



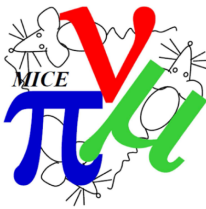
Paolo Franchini
University of Warwick

MOM Report

MICE CM 49

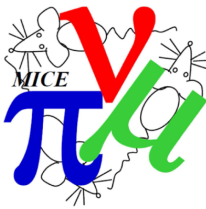
4th October 2017





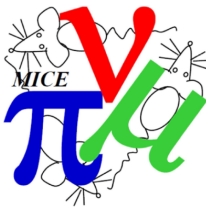
Run cycle 2017/02

- Run period: 19/9/2017 – 27/10/2017
 - **Liquid hydrogen** absorber in **solenoid** and **flip** mode (two cooling channel settings each)
 - **M2D** commissioned sometime this week
 - Empty absorber before the end of the cycle



Shift and personnel

- 8 weeks, 24 hours per day
- Shifters and BLOCs
 - Nearly 40 people involved
- MOMs:
 - Paolo Franchini
 - Durga Rajaram (current)
 - Melissa Uchida
- DCs:
 - Craig Macwaters
 - Andy Nichols
 - Victoria Blackmore

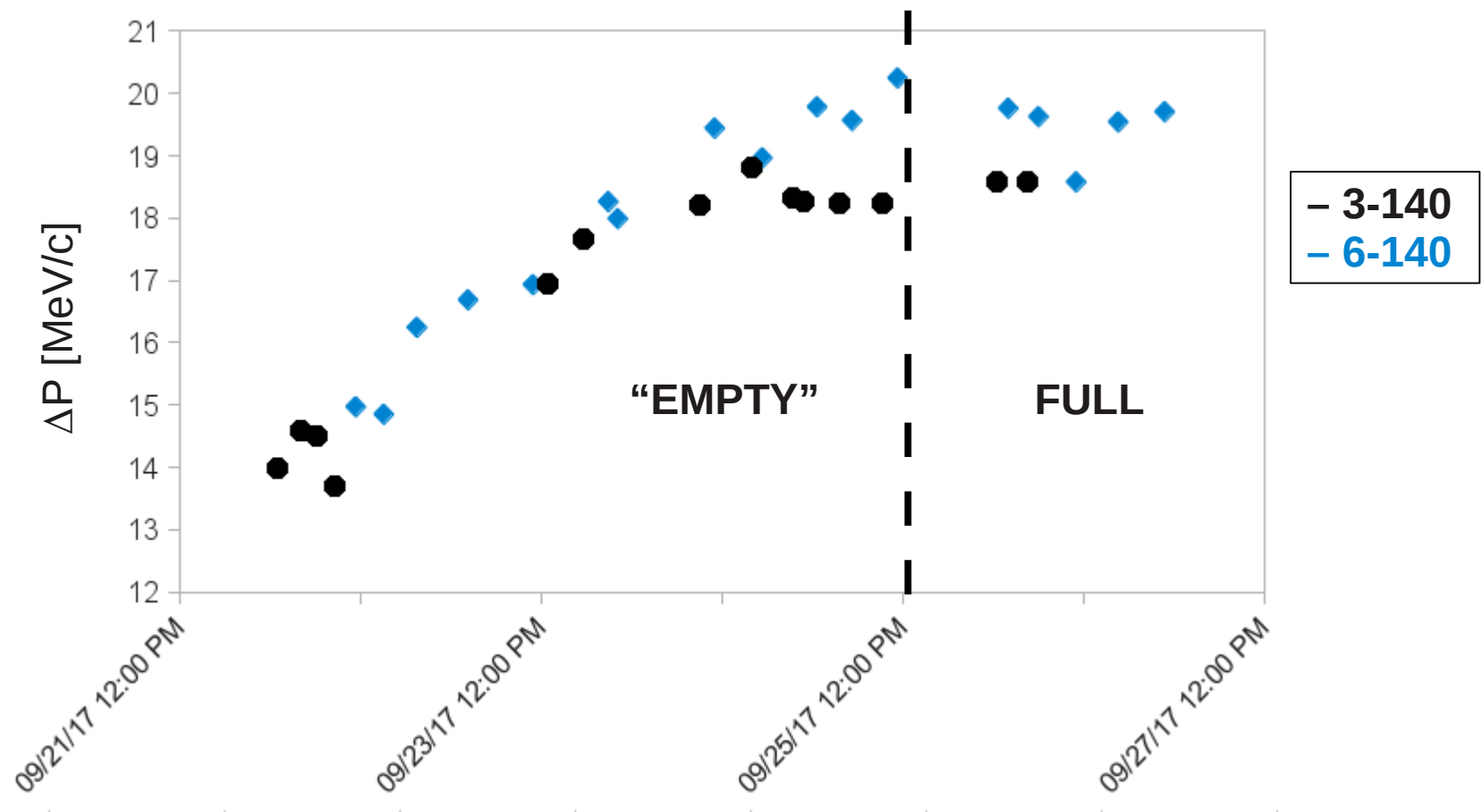


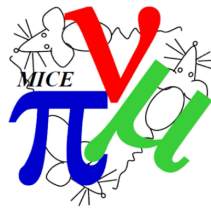
Last month

- Pulsar run: 7th Sept.
... time for fixing things ...
- Expert run with beam: 14th Sept.
... time for fixing things ...
- Start of the cycle: 19th Sept. at 8 am
... straight tracks ...
- Cooling channel ramp: 21st Sept.
... empty absorber data ...
- Absorber full: 26th Sept.
- 1 change of CC currents: 27th Sept.
... traight tracks: 28th -29th night ...
- 1 change of polarity, solenoid \rightarrow flip: Friday 29th
- 1 more change of CC currents: today

Liquid Hydrogen filling

- Momentum loss during the filling:





Data summary

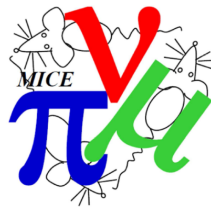
Tag	Time (HH:MM)	Particle triggers (k)
400MeV+DS200	2:50	933
ToF-Calib+150	4:16	528
3-140+M3-Test3	18:48	8136
3-170+M3-Test1	10:10	1845
3-200+M3-Test1	1:00	291
3-200+M3-Test2	16:38	4036
3-240+M3-Test1	2:51	915
6-140+M3-Test2	10:45	8002
6-200+M3-Test1	5:51	1857
ToF-Calib-NoDS	2:22	633
10-140+M3-Test3	1:32	459
10-140+M3-Test4	8:57	10687
10-200+M3-Test1	5:28	2086
ToF-Calib+150-NoDS	7:32	736
Individual Settings	2:00	240

- TOF calibration
- Detector alignment
- Beam line tuning

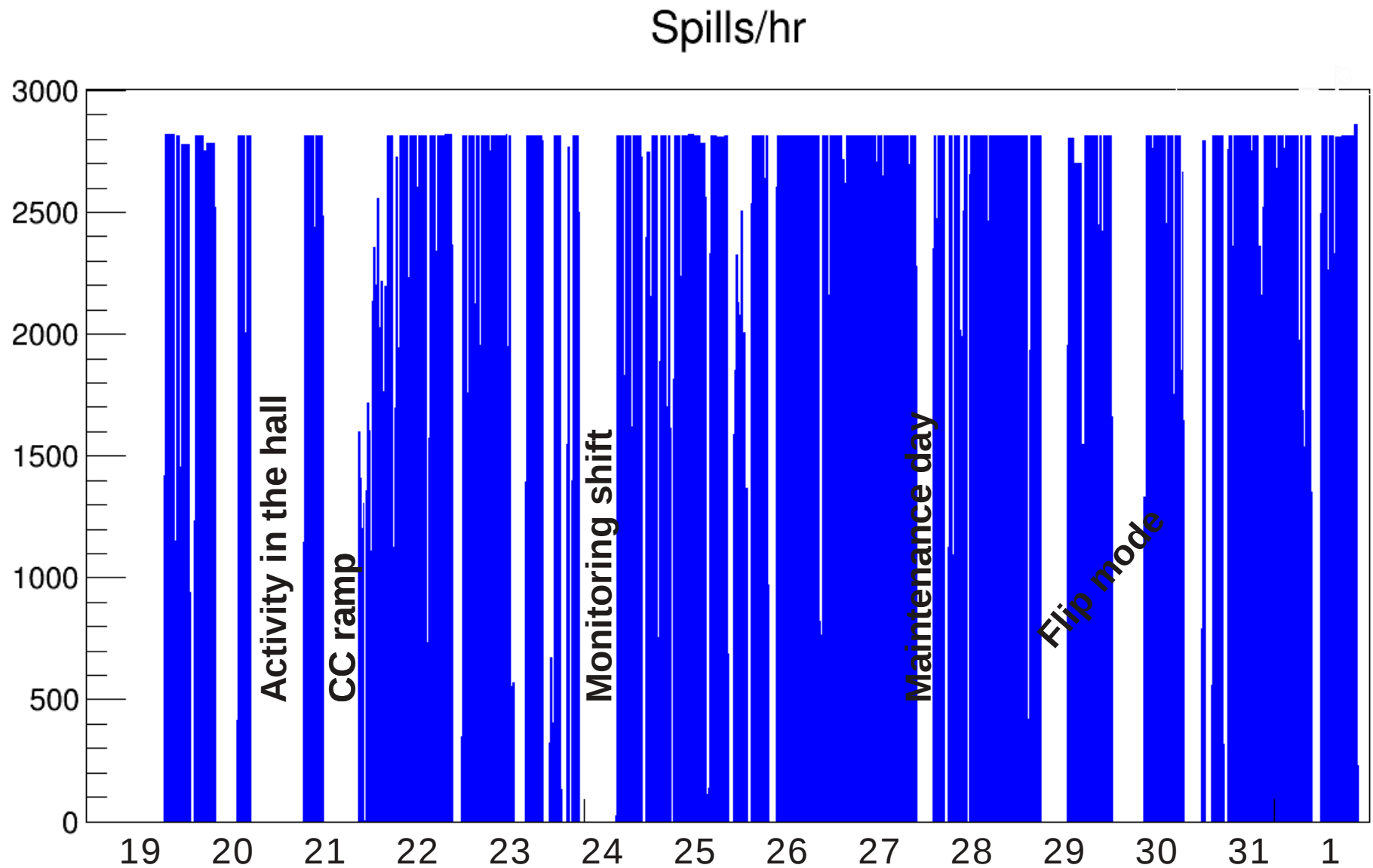
- 140 MeV/c
- 200 MeV/c

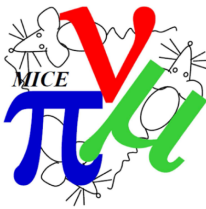
- Momentum scan with straight tracks

Runtime: 100/318 hours (updated yesterday night)



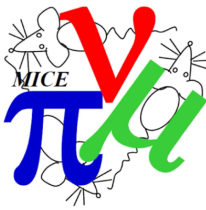
Data summary





Run plan

- Currently running in **flip mode**
- Second setting for 140 MeV/c: today
- Commissioning of **M2D**: this week
- Solenoid and flip mode
- **Empty absorber** for the scattering comparison

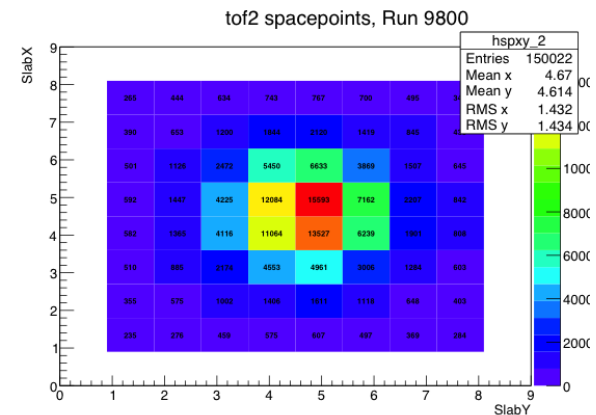
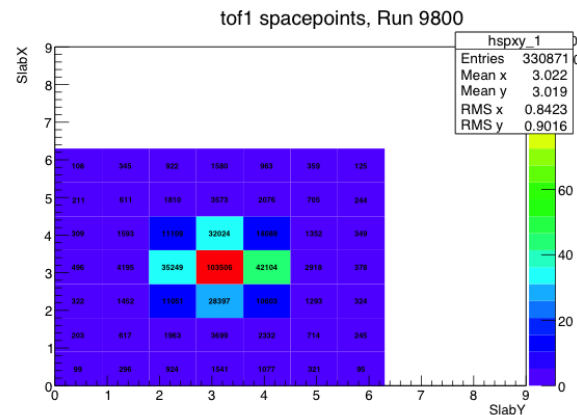
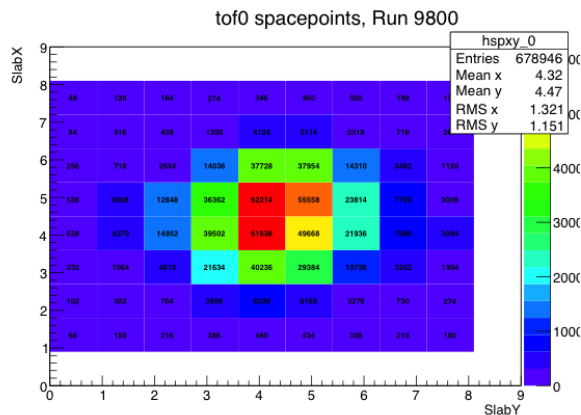
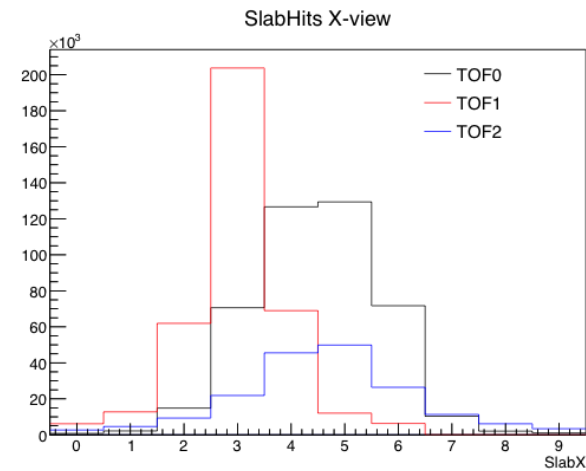
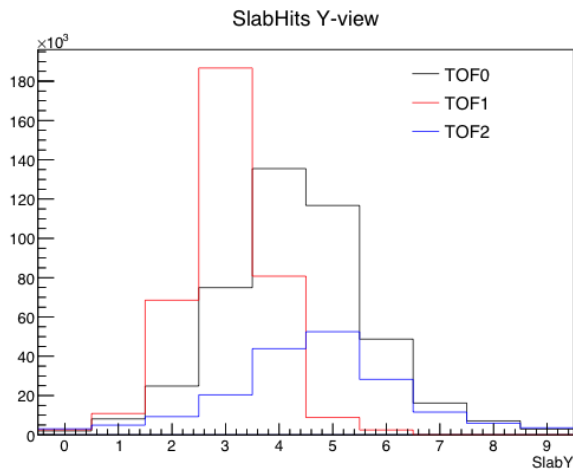


Detector performances

- Slides from Durga...

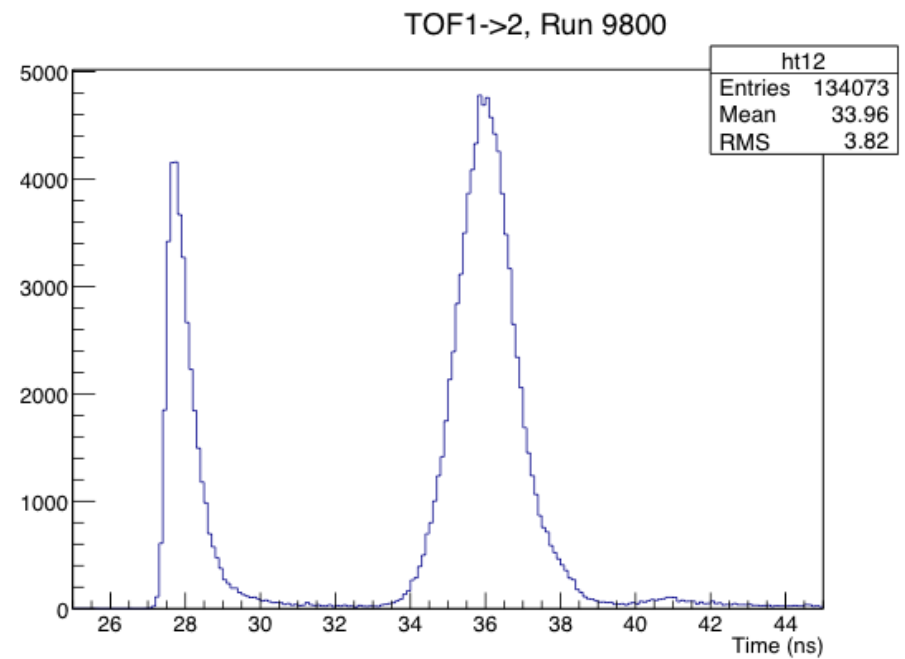
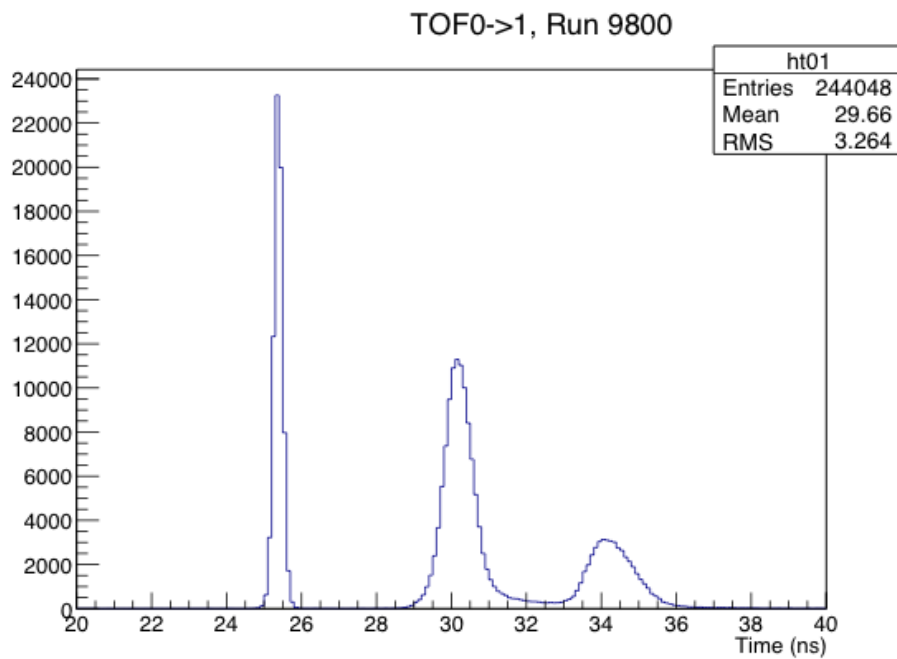
TOF

- No issues, all PMTs operational, no change in position in months
- Calibration data taken recently could be used to cross check stability of calibrations
- Plots below from recent 3-140 Run



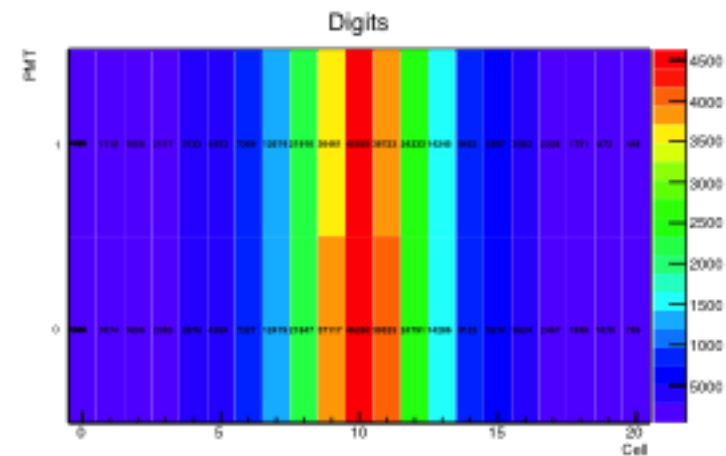
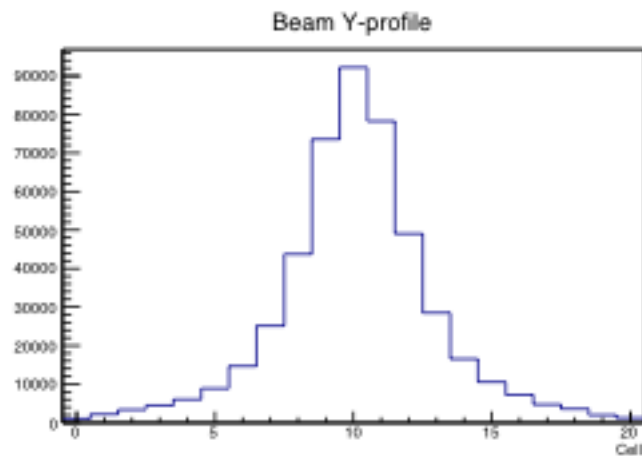
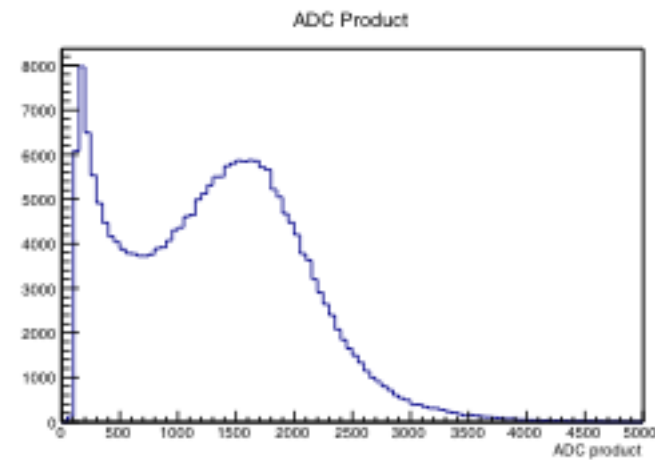
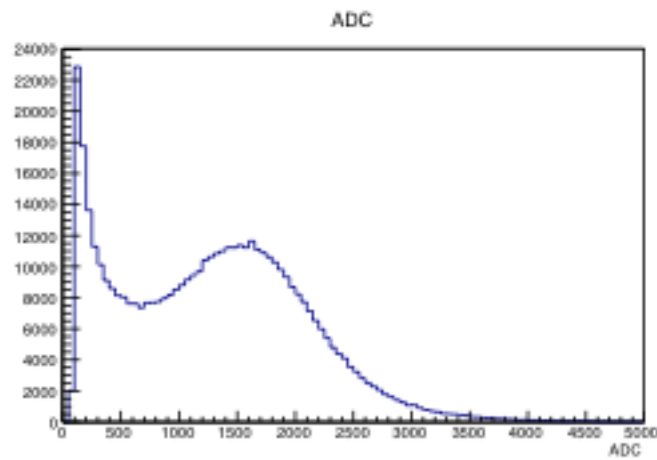
TOF

- More plots from recent 3-140 Run



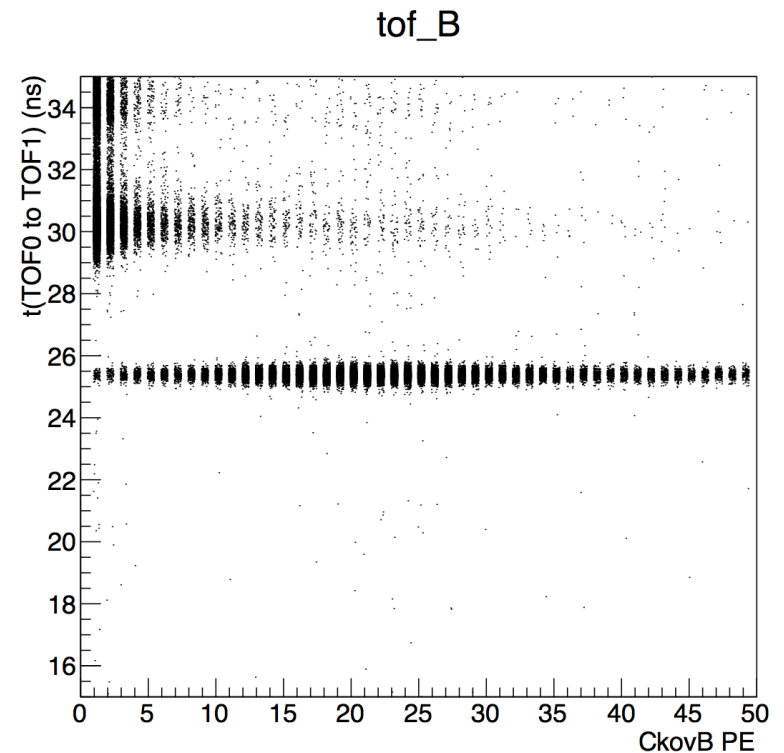
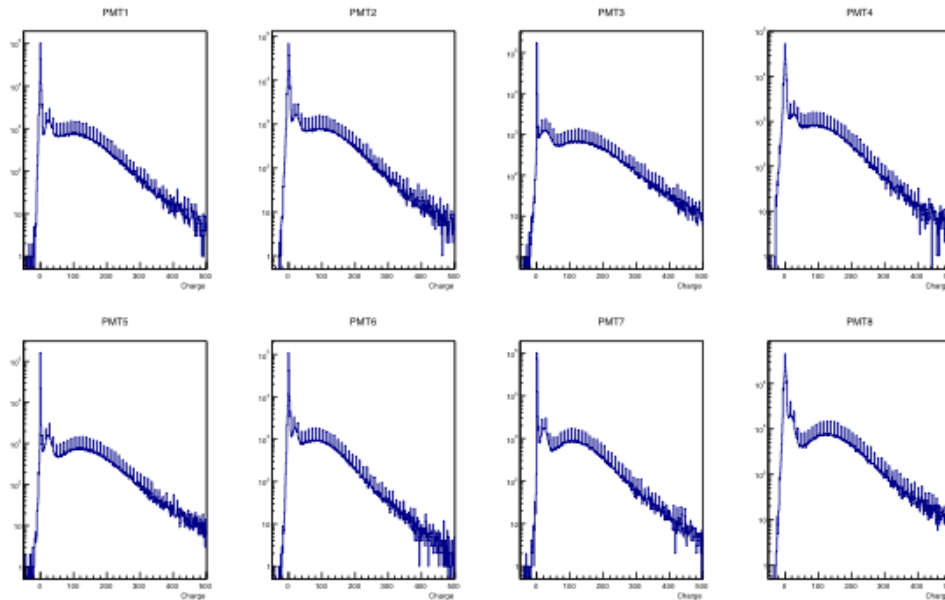
KL

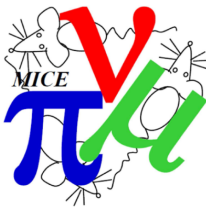
- No issues
- All PMTs functional



Ckov

- No major issues
 - Flow meter incorrectly calibrated gives spurious readings
- Readouts working normally
- Plots below are the charge distributions in each PMT and number of photoelectrons in each counter



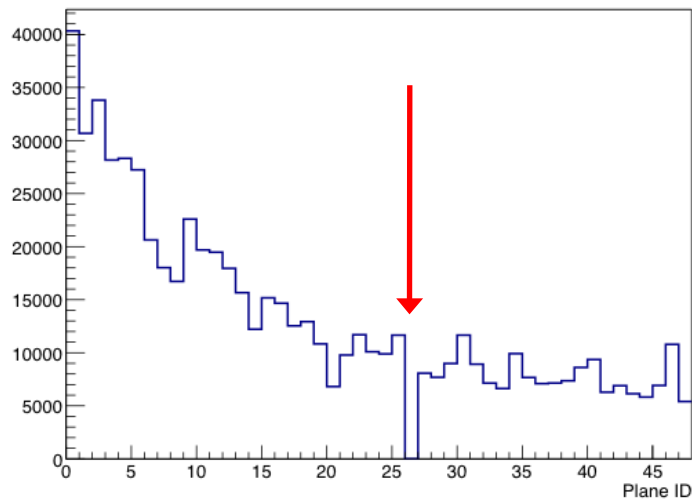


EMR

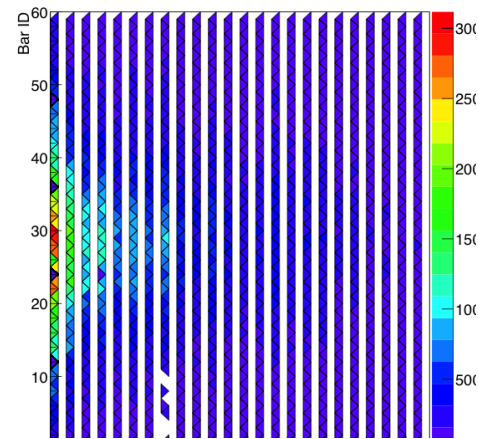
- **Readout issues** during expert startup run
- At least one VRB failed to respond – and we did not have a spare
- One VRB was replaced earlier this year with the only spare on-site.
- Followed by several attempts at bring it back to life – moving module to a different slot, re-seating cables, cleaning
- Started working just before beam-on running
- Still not clear whether it is a flaky board, or a flaky DBB<->VRB cable
- Readout has been fairly stable since then
- Since start of data-taking, the EMR readout has died twice during a run (this results in a DAQ auto-stop)
- Since then we have also identified **spared VRBs** at INFN – will be delivered to MICE this week.
- One **single anode PMT started tripping**. Trip limit was raised to 350 uA (from 325), the tube held ok for a few days and then tripped again recently and trips repeatedly at full voltage

EMR

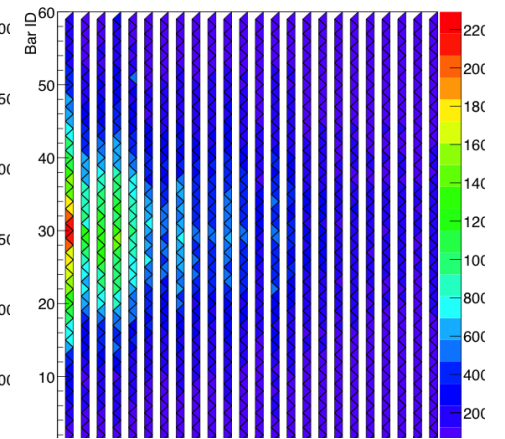
Beam profile along the Z axis

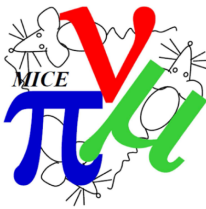


Occupancy in the xz plane



Occupancy in the yz plane





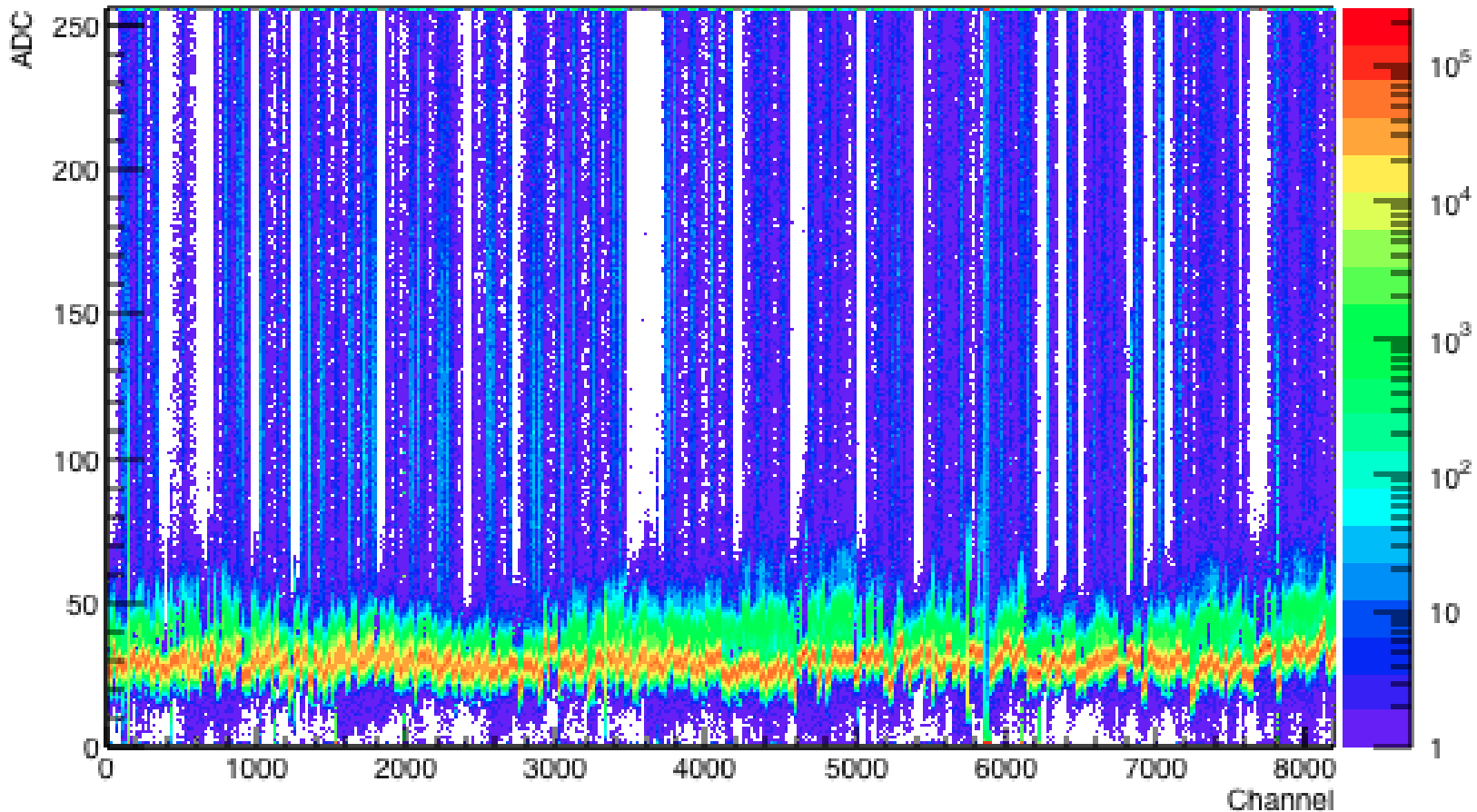
Trackers

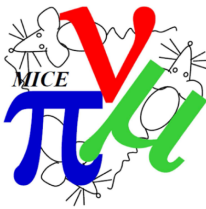
- All **4 cryos were serviced** earlier this year –Noticed a lot of dead channels after the cool-down
 - Despite purging out moisture and other attempts, we were still left with a number of dead channels
- It was decided to **swap waveguides** to redistribute the dead channels in order to optimize spacepoint reconstruction
 - Resulted in a need for new mapping & new calibrations
 - Issues with the mapping & calibration resulted in large gaps in reconstructed spacepoint distributions
 - Mapping has been fixed
 - Collected x4 calibration data to improve calibration fits & recalibrated (some channels adjusted by hand)
- One other issue was **Cryo1 power supply tripping** (4 times within 2 weeks)
 - Was traced to a 5A fuse being improperly seated – fixed
- Spares: Would like to have **spare AFE boards**, but decided not to risk disturbing the functioning system (requires pulling out existing boards, sticking in spare boards, and flashing them)
- Current status:
 - Low-level readout looks OK
 - Some groups of channels appear noisy in the reconstruction due to low gains set by the calibration

Trackers

- ADCs: low-level readout looks OK

VLSBfADCPattHist_R09800





Conclusions

- Data taking has been very stable and fast (nearly one setting/day)
- Short downtimes due to ISIS
- No major issues in the detectors
- ALH more robust and reliable
- Few minor problems, no real showstoppers
- **Thanks to all the shifters and experts!**