Cluster counting with Timepix

A few plots from Master thesis
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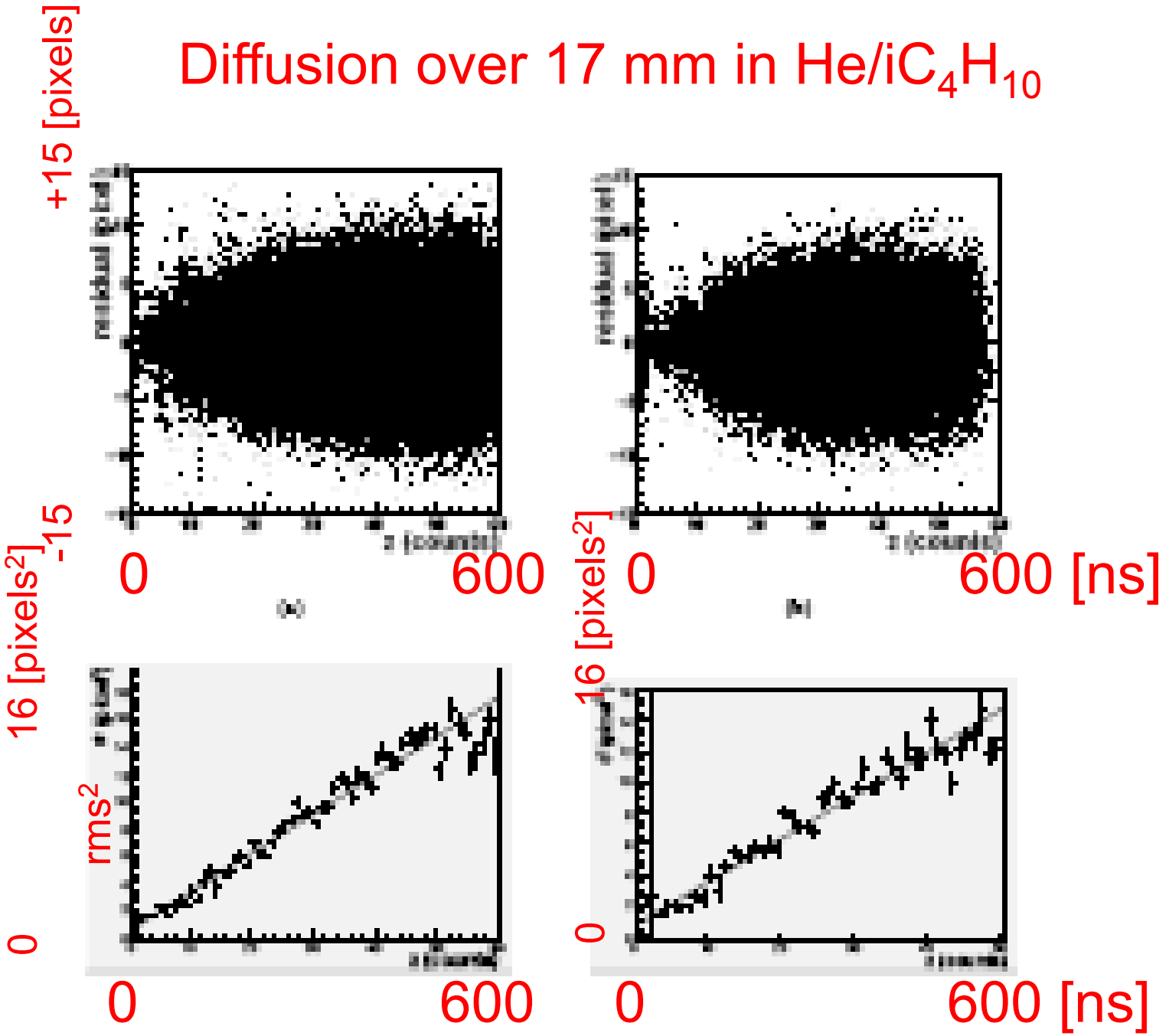
Data from 5 GeV π/e testbeam

- Gases used:
  - He/iC_4H_{10} 80/20
  - Xe/CO_2 70/30
  - $Ar/CF_4/iC_4H_{10}$ 95/3/2
  - Ar/CO_2 70/30

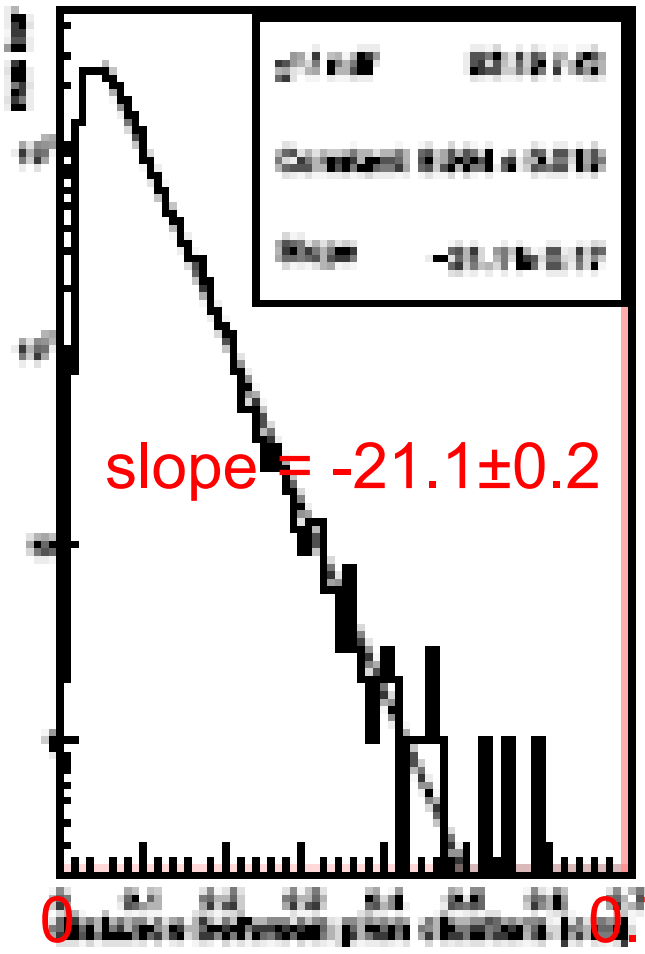
Data analysis

- Track search/reconstruction using Hough transforms
- 2D and 3D track fits
- Drift velocity measurements (value for $Ar/CF_4/iC_4H_{10}$ low by almost factor 2)
- Diffusion measurements: $He/iC_{4H}H_{10}$ "OK" other mixtures "off"
- Cluster distances and cluster counting

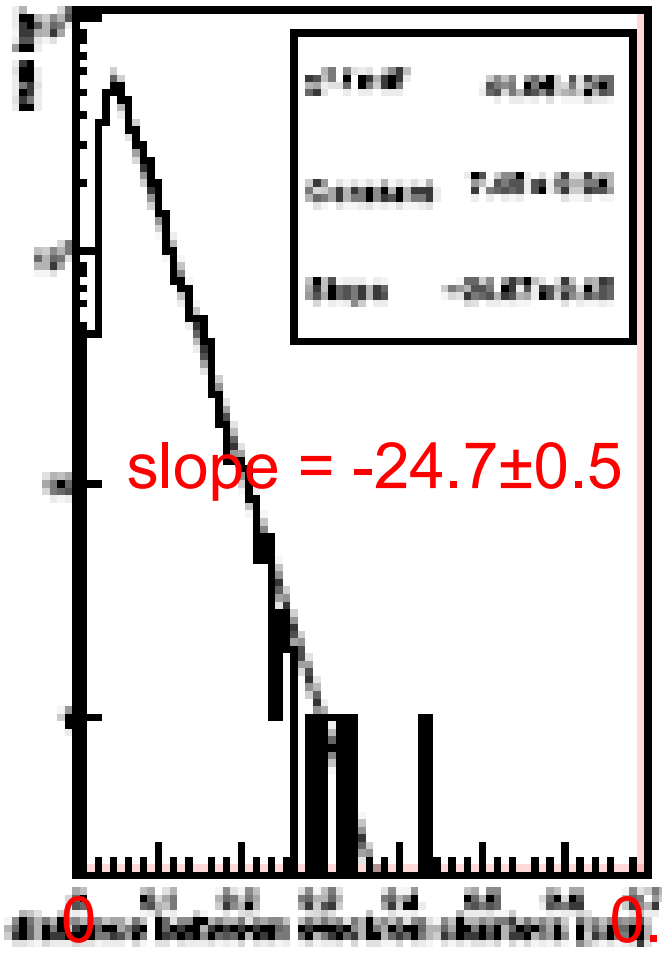
Diffusion over 17 mm in He/iC_4H_{10}



Cluster distance distribution in He/iC4H10

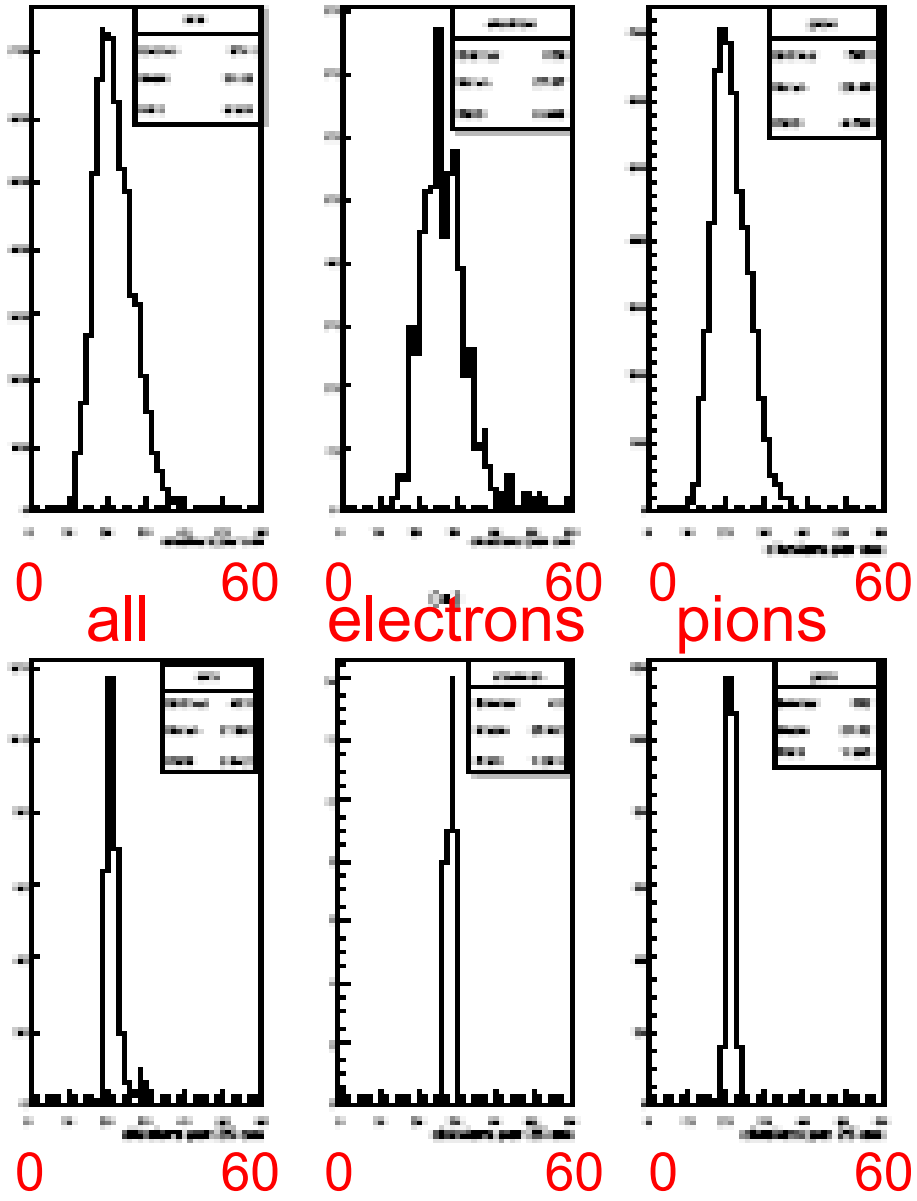


pions



electrons

Cluster counting distribution in He/iC4H10



- From 1 cm tracklength

Electrons:

Avg=27.1 rms=6.3

Pions: 21.0 4.8

- From 25 cm tracklength

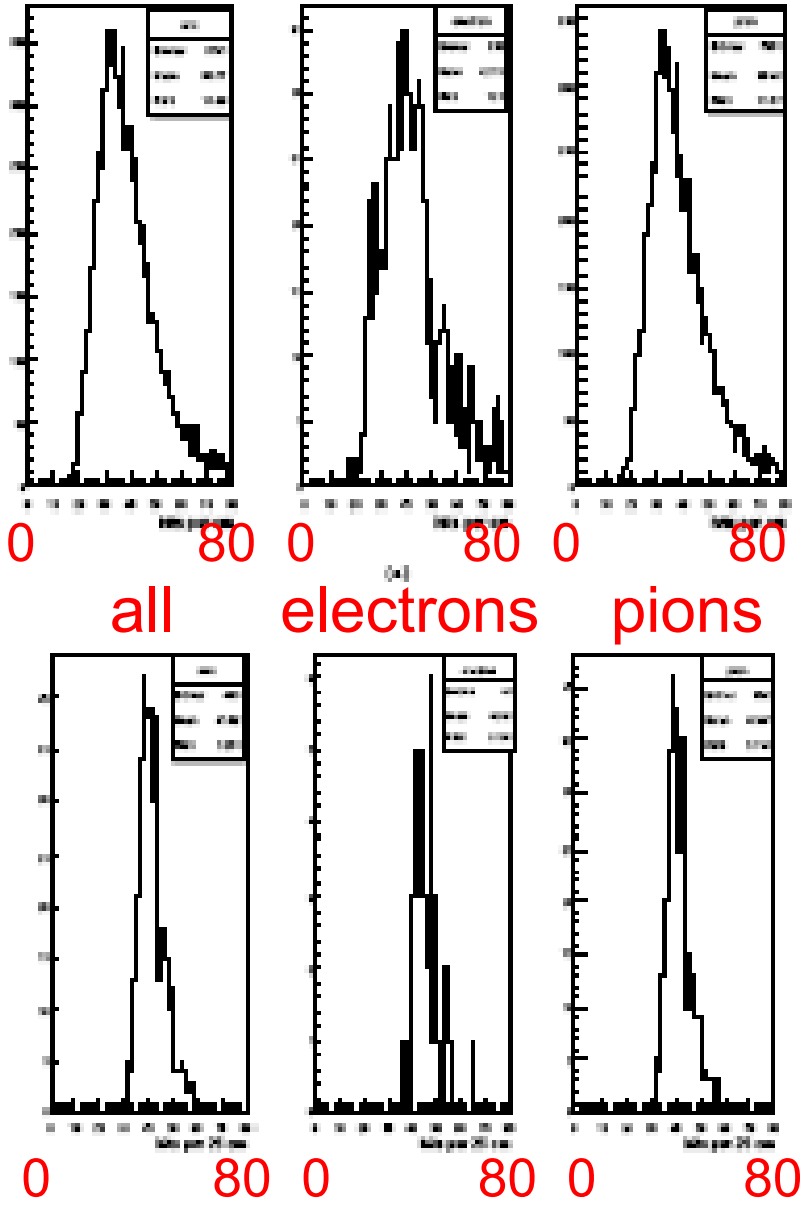
Electrons:

Avg=28.4 rms=1.2

Pions: 21.0 1.2

4.4 σ difference

Single hits counting distribution in He/iC4H10



- From 1 cm tracklength

Electrons:

Avg=42.2 rms=12.1

Pions: 38.4 11.6

- From 25 cm tracklength

Electrons:

Avg=46.0 rms=5.1

Pions: 41.5 5.1

0.6 σ difference