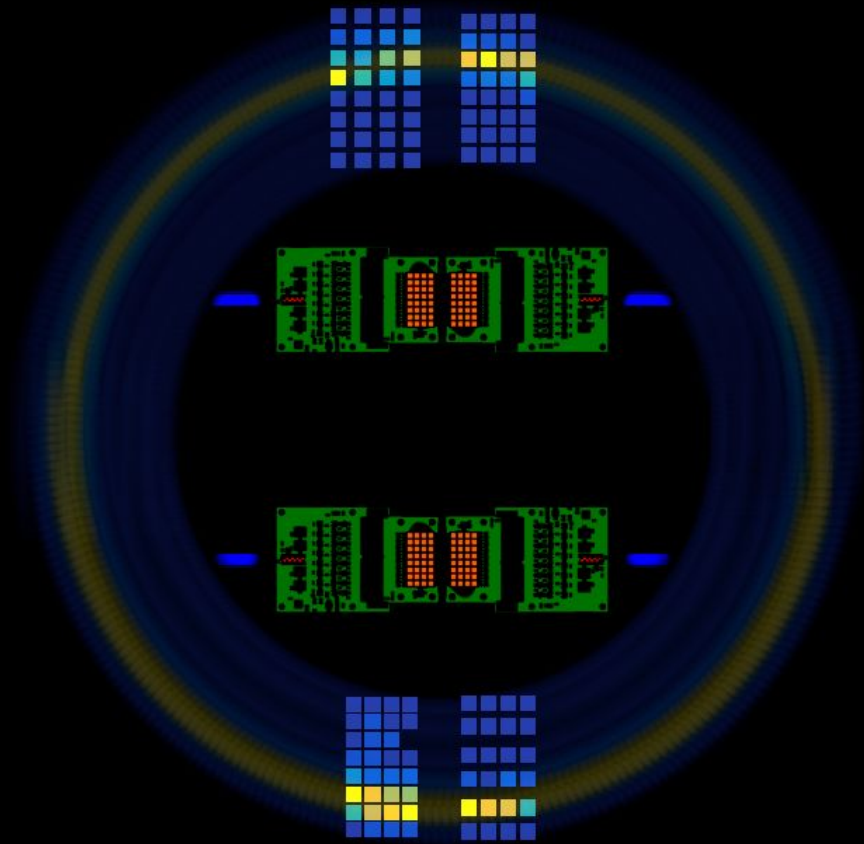


# dRICH SiPM test-beam 2022

Roberto Preghenella



# Test beam at CERN just concluded

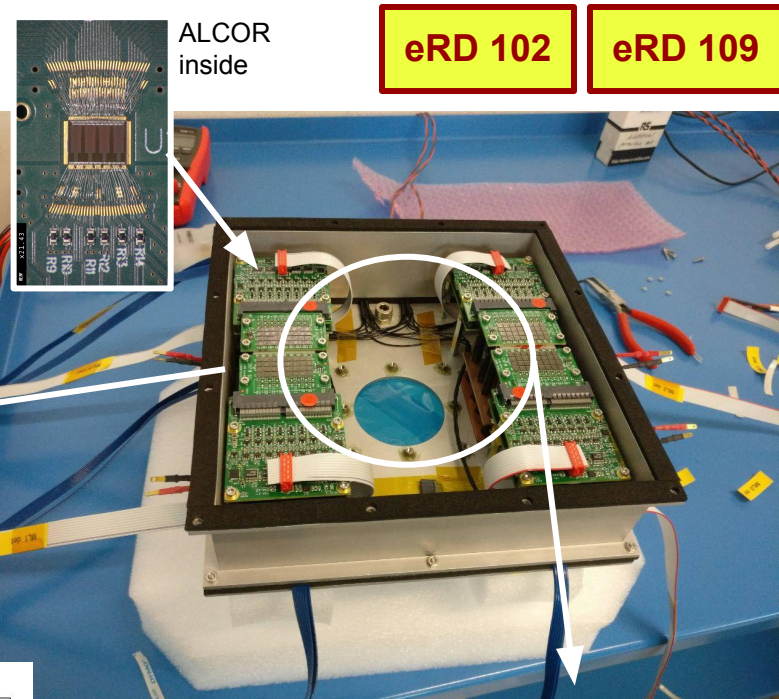


dRICH prototype on PS beamline with SiPM-ALCOR box

beamline shared with LAPPD test

## successful operation of SiPM

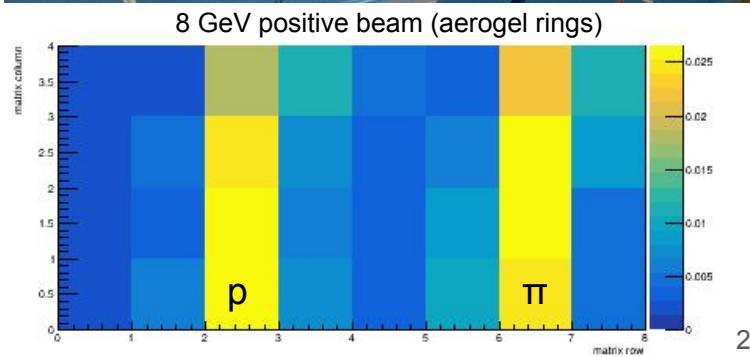
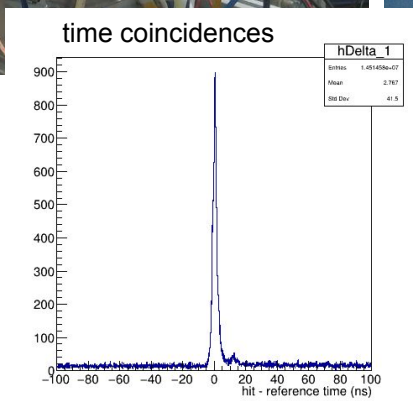
- all sensors were irradiated (up to  $10^{10}$ ) and annealed (oven)
- complete prototype readout chain based on ALCOR-v1



ALCOR inside

eRD 102

eRD 109

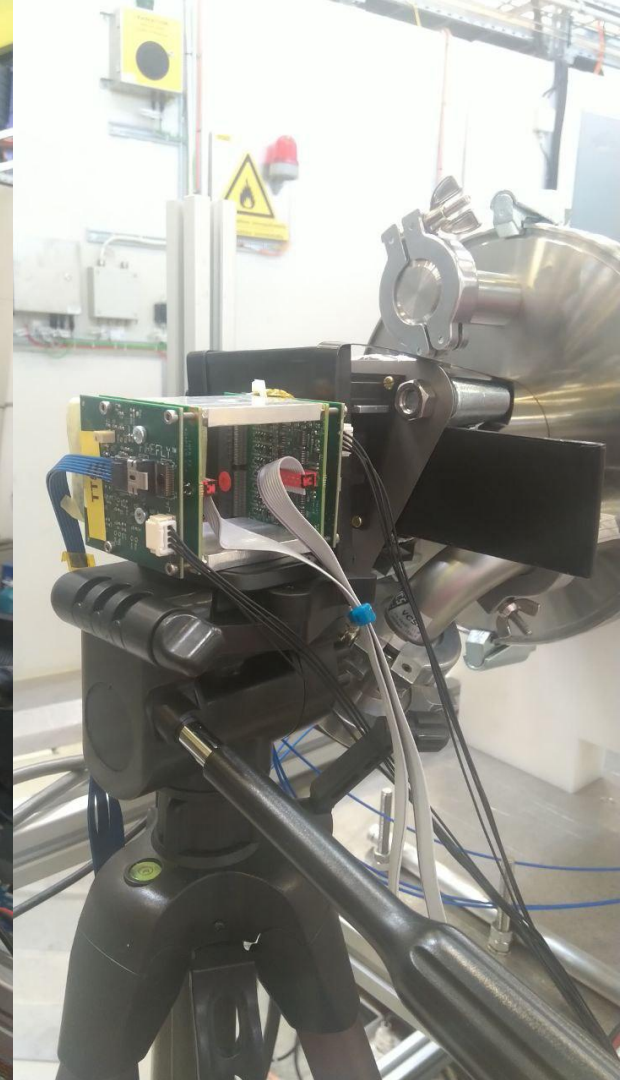
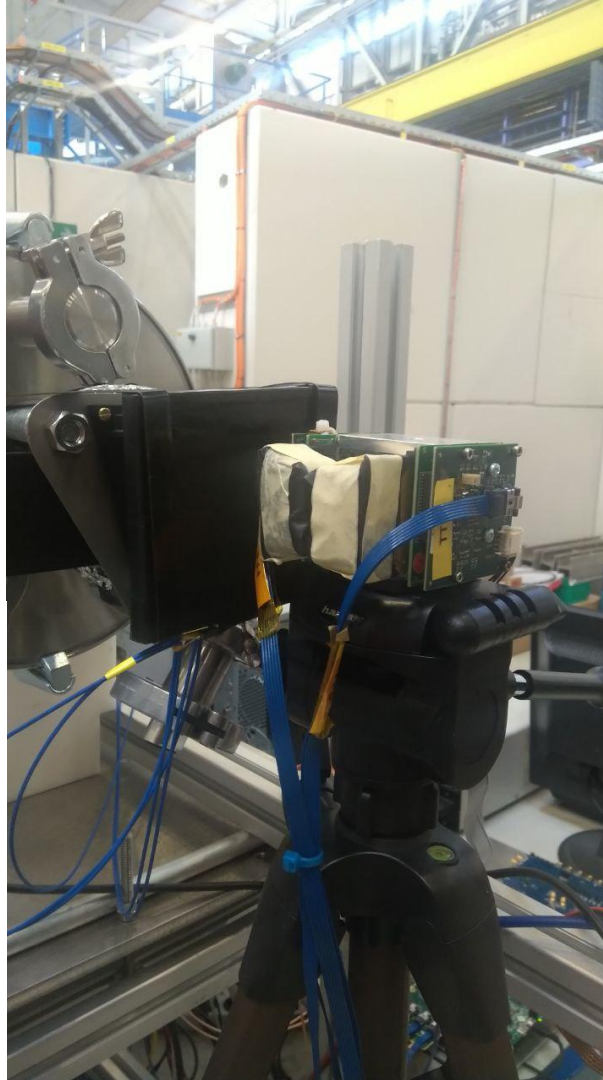
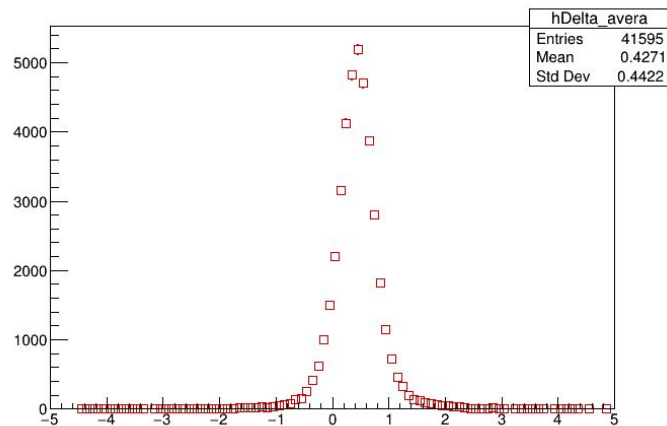


8 GeV positive beam (aerogel rings)

# Timing system

2x 2x3 cm<sup>2</sup> scintillators  
mounted on tripod downstream dRICH  
read by 2x 32-SiPM (BCOM) matrices  
with full ALCOR readout

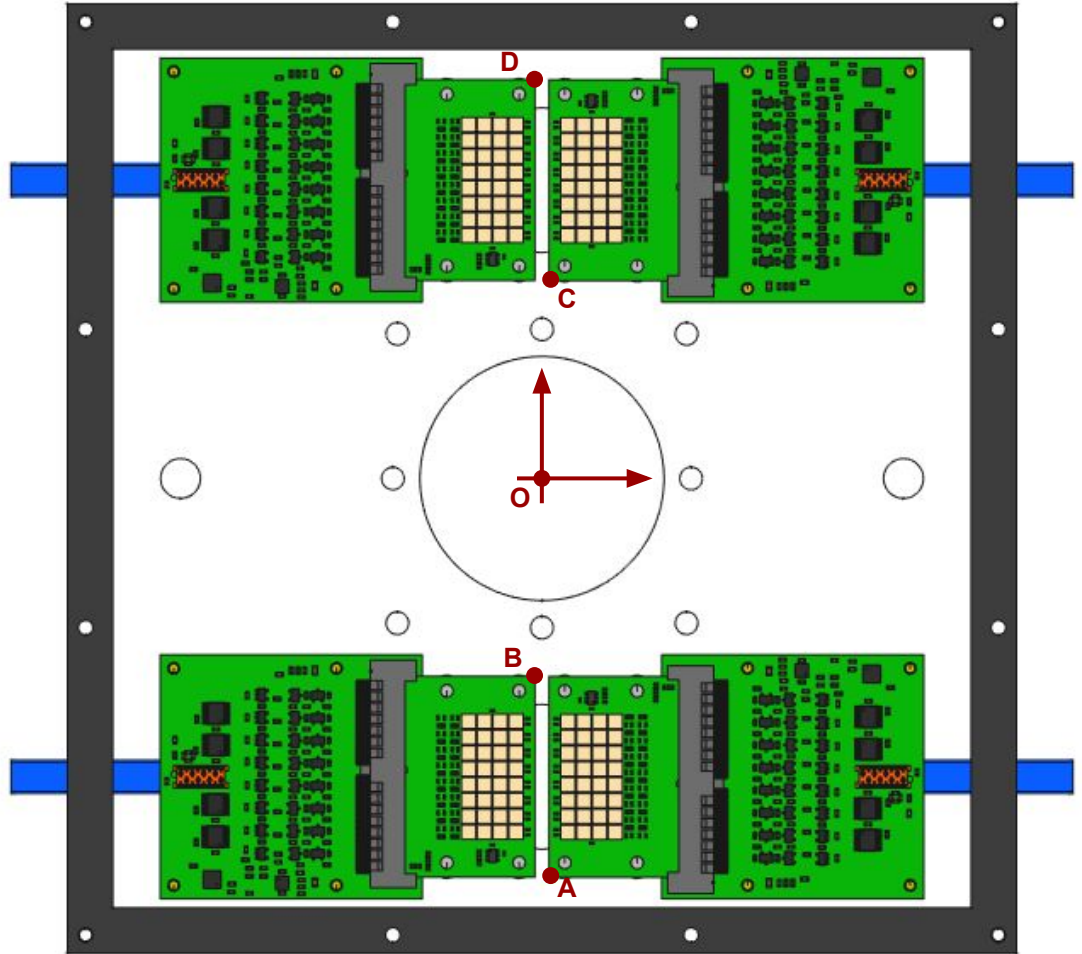
to provide reference time  
delivered particle time with  $\sim 200$  ps  
(yet to be fully calibrated)





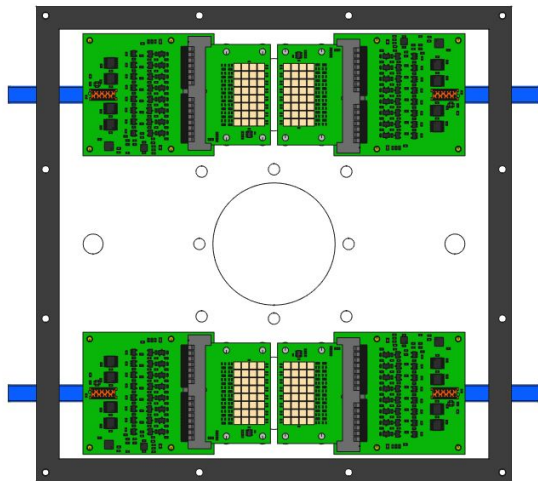
# Coordinate system

$O = ( 0.00 , 0.00 ) \text{ mm}$   
 $A = ( +1.55 , -88.25 ) \text{ mm}$   
 $B = ( -1.55 , -43.79 ) \text{ mm}$   
 $C = ( +1.55 , +43.79 ) \text{ mm}$   
 $D = ( +88.25 , -1.55 ) \text{ mm}$

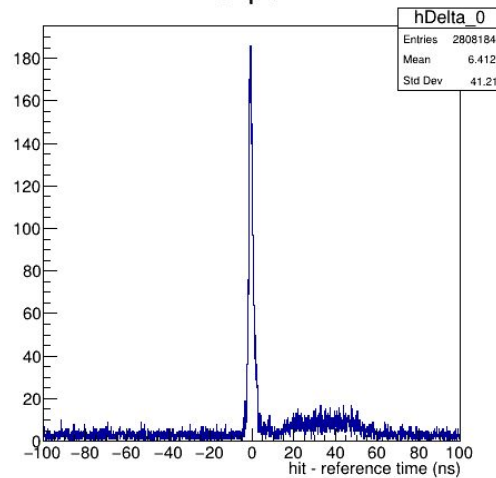


# Time coincidences (online)

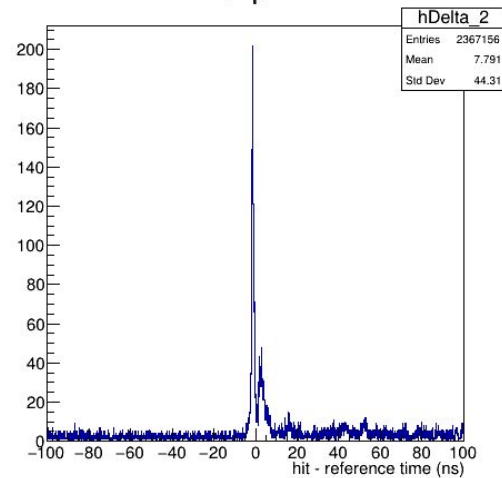
Cherenkov photon time difference  
wrt. reference particle time  
(combinatorial)



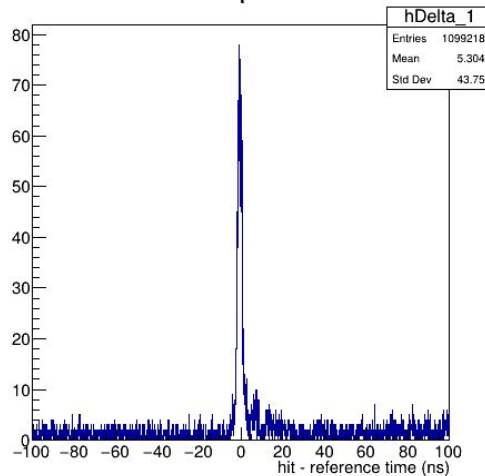
chip 0



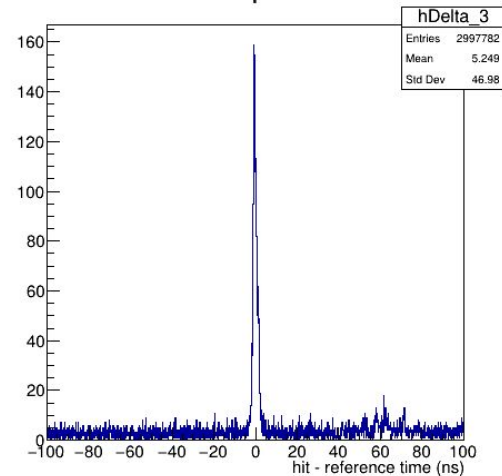
chip 2



chip 1

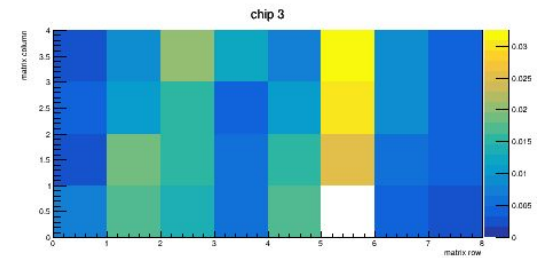
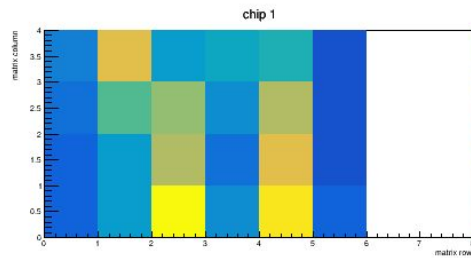
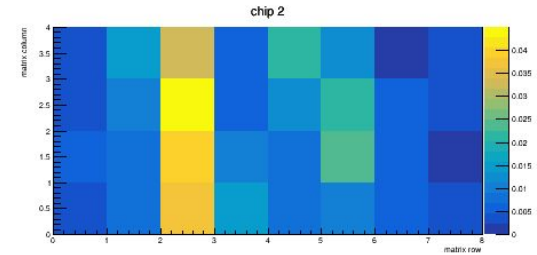
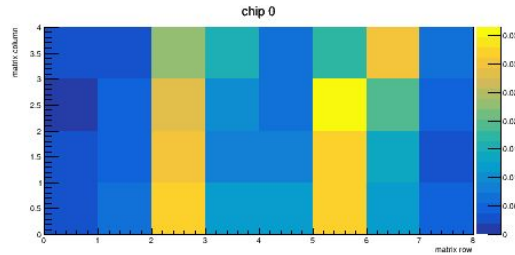
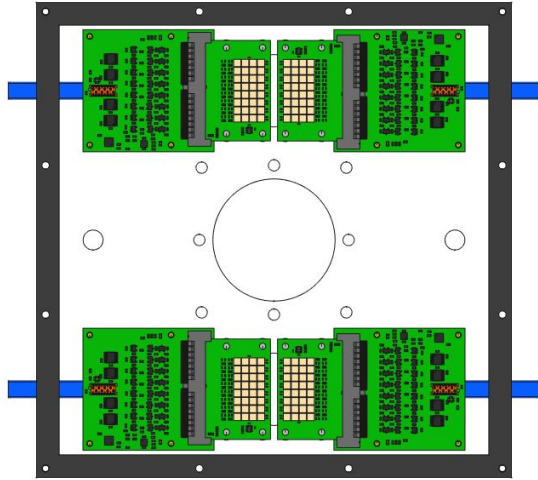


chip 3



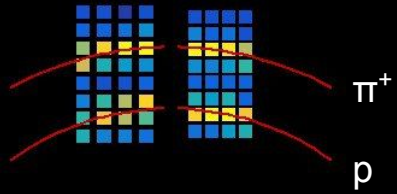
# Ring patterns (online)

with a loose cut ( $\pm 10$  ns) on time coincidences  
first rings could be seen (positive beam)

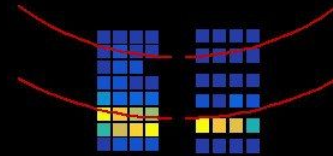
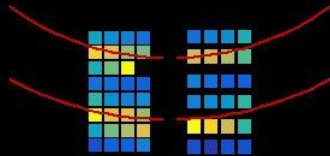
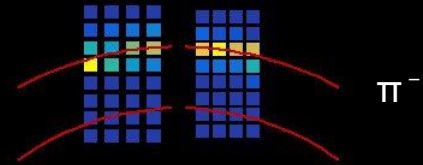


# Ring patterns (offline)

8 GeV (positive beam)



8 GeV (negative beam)



# Summary

- **taken plenty of data with different conditions**

- positive beam
- negative beam
- variable momentum, from 4 to 10 GeV/c
- with triggers
  - Luca fingers scintillators
  - Cherenkov threshold counter (pion-ID)
- with GEM tracking
- with different Vbias

- **system needs to be calibrated offline**

- position alignment
- timing

- **it will be fun data to analyse**

- it is EIC\_NET public
- contact Roberto for details

**thanks to everyone for a successful ALCOR+SiPM test beam**