

Stuart George - ESR4

ARDENT Pre Midterm Meeting - June 2013



ARDENT

Advanced Radiation Dosimetry European Network Training



Training

- Conferences etc
 - IEEE 2012/13, Eurados WG9 Meetings/Congress, Medipix Meetings, ARDENT Meeting 2012/13
- Training
 - French courses, Website Design
- Skills Acquired
 - Root, MAfalda, Practical Medipix Skills, dosimetry etc



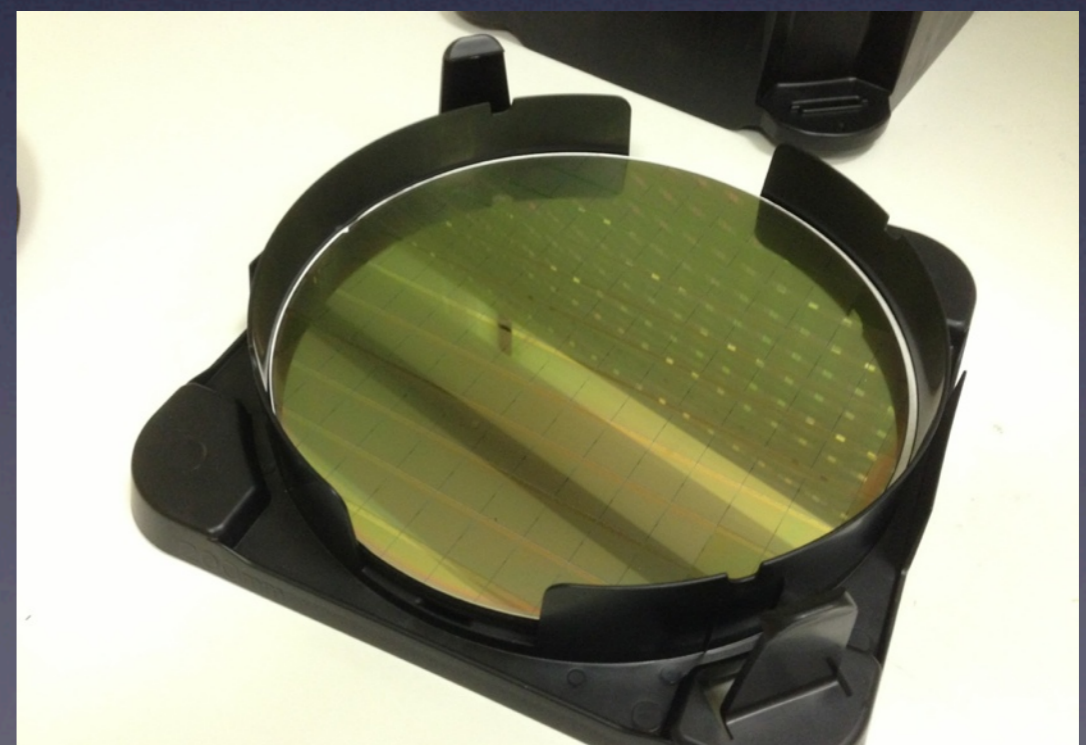
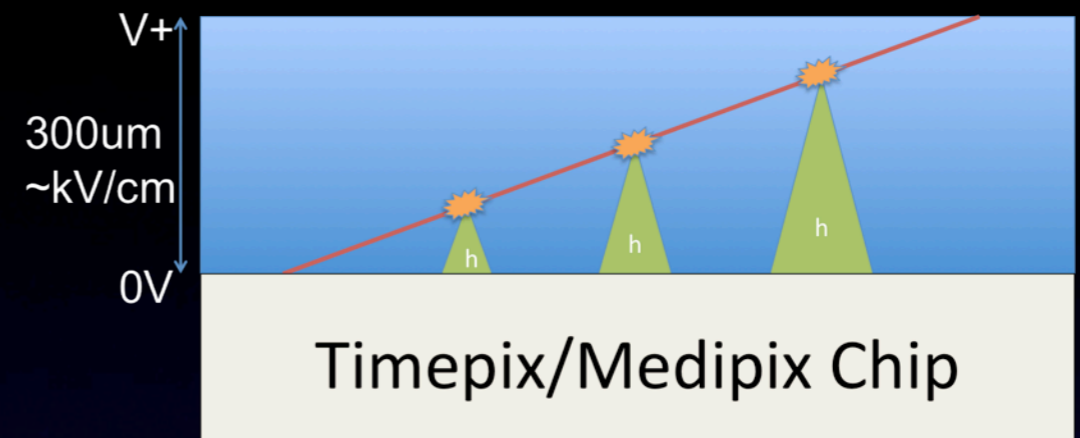
Outreach Work

- Sheffield, LN2
- EU Commissioner
- More activities planned for next year



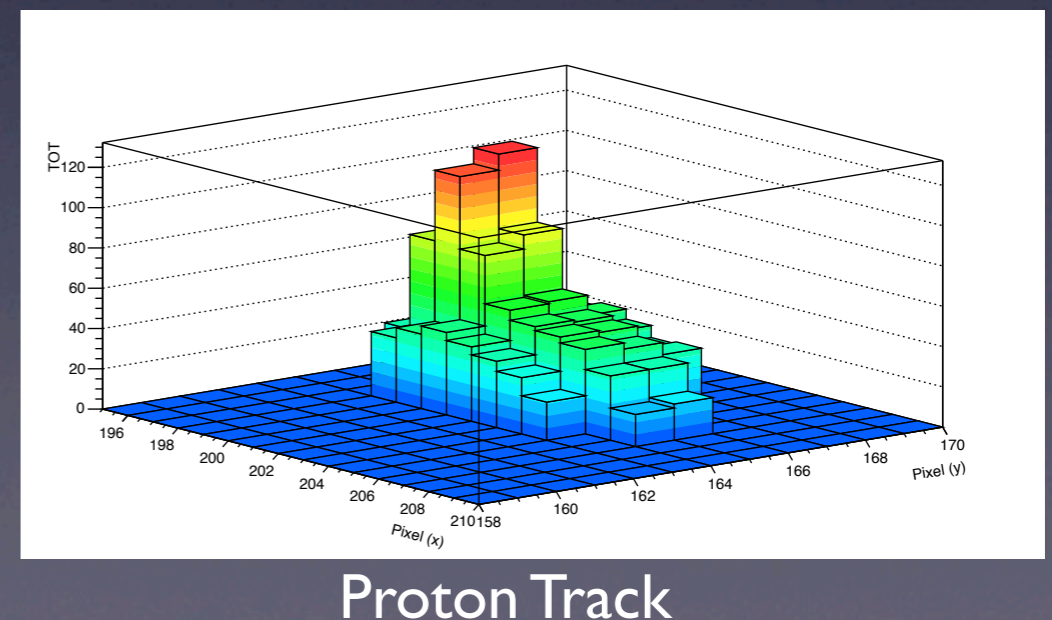
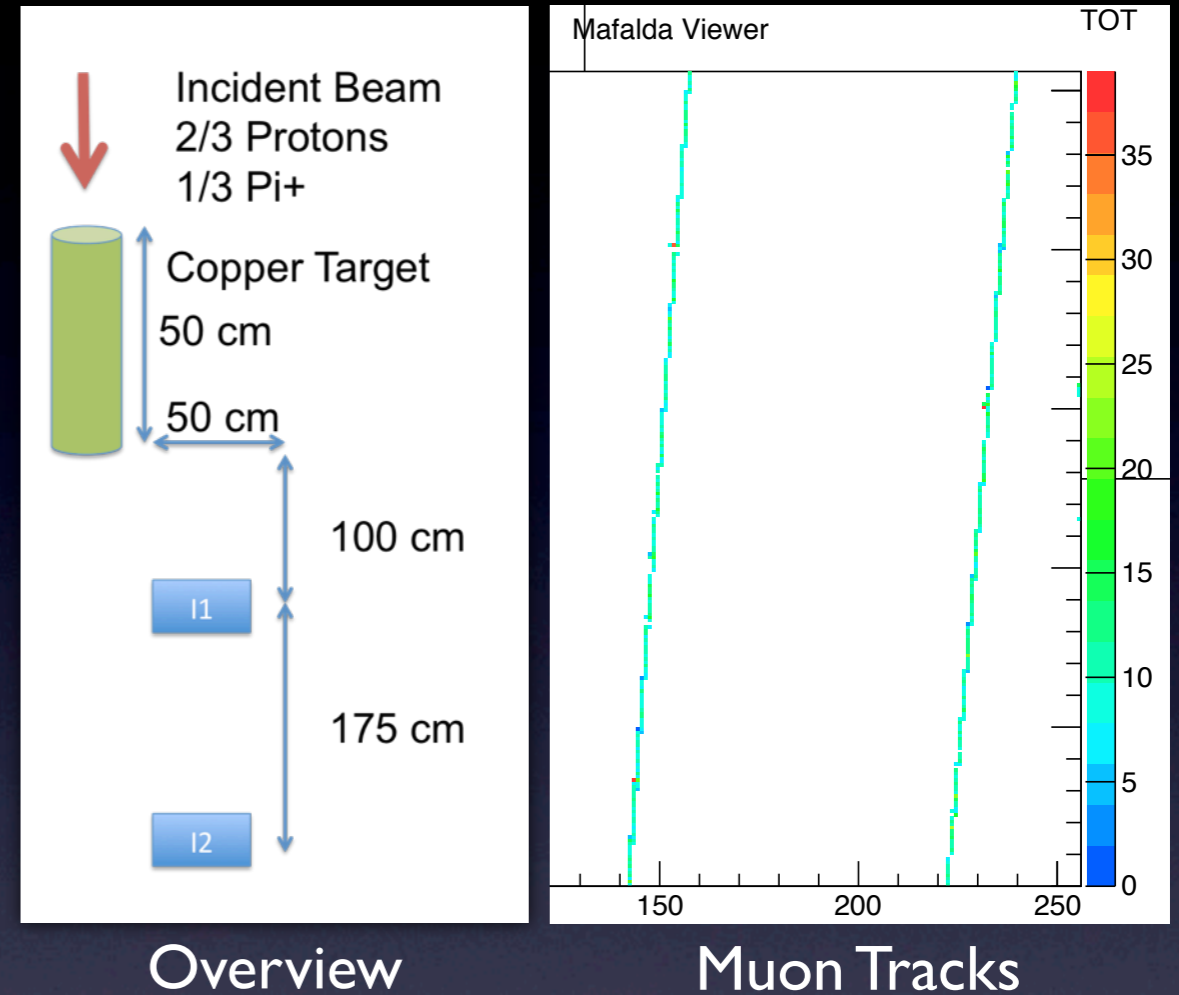
Timepix - a quick intro

- 256x256 Pixel ASIC, bonded to a biased semiconductor sensor
- When energy is deposited electrons and holes (a pair per 3.6eV) are swept out.
- Charge spreads out through diffusion.
- When charge on pixel crosses a threshold value start a clock, stop when the charge drops again. This can be calibrated to energy deposited.

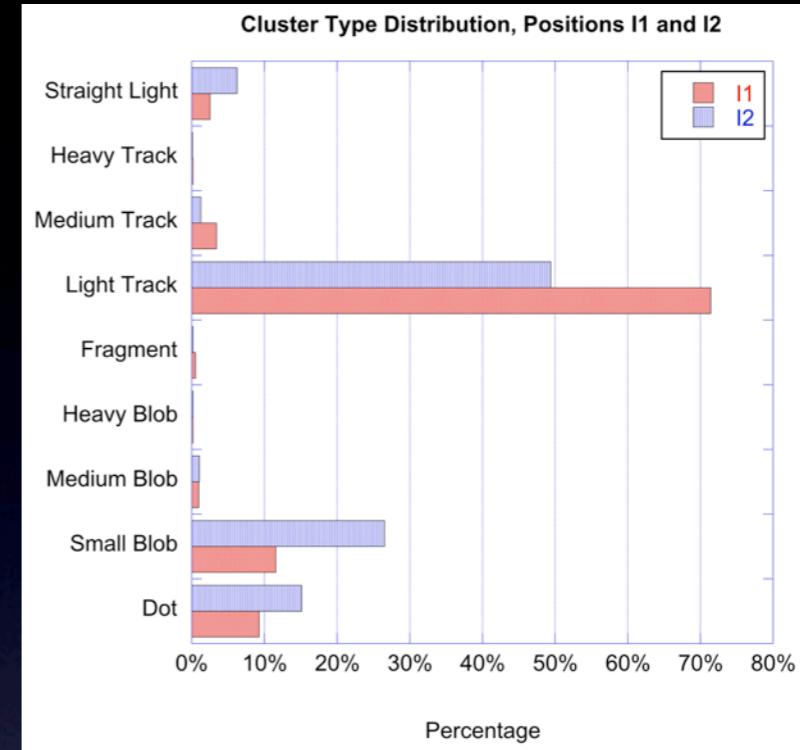
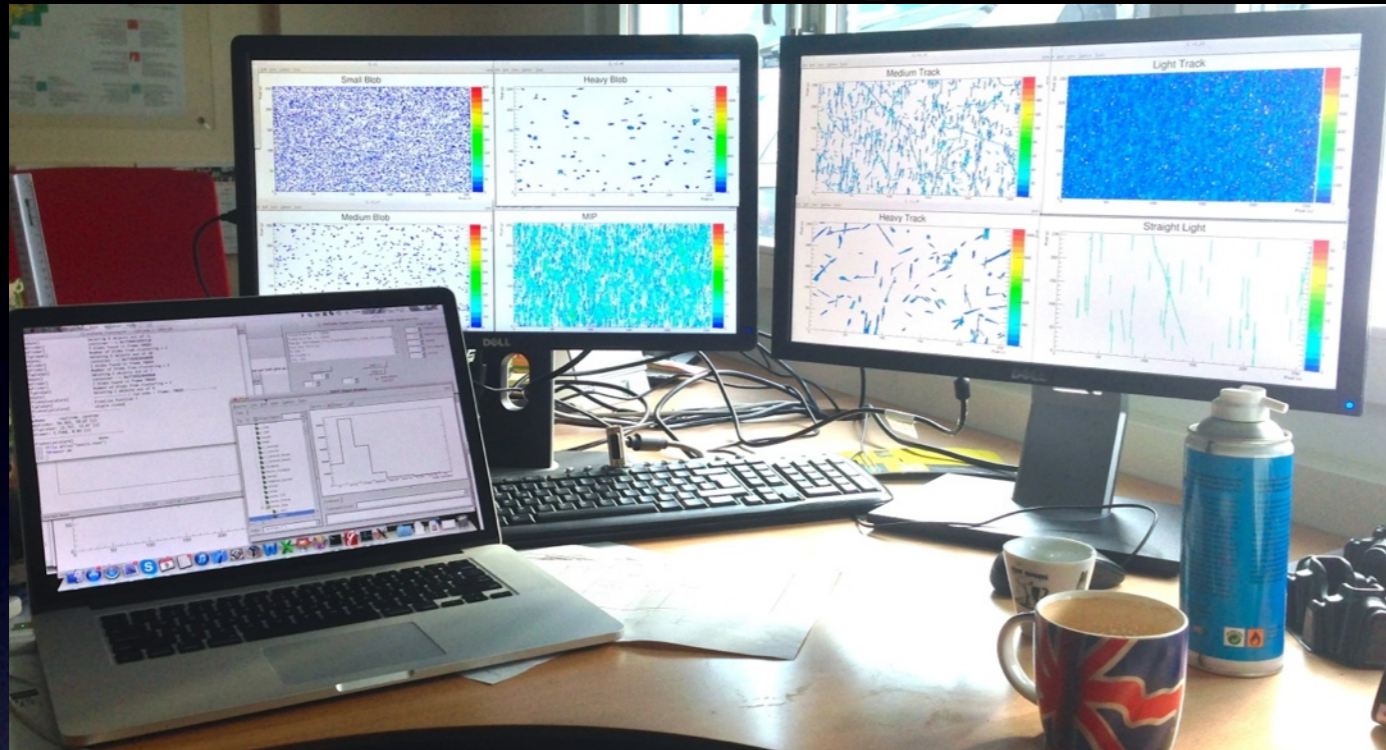


Medipix at CERF

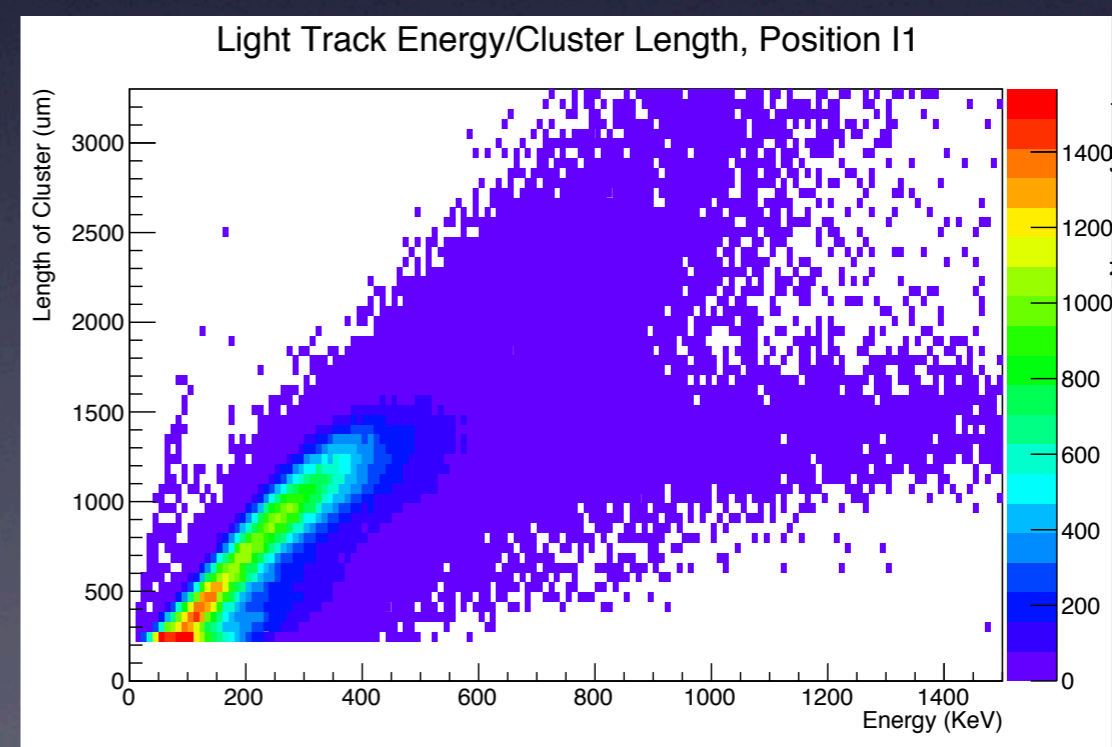
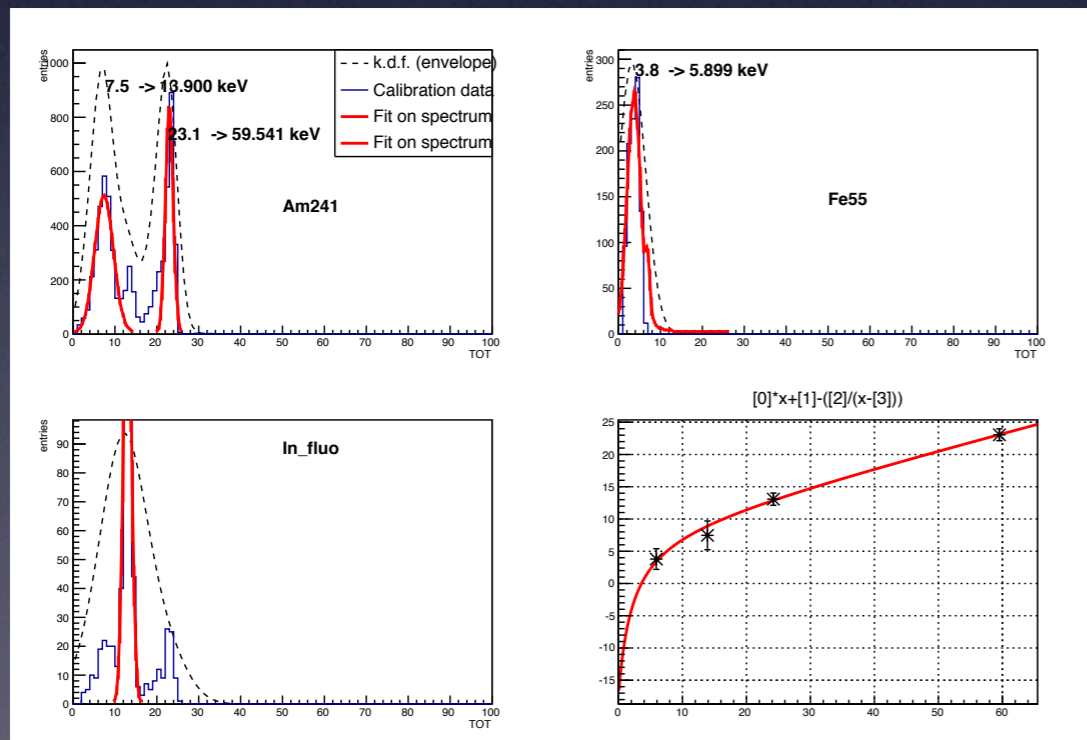
- 120 GeV/c beam of 2/3 protons and 1/3 pi+ incident on a 50 cm copper target
- Mixed field of protons, electrons, pions, muons, photons, neutrons
- Field similar to that found in aviation
- What a mess!



Medipix at CERF



Clustering (custom in MAfalda)



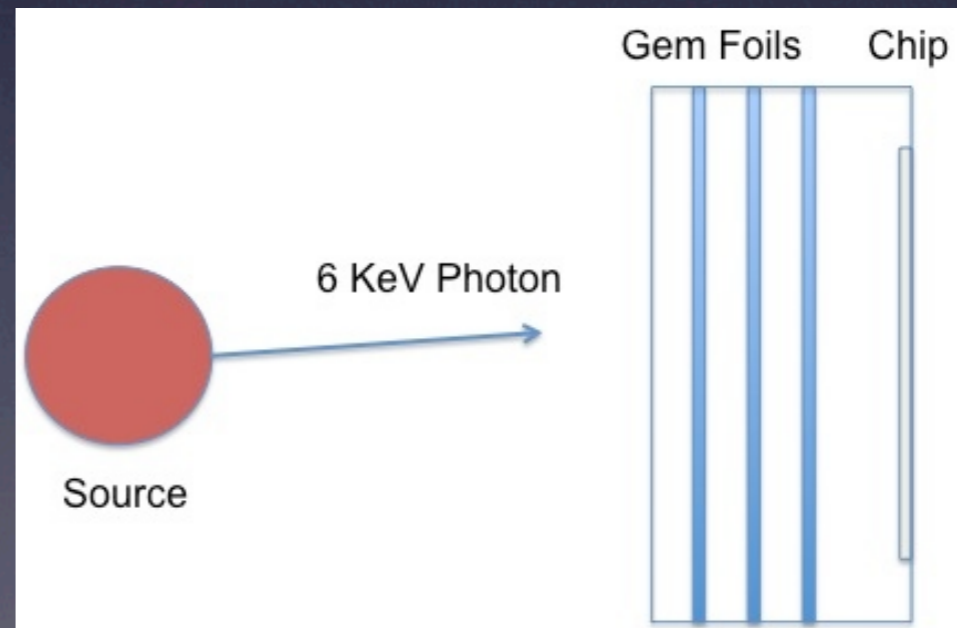
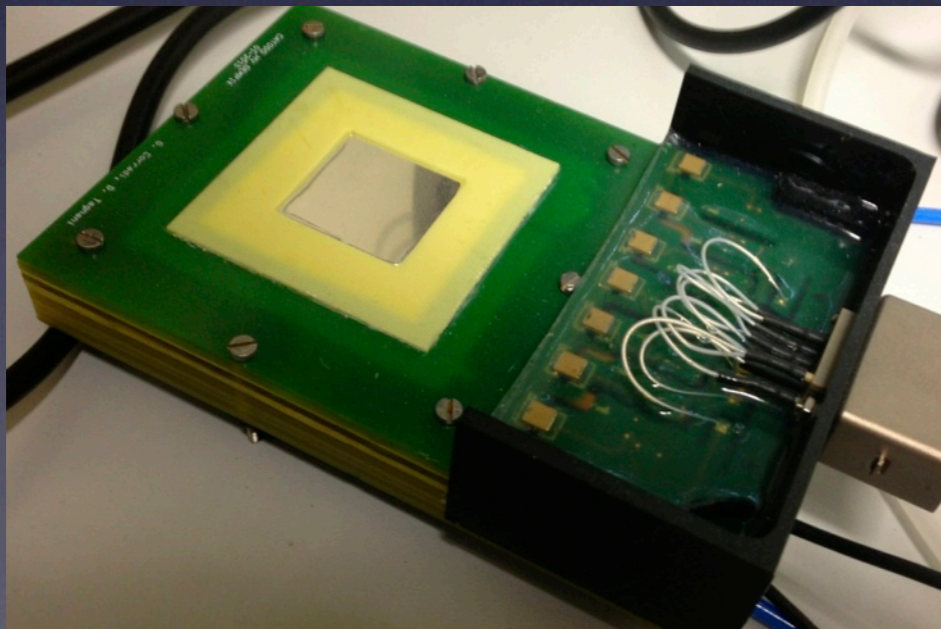
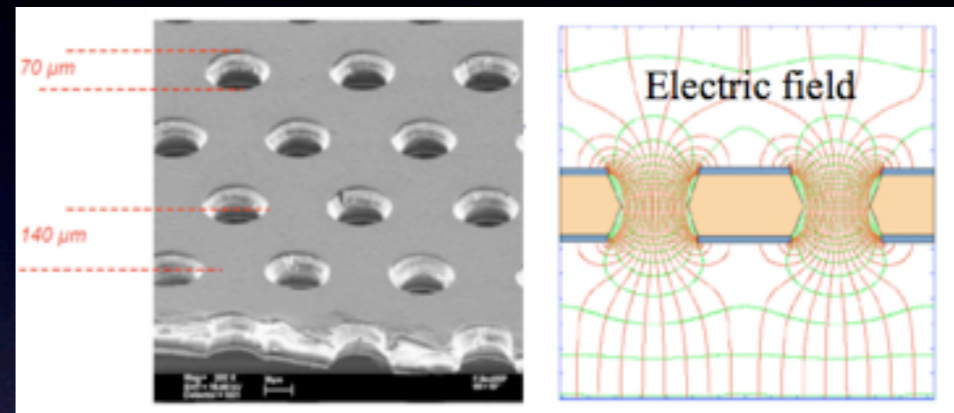
Calibration (Jakubek Method) Results (ROOT)

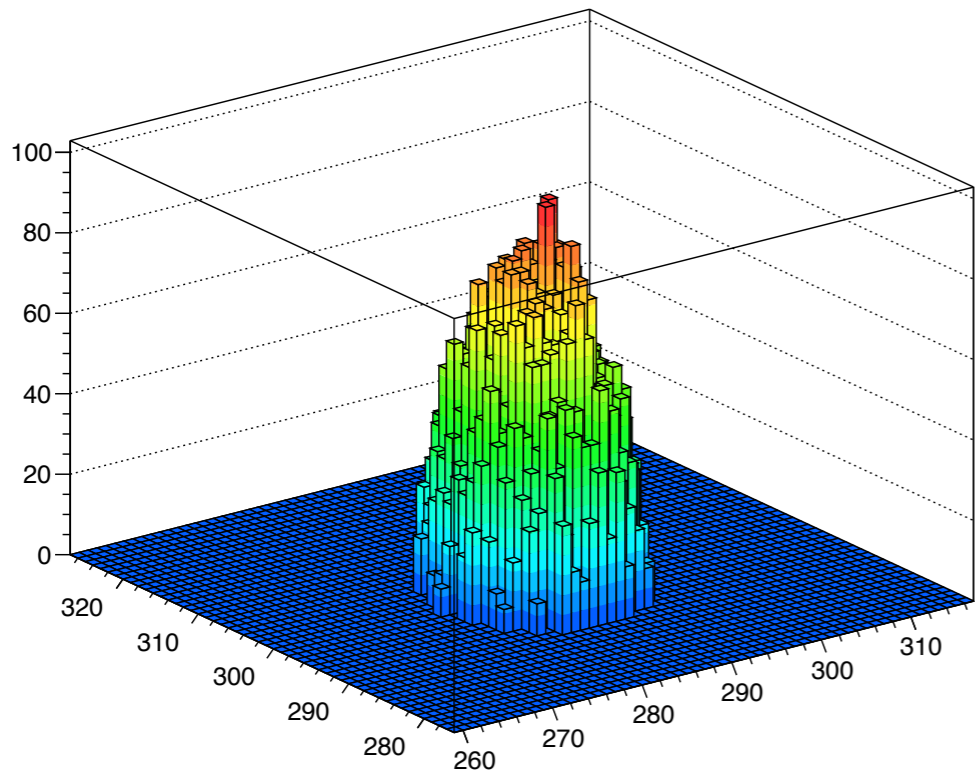
Results and the Future

- How to interpret the photoelectron spectra in silicon, especially with an energetic beta background...
- Do proper spectroscopy with protons.
- Planning measurements in proton therapy, neutron measurements with converters in radiotherapy.
- Dedicated calibration campaign with different neutron sources.

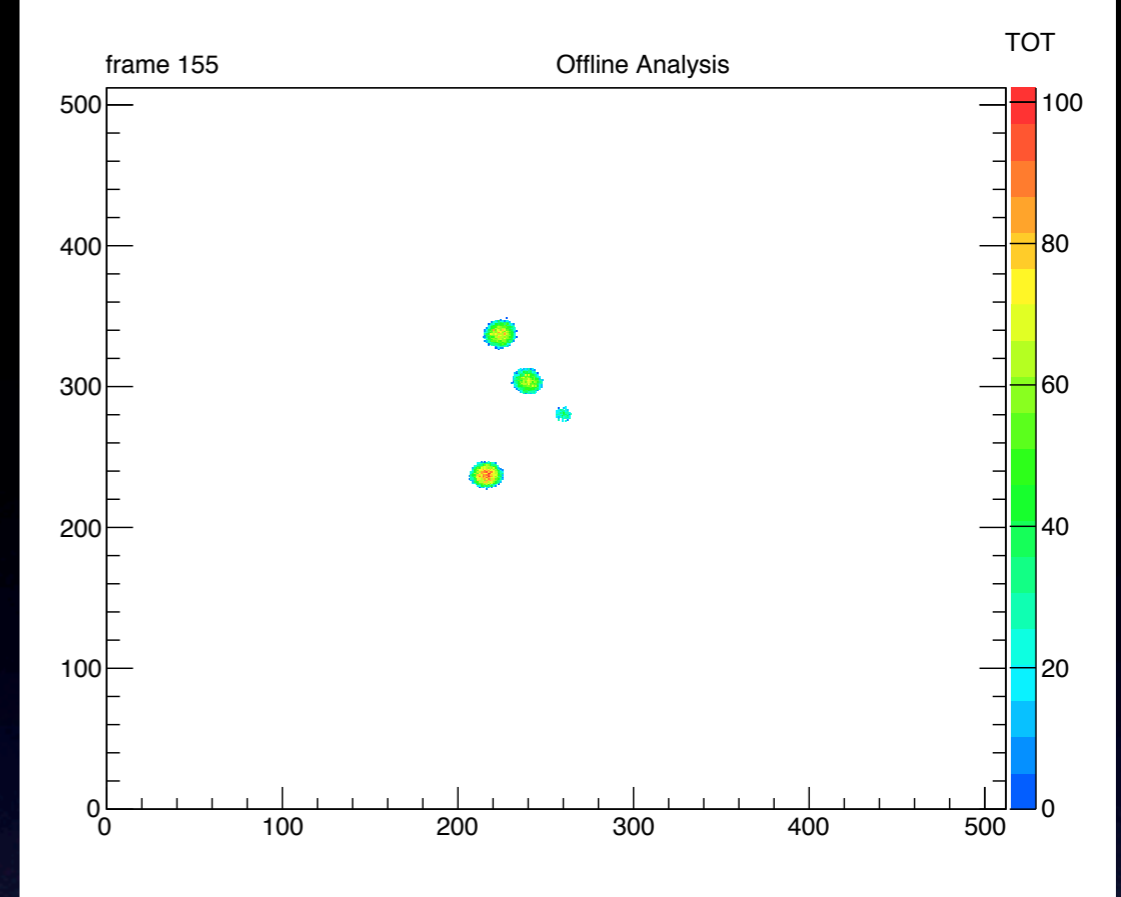
Gempix - Intro

- Basic Idea - bond a triple GEM to a quad medipix ASIC.
- Originally as a highly scalable beam monitor for proton therapy

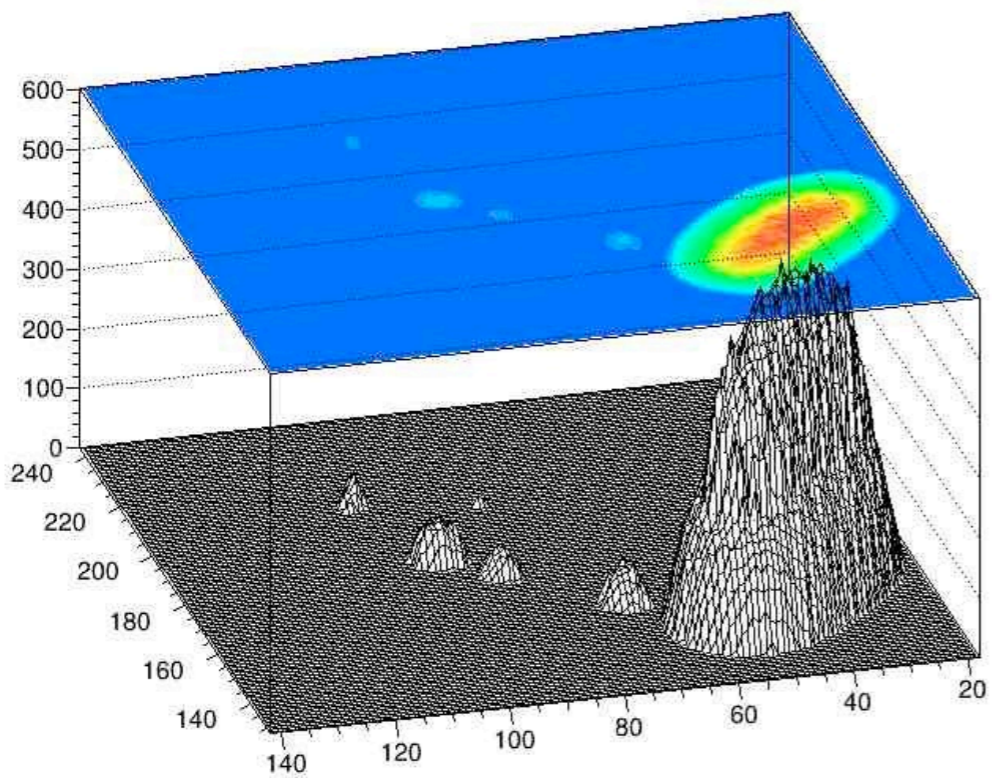




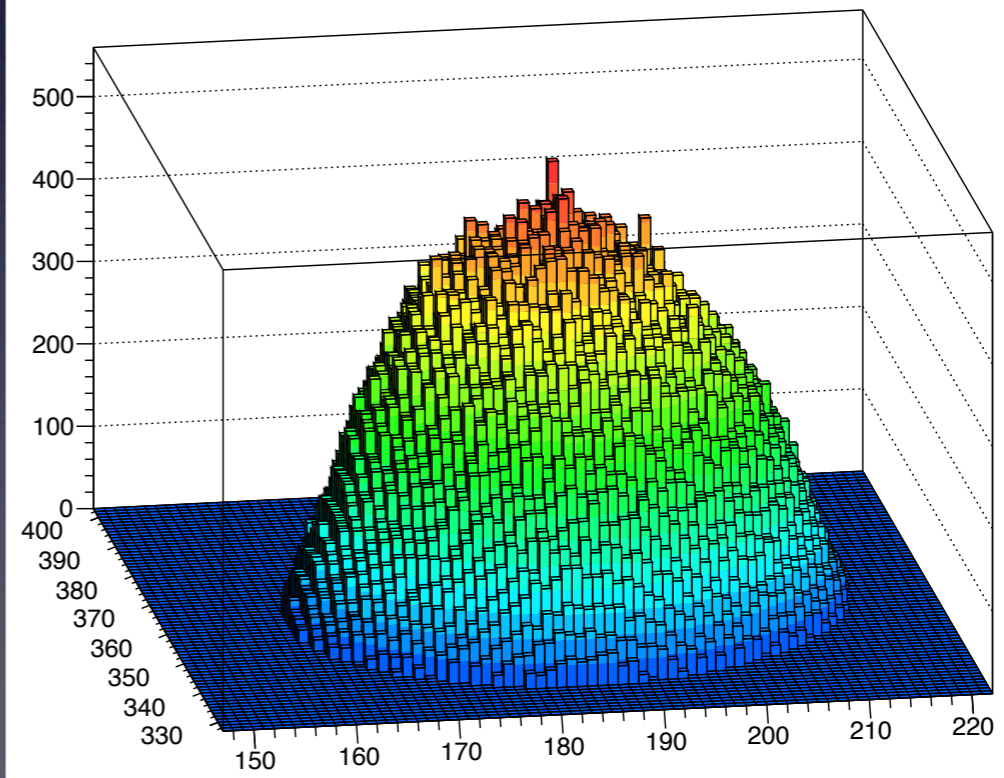
Fe55 Photoelectron (5 keV)



Typical Frame

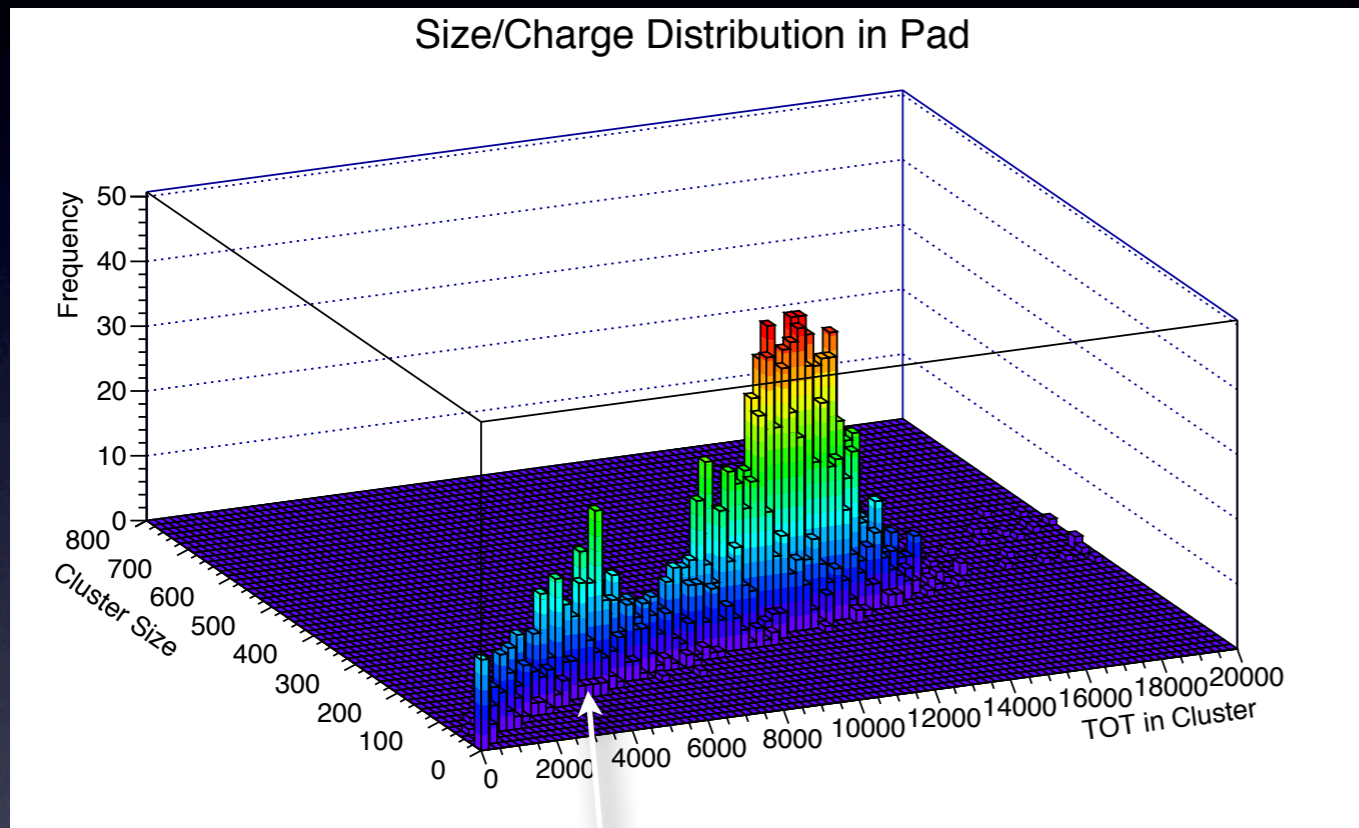


Cosmic Ray (Proton?)

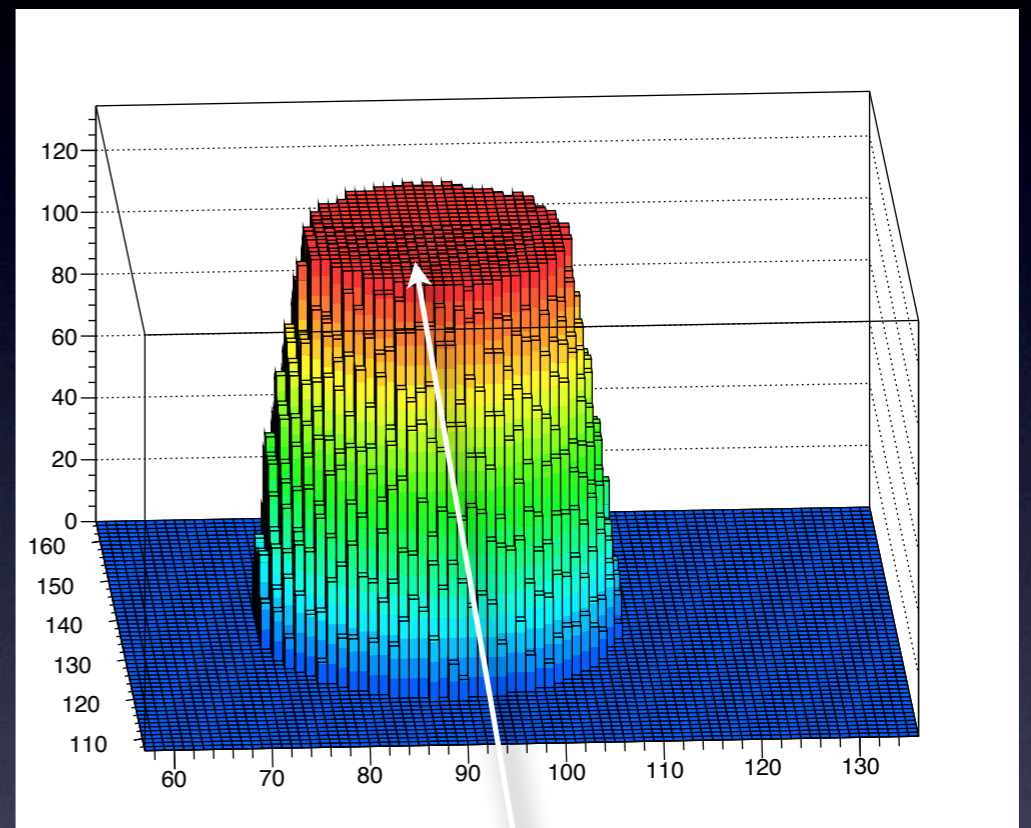


~5 MeV Alpha (Am 241)

Gempix Results



Events between first
and second foils?

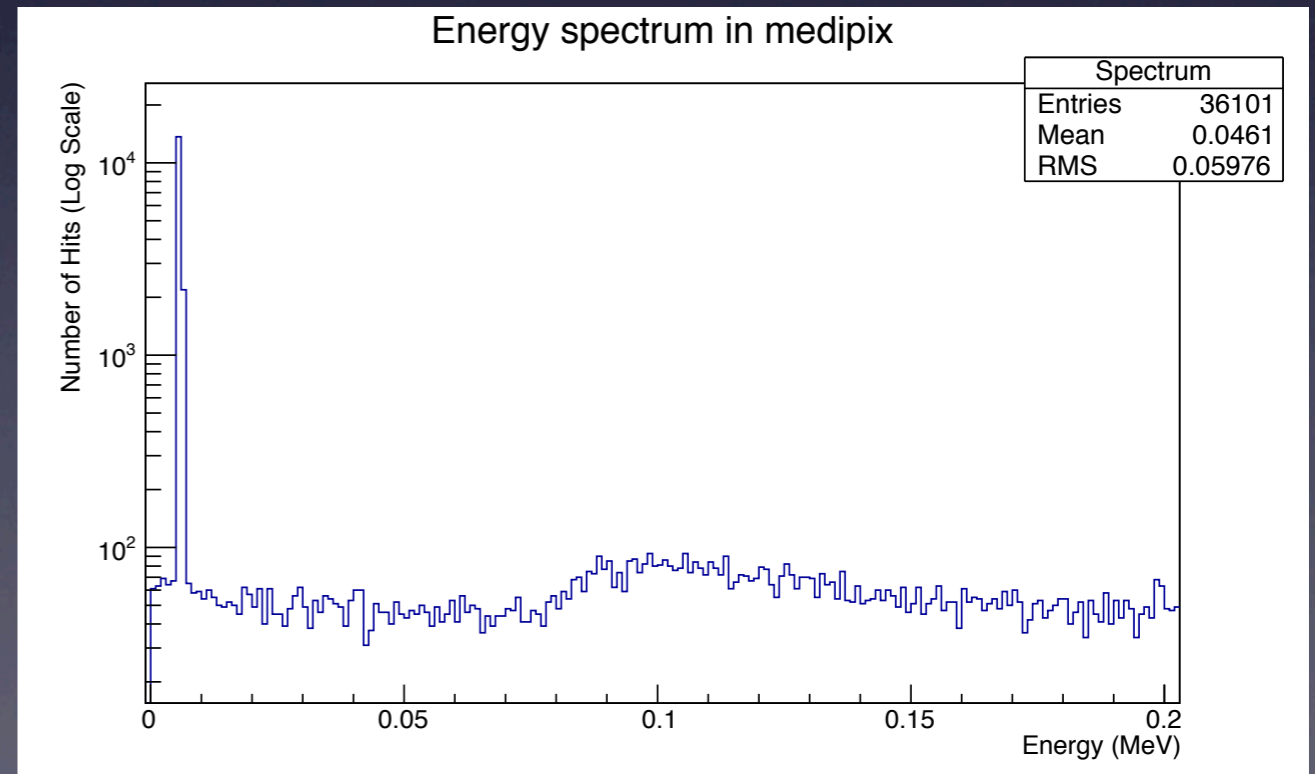
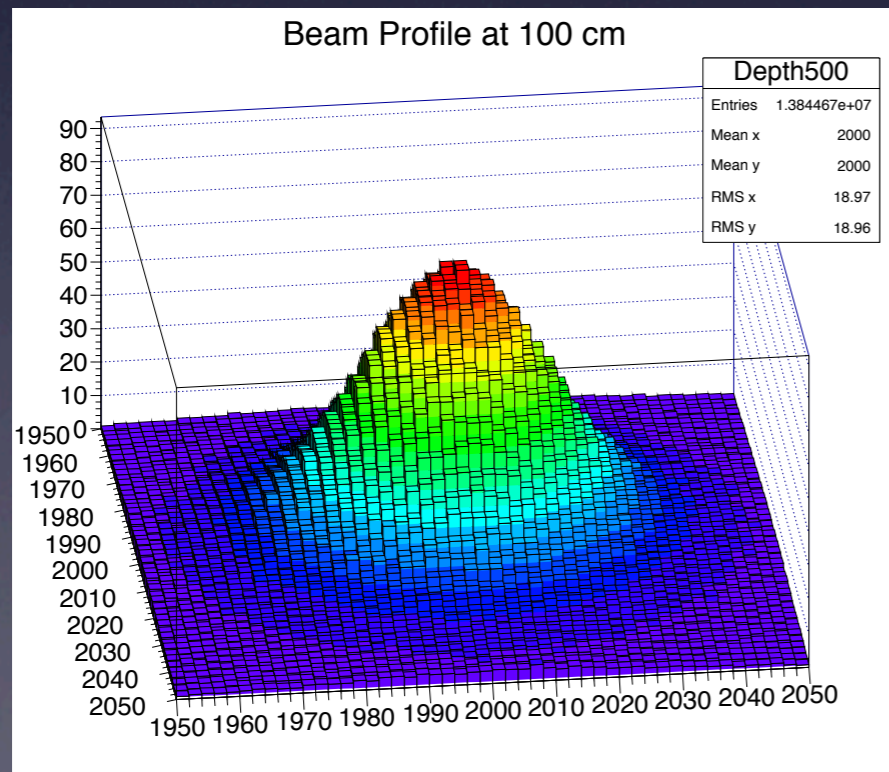
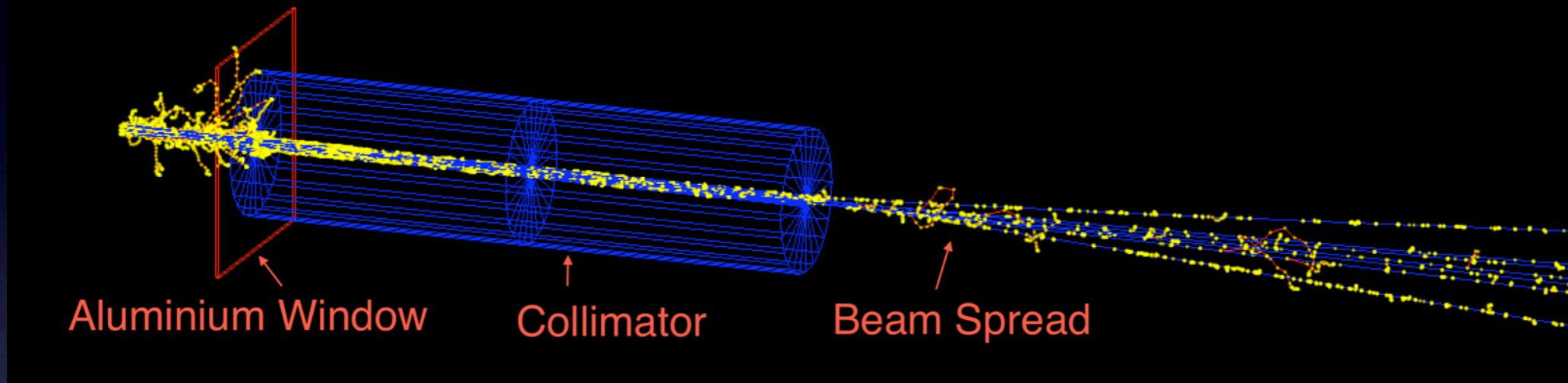


End of Frame

Gempix Future

- The minimum ionization energy in ArCO₂ is about 20 eV - do we see these minimum clusters?
- If not, what is the minimum energy we can see?
- Lots of electrons - non linearity in preamplifier/correction or a high I_Krum?
- Cluster using a mixed TOT/TOA mode. Tricky because the diffusion time is not negligible.

Other Stuff



Planned Work

- Medipix Measurements/Characterisation
- Secondment in Wollongong (in the middle of winter...)



Any Questions?


JORGE CHAM © 2008

NINJAS vs PROFESSORS

A COMPARATIVE ANALYSIS



NINJAS

Experts in methods of subterfuge
Employs assortment of lethal weapons
Can kill you without remorse
Always shown wearing the same outfit
Wears a hood
Hurls Shurikens 
People think they're pretty cool
Shrouded in mystery



PROFESSORS

Experts in methods no longer used
Employs a bunch of lazy peons (you)
Can kill your career or worse
Always wears the same outfit
Wears a hood at graduation
Hurls when you present your research
They think they're pretty cool
Shrouds you in misery

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