ALICE Software and Computing Week
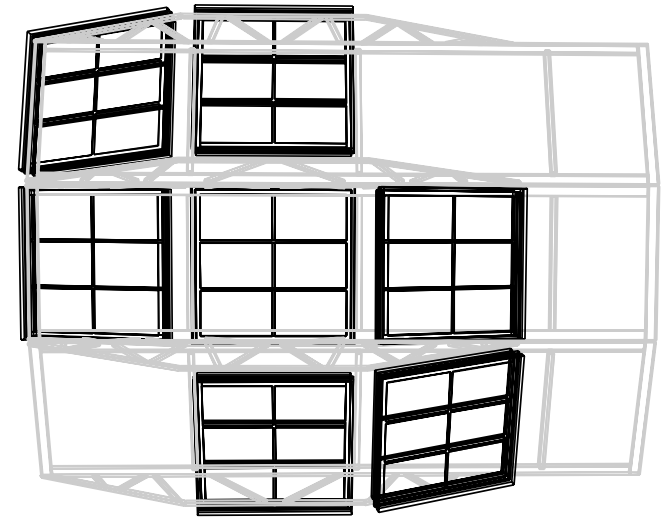
Status of HMPID developments

03/04/2019

Giacomo Volpe
Unversity & INFN, Bari

HMPID simulation in O^2
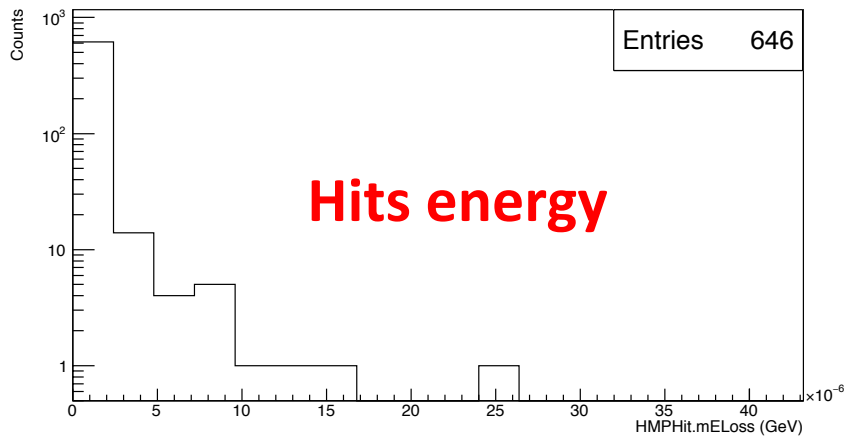
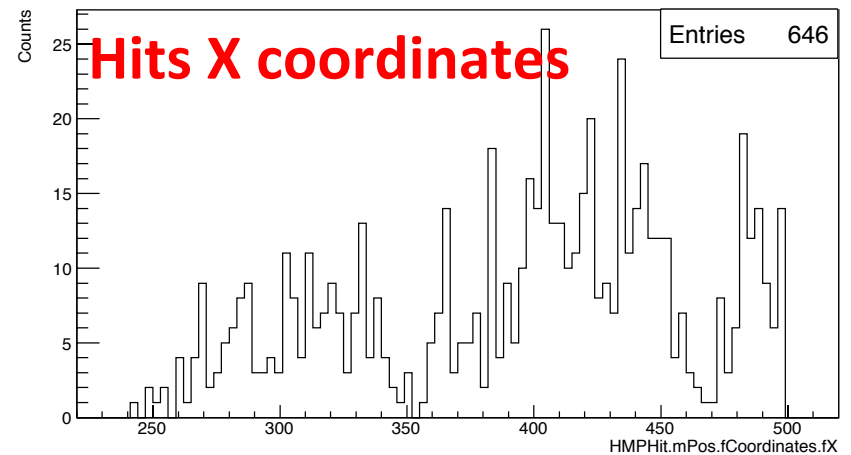- HMPID Geometry in O^2 [**done**]

- HMPID Hits [**done**]

Chambers + cradle

HMPHit.mELoss

Hits energy

Entries   646

Counts

10^3

10^2

10

1

0   5   10   15   20   25   30   35   40 $\times 10^{-6}$

HMPHit.mELoss (GeV)

HMPHit.mPos.fCoordinates.fX

Hits X coordinates

Entries   646

Counts

25

20

15

10

5

0

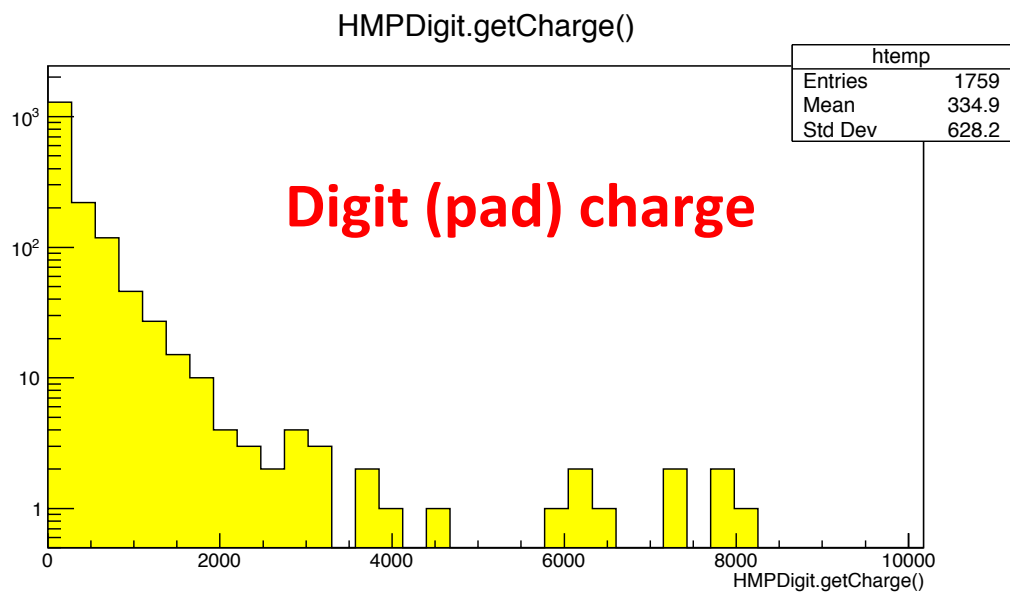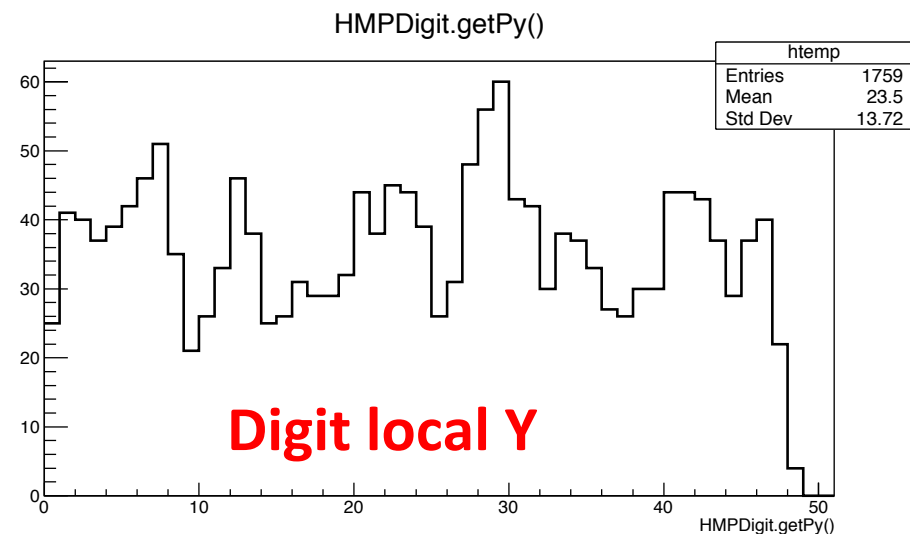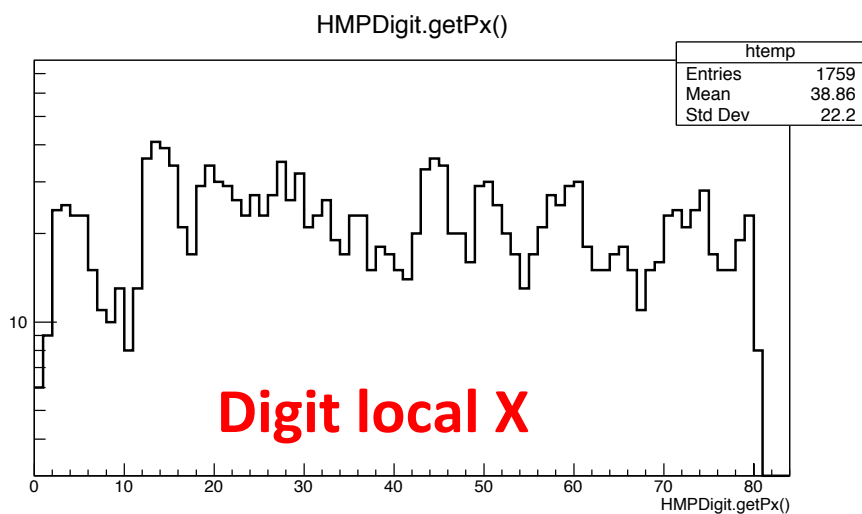250   300   350   400   450   500

HMPHit.mPos.fCoordinates.fX

HMPID simulation in O^2: digitization

- Make a toy digit class [**done**]

- Get the workflow running (DPL); have hits converted to (toy) digits [**done**]

- Pileup of digits [**done**]

- Labels [**done**]

- Write digits to file [**done**]

HMPID simulation in O^2: digitization

HMPDigit.getPx()

htemp	
Entries	1759
Mean	38.86
Std Dev	22.2

Digit local X

HMPDigit.getPy()

htemp	
Entries	1759
Mean	23.5
Std Dev	13.72

Digit local Y

HMPDigit.getCharge()

htemp	
Entries	1759
Mean	334.9
Std Dev	628.2

Digit (pad) charge

4

HMPID simulation in O^2: digitization

- Realistic zero suppression with conditions taken from CCDB [**to be done**]

- Make some things configurable (such as dead time ,...) [**to be done**]

- Cross-check localX, localY calculation with might be modified from totalQ calc (not consistent) [**to be done**]

- Try to see if we can make pad a real compact linear space (with proper dimensions for px etc) [**to be done**]
  - If yes, revisit lookup for digit indicies which is now done with a map [to do]

- RAW data format from digits [**to be done**]

- Do we write in triggered buffers or a flat vector? [**to be done**]

HMPID simulation in O^2: schedule

Relevant support from S. Wenzel

Task	Status	Manpower
Geometry and base classes	**DONE**	G. Volpe
Hits creation	**DONE**	G. Volpe
Digitization	**Almost completed**	G. Volpe
Simulated data compatible with timeframe	May 2019	G. Volpe

HMPID reconstruction in O^2: schedule

Task	To be completed	Manpower
Clusterization (from raw data and Monte Carlo)	June 2019	G. Volpe
Reconstruction (Cherenkov angle calculation from tracks information)	June/July 2019	G. Volpe
Calibration (chamber gain and refractive index using DCS information)	July 2019	G. Volpe

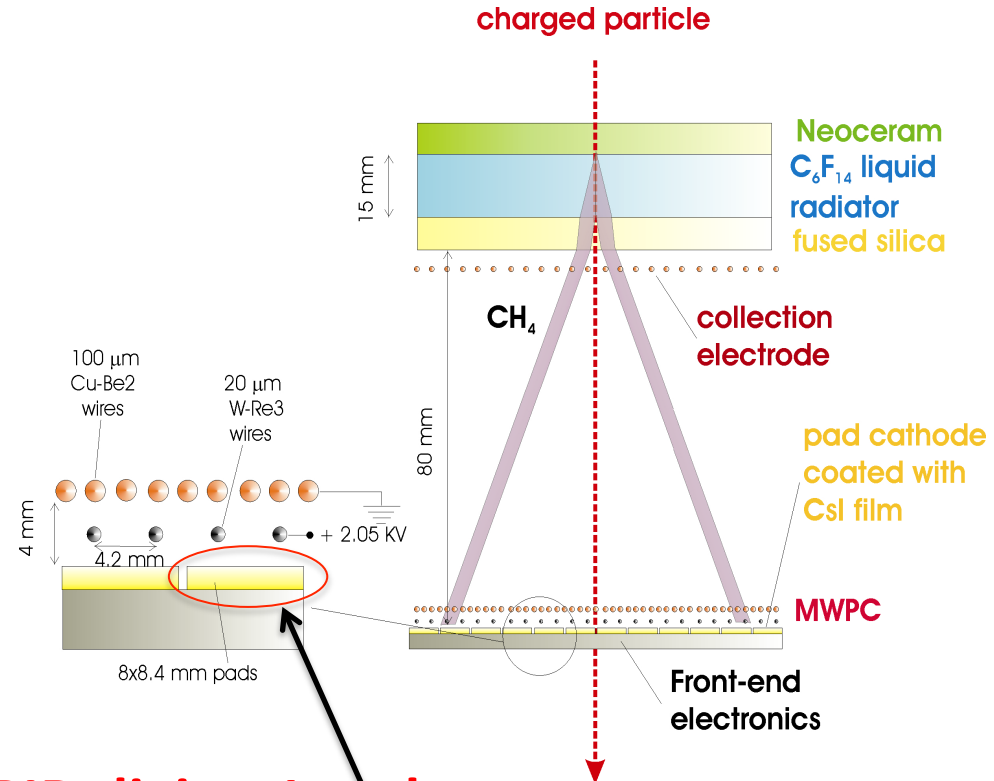# Backup

HMPID simulation in O^2

Basic HMPID digitizer workflow

Basic DPL digitizer workflow for the HMPID implemented and committed:
- rudimentary digits and first conversion from hits
- Digitizer class
- DPL components for digitization

The following steps need to be done:
- Complete the hits → digits conversion
  - consider cross talk (hit influencing multiple pads)
  - implement digit pileup + zero suppression
- finish IO of digits
- add treatment of MC labels

charged particle

15 mm

Neoceram
C_6F_{14} liquid radiator
fused silica

CH$_4$

collection electrode

100 μm Cu-Be2 wires

20 μm W-Re3 wires

80 mm

4 mm

4.2 mm

+ 2.05 KV

8x8.4 mm pads

pad cathode coated with CsI film

MWPC

Front-end electronics

1 HMPID digit = 1 pad