were replaced during tests at LNS.



Test on other SiPM types will be conducted, we are planning to buy some samples from Hamamatsu. (also 6 x 6 mm)

Particle identification @ LNS



Current work

- New 40 cm long bars arrived in Pisa (2-3 mm thickness)
- Preliminary laboratory tests (attenuation and light yield)
- Tests on other SiPM samples (Hamamatsu)
- Fine tuning of the Monte Carlo simulations of the optical transport