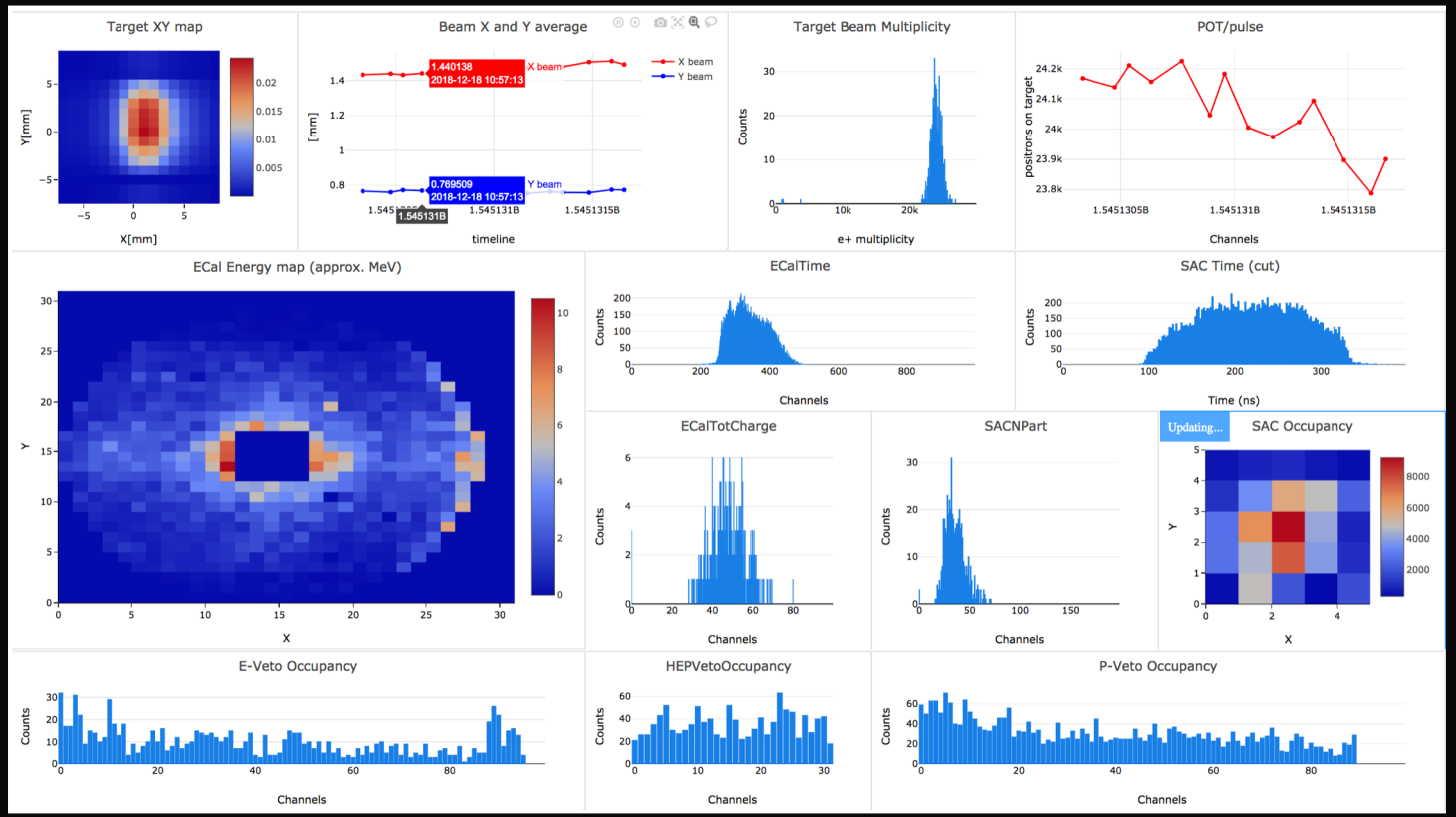
Data taking conditions 2018



Mauro Raggi,
Sapienza Università di Roma e INFN Roma

PADME Collaboration Meeting 8-9 Gennaio 2019

Data taking 2018

- The data for physics have been acquired from November 1st to December 19.
- The data acquired in October need to be studied in detail to identify possible good runs.
- General running condition study is needed

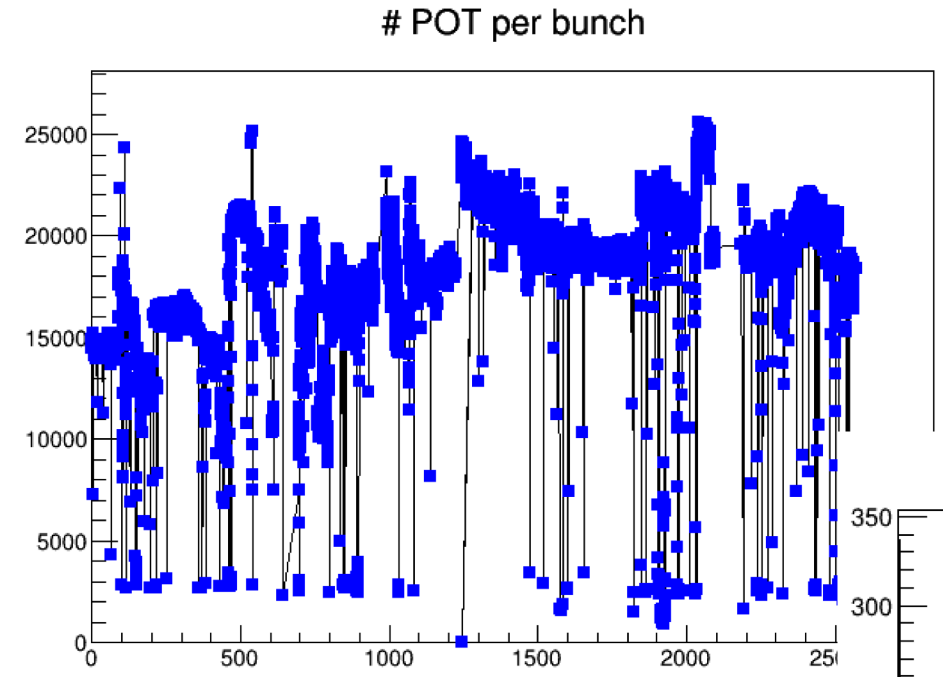
The method

- Open the reco files and collect the average number of POT from the target Target/TargetBeamMultiplicity
  - Use only stream 0 (1/5 of the files) but full time coverage
- Multiply the MeanPOT*5000 to take into account the missing files
- Correct the number for the reco efficiency
  - Calculated for the November run from the ratio Nreco/Nraw files.
- Assing to each file the time of the first event in the RecoEvent structure

The method caveats

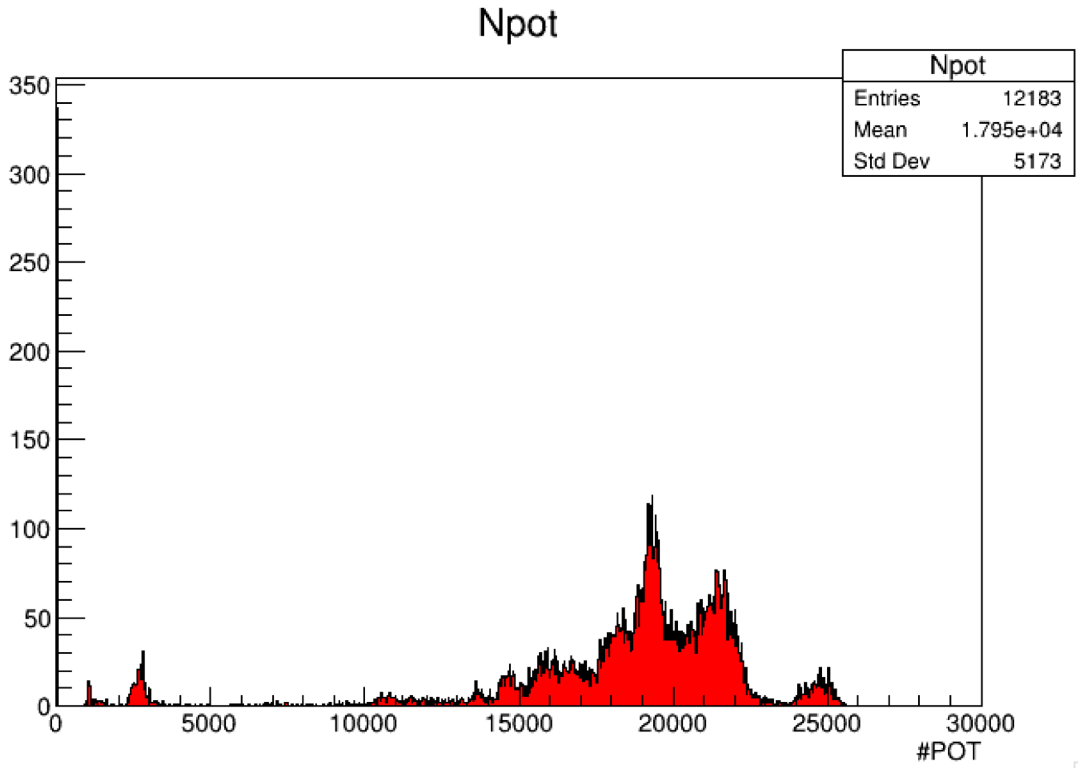
- The beam characteristics obtained in the following session are derived from automatic reprocessed data
  - Missing files different amount of reprocessed data are uncertainty sources
- The results are affected by reconstruction efficiency
  - An average correction has been implemented but residual effect have to be estimated more precisely
- Results are based on the target calibration which was available at the online level (may be corrected in the future)
  - According to new calibration by Gabriele (reduced to 60%)
- Final and robust estimate needs data reprocessing
  - Emanuele prepared a reprocessing script which seem to work.

Data taking conditions November

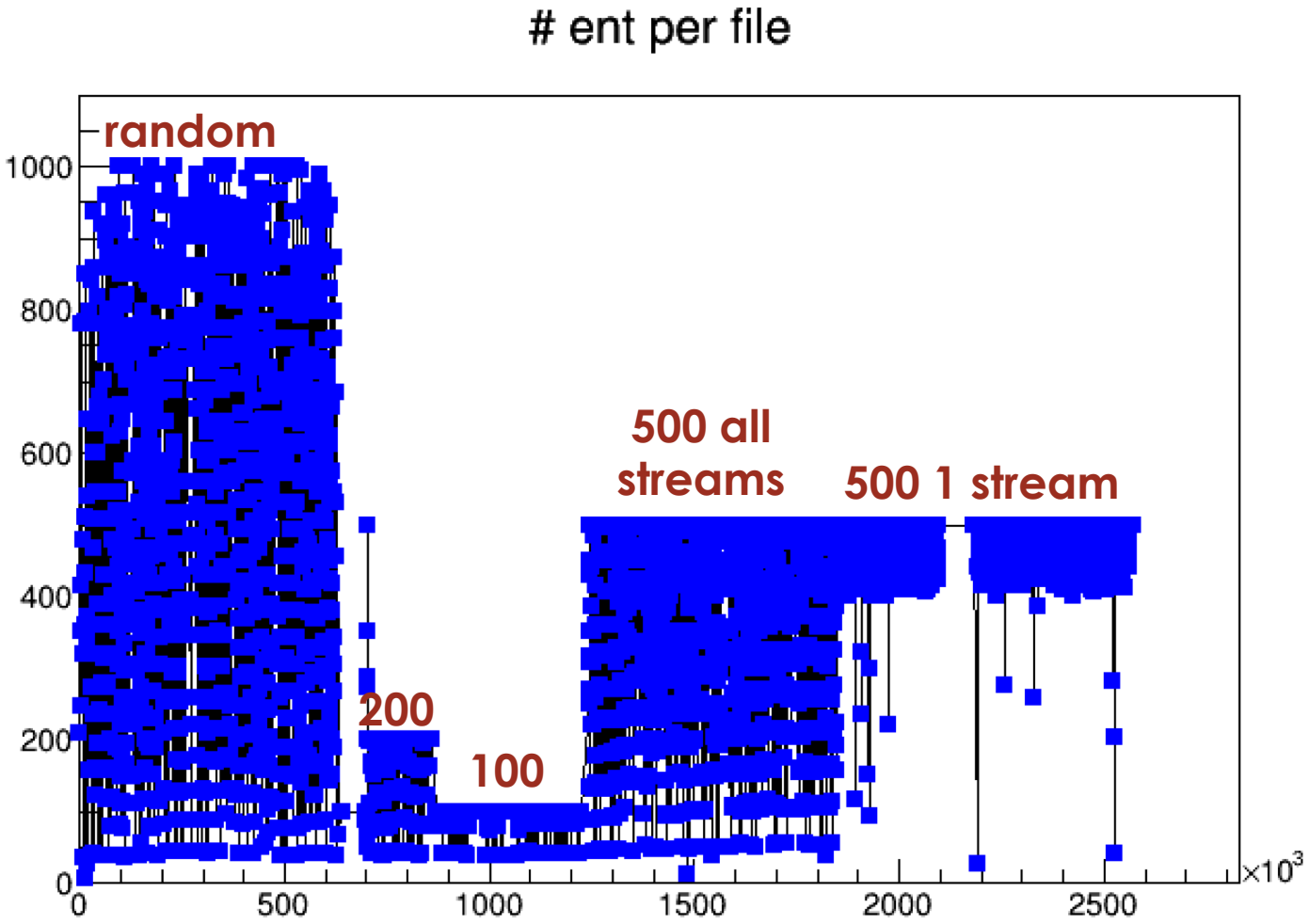


Running at 15 K at the beginning moved to ~20K at around mid November.

Allows to understand pileup in different intensity conditions!



Reco performance November

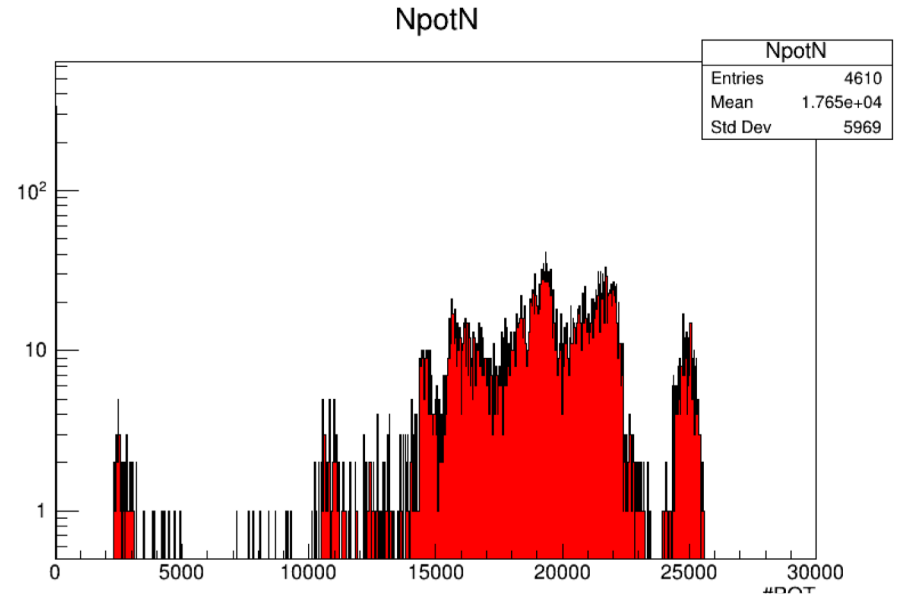


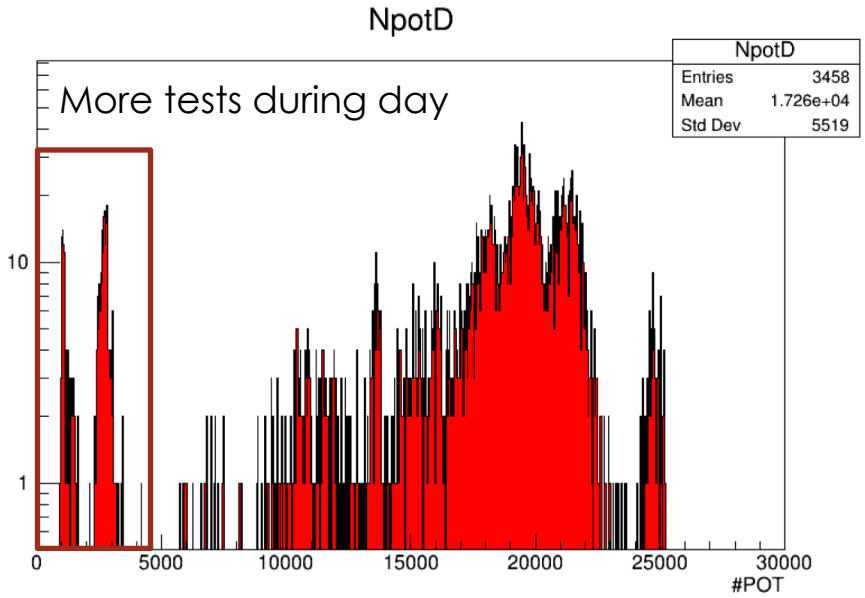
Number of event per file processed by the reco program reached good configuration 500 only stream 0

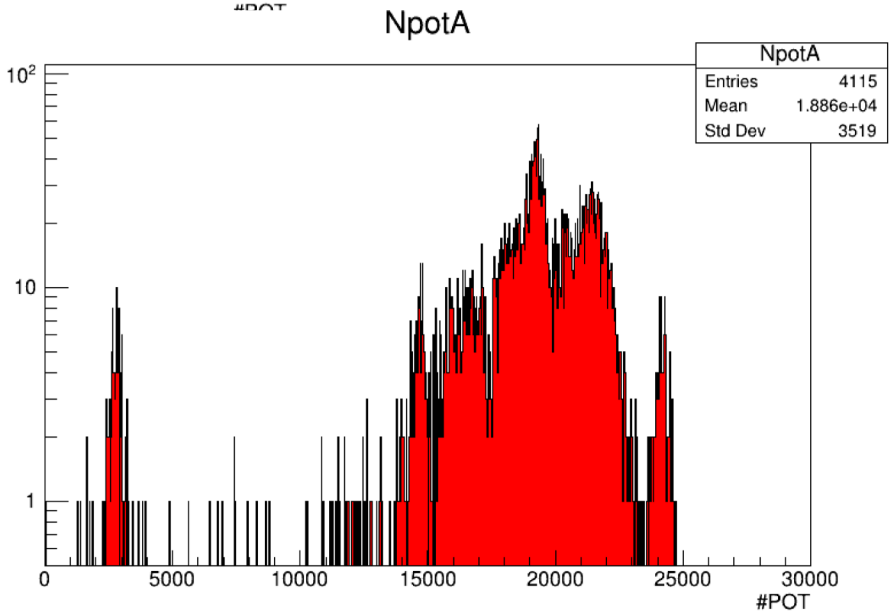
Shift DAQ

- Try to evaluate the amount of data acquired during the 3 different type of shifts
  - Day (D) 7-15
  - Afternoon (A) 15-23
  - Night (N) 23-07
- Used the first event time stamp to select events from different shifts type. performance

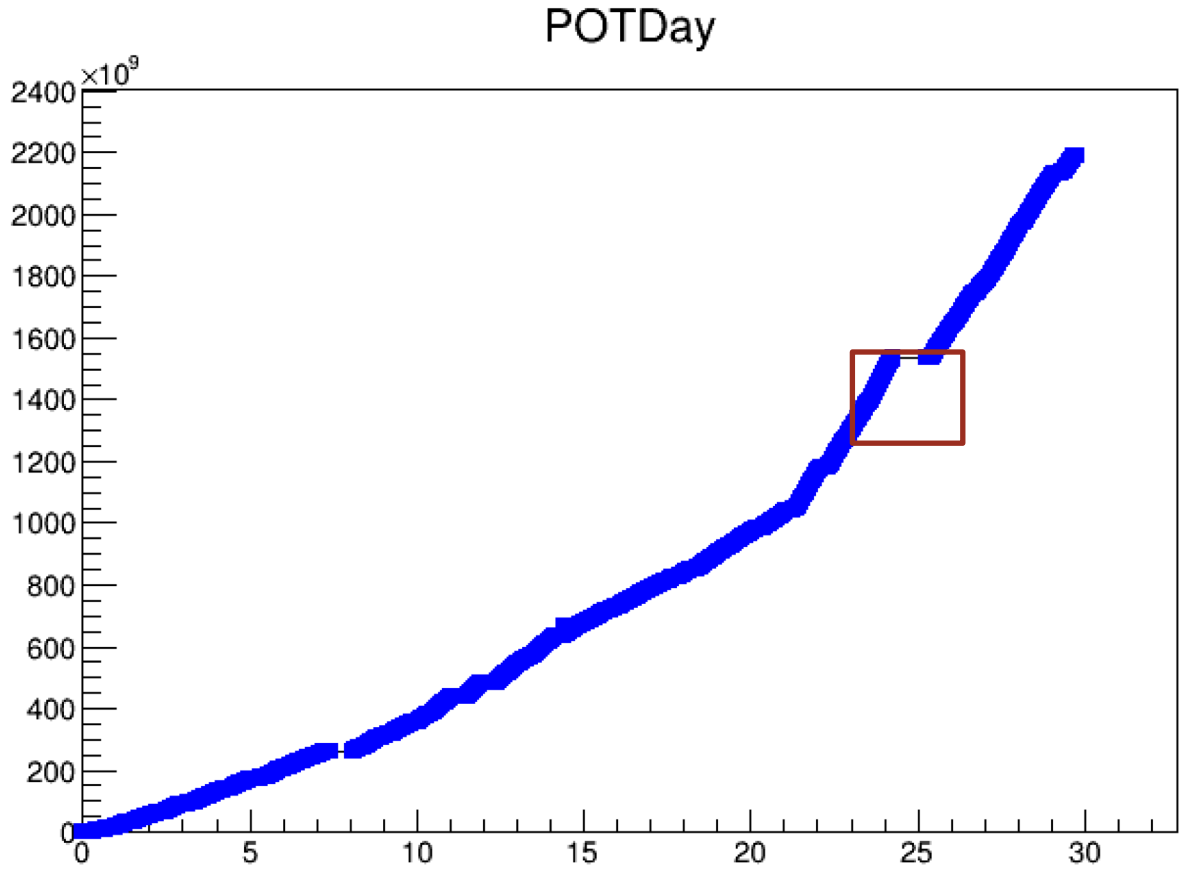
Number of positrons on target/shift







POT on target per day November



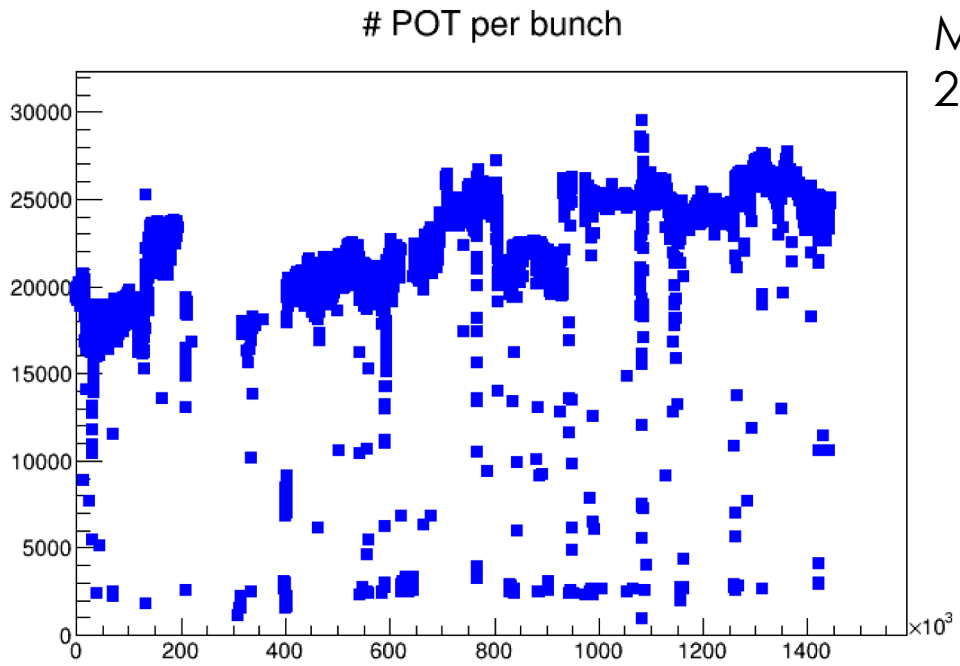
~**2.3E12 during November**.

Short stop around 24th can we track it back or it's just a runReco stop?

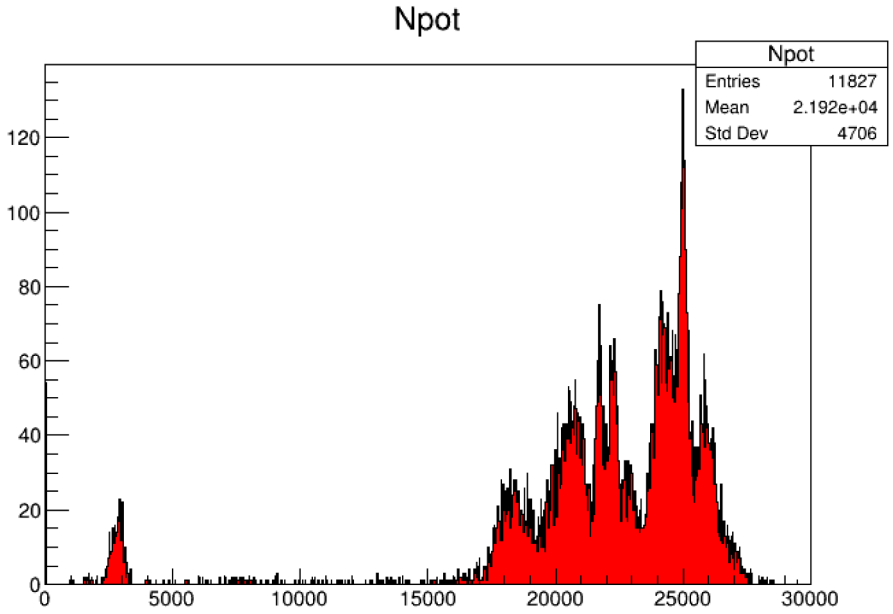
Upscaled by 40% due to missing reco files wrt to raw file.

(final number depends when we lost the reco files first or second part of the run?)

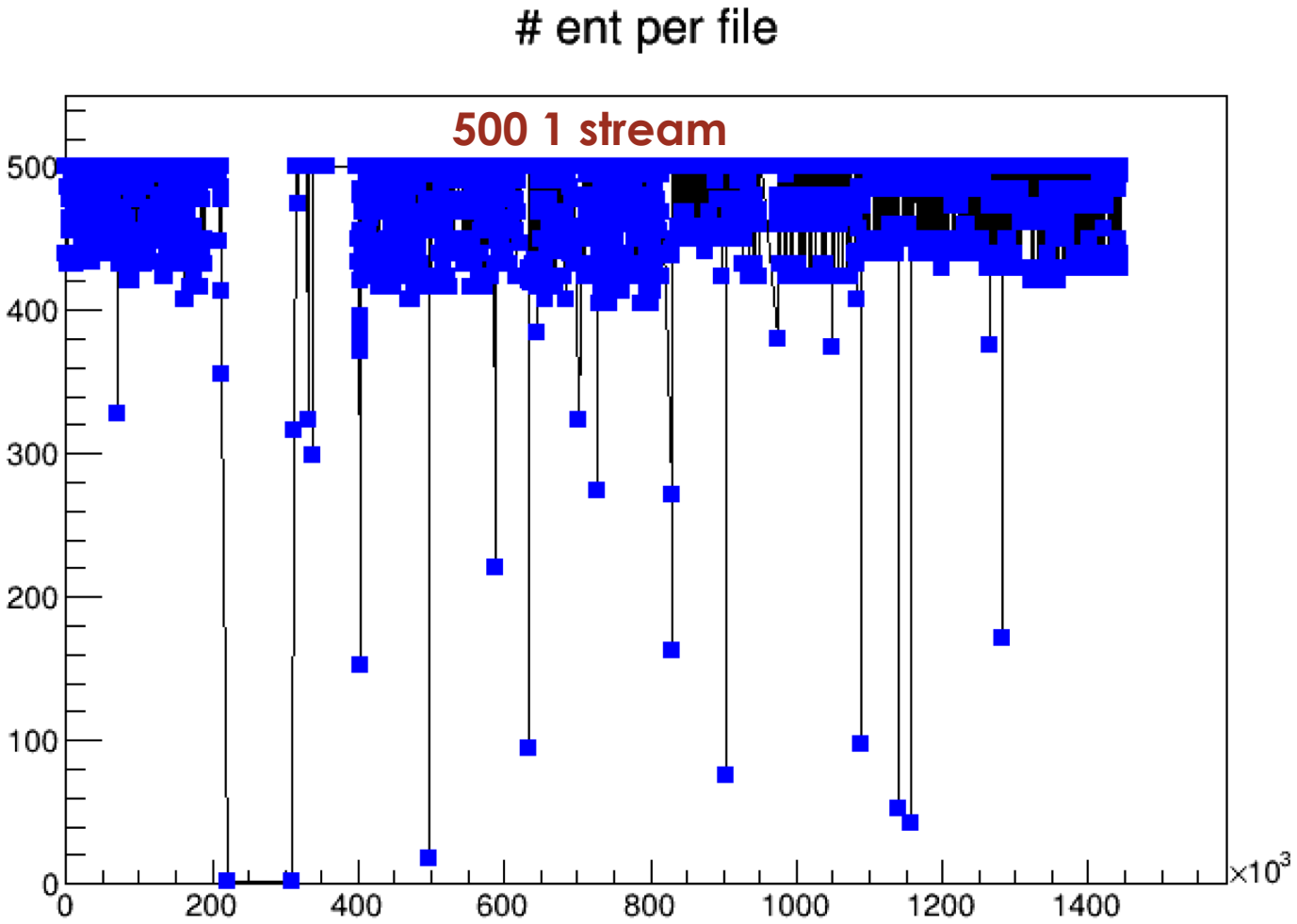
Data taking conditions December



Most of the time running above 20000 particles

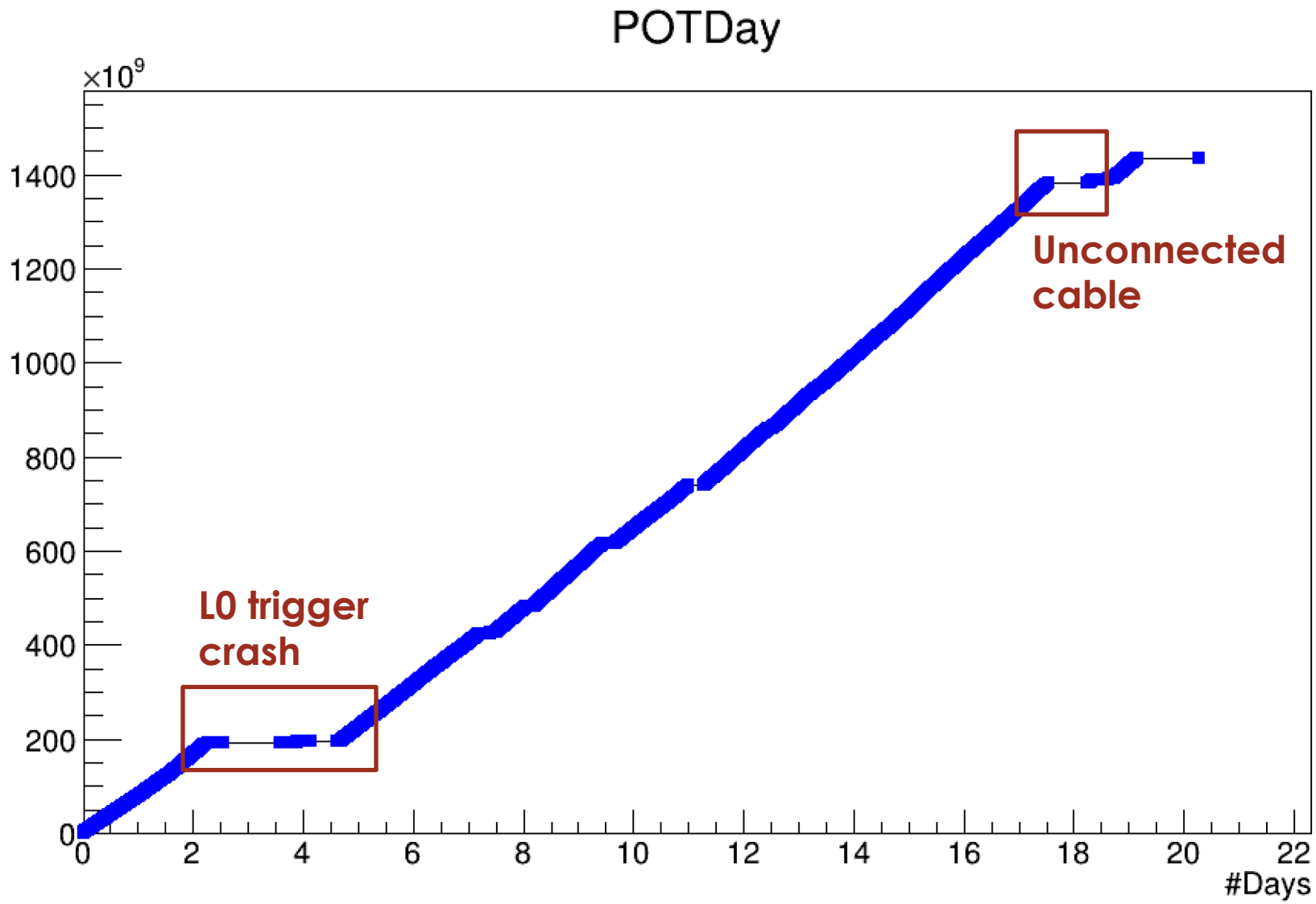


Reco performance December

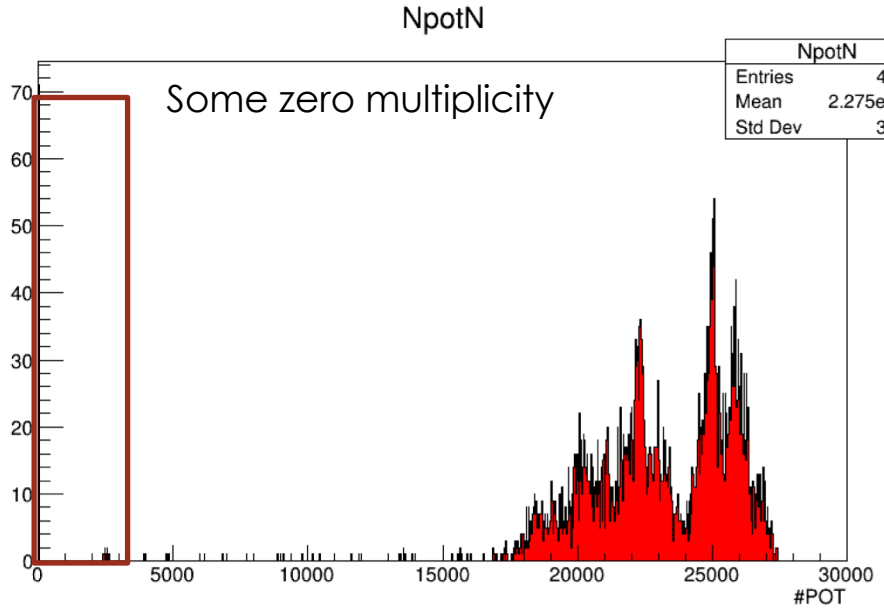


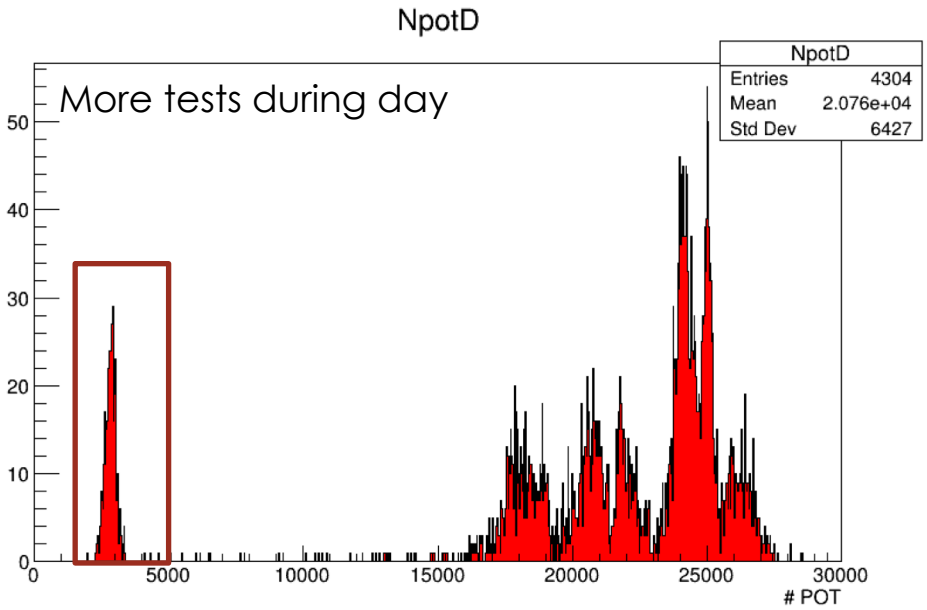
Very stable reco condition. Improves stability in the POT measurement.

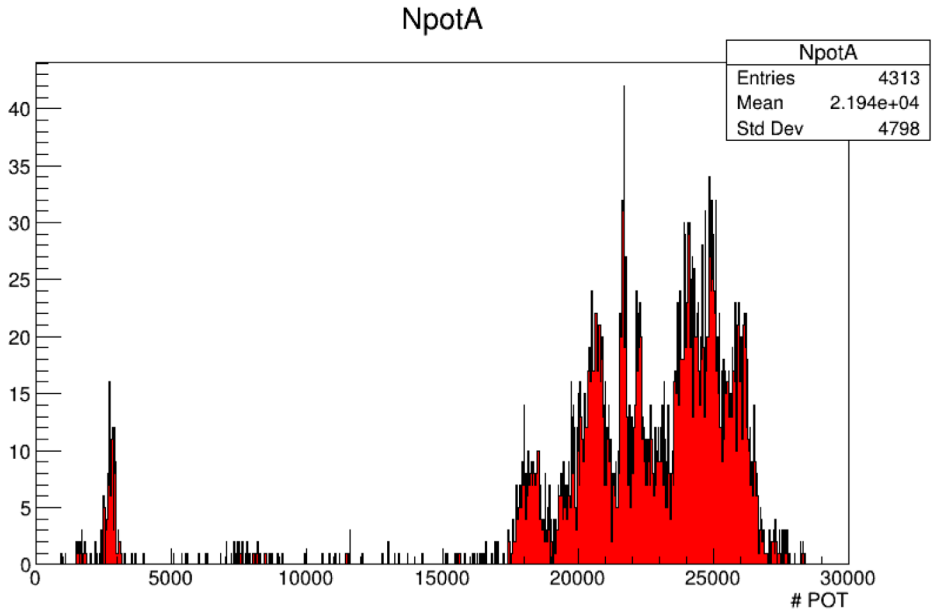
POT on target per day December



Number of positrons on target/shift







Summary of the shift perfomance

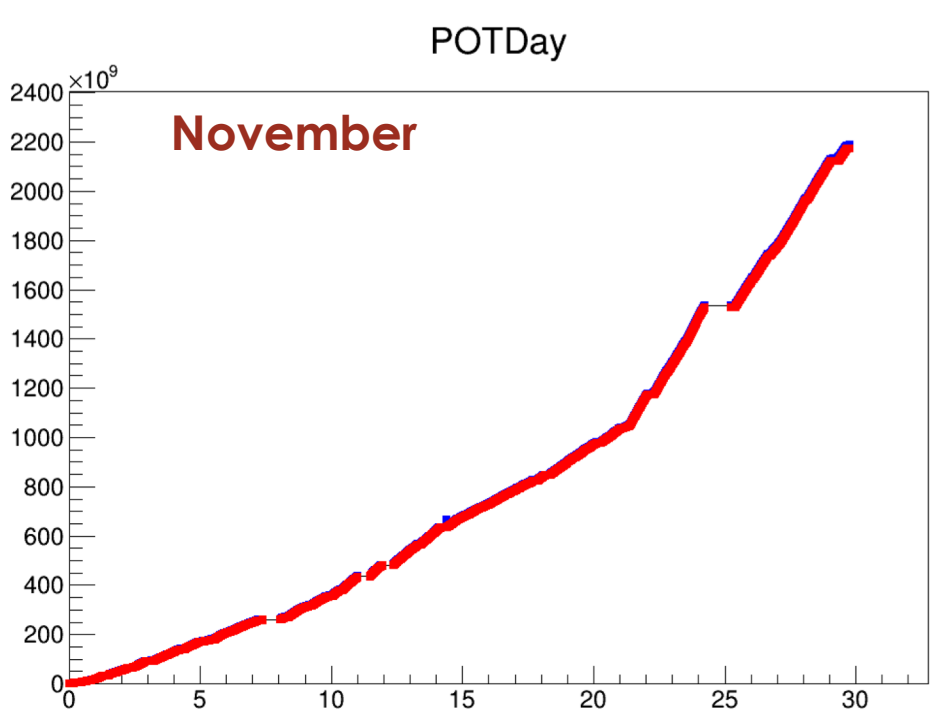
Shift type	Ent	#POT avg	#POT RMS
N (23-07) Nov	**4610**	17650	5969
D (07-15) Nov	3458	17260	5519
A (15-23) Nov	4115	18860	3519
N (23-07) Dec	**4527**	22750	3976
D (07-15) Dec	4304	20760	6427
A (15-23) Dec	4313	21940	4798

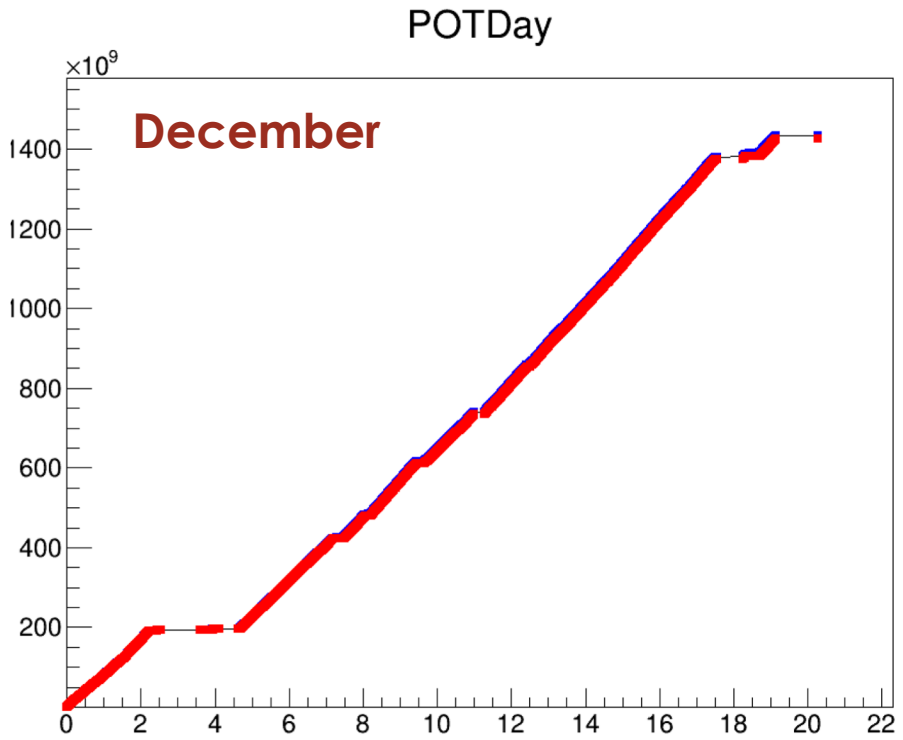
No evident difference in between day and night shift can be observed.
Slightly higher number of reconstructed files during night shifts.

Night shifts have been as effective as day shifts!

Correcting for test runs

- To try to correct for test runs I excluded from POT counting all runs with <10K POT arbitrarily tagging them as test runs.
  - The correction looks marginal





Correcting cluster calibration

Nominal	Target from reco	TimePix3					FitPix			
		From pixel counting	From cluster counting	Mean CS	Acc	Time Pix3/ Target	From pixel counting	From cluster counting	* Mean CS	Acc
5000	5000	7015	3160	2.22	0.82	0.63	5540	3638	1.5	0.9
10000	11570	16200	6890	2.35	0.77	0.59	11290	5870	1.5	0.9
15000	19000	28125	11250	2.50	0.69	0.59	17000	11200	1.5	0.9
20000	28000	43440	16270	2.67	0.61	0.58	22280	15160	1.5	0.9

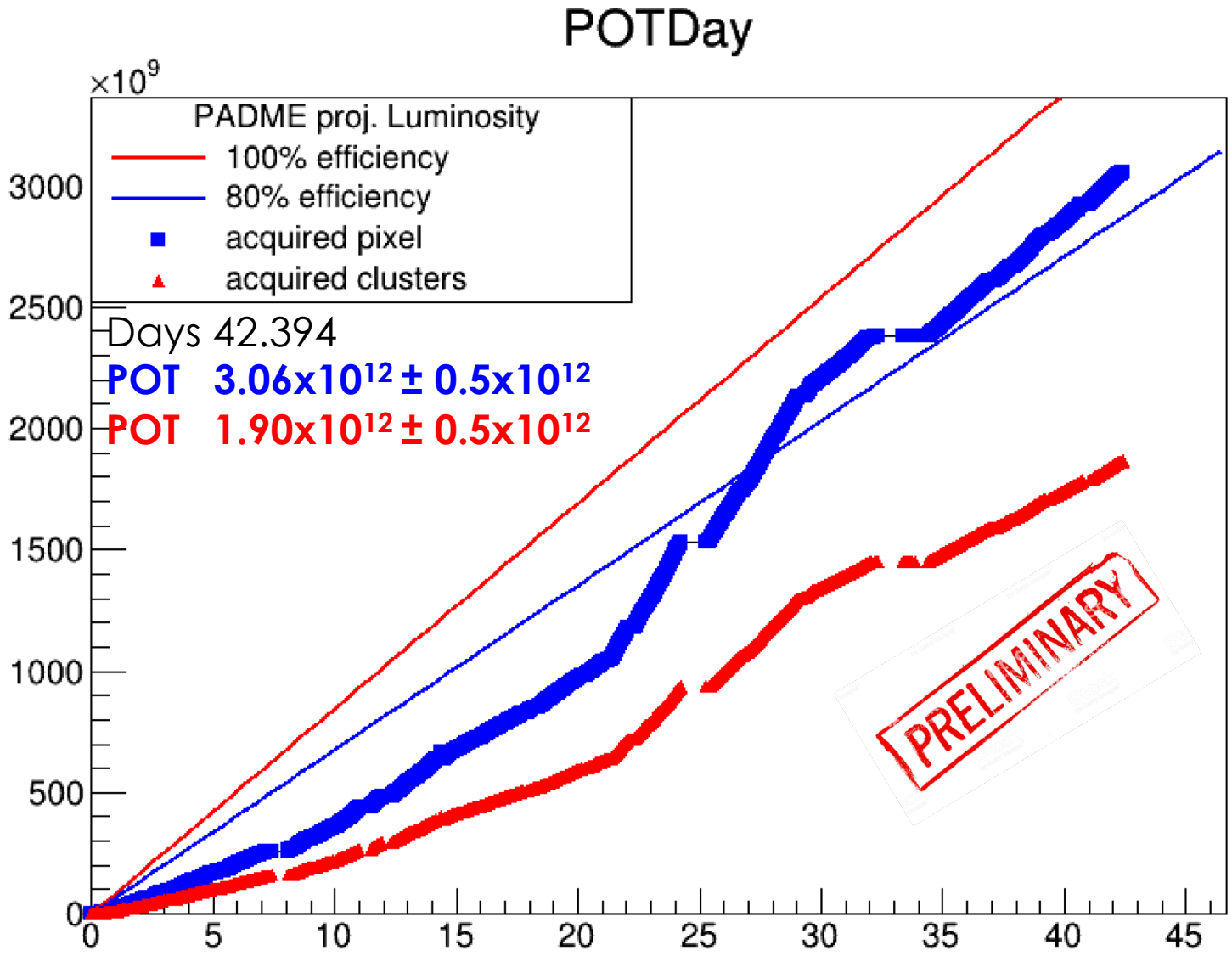
* supposing same value of 5k for 10k, 15k and 20k

cluster counting/POT on target

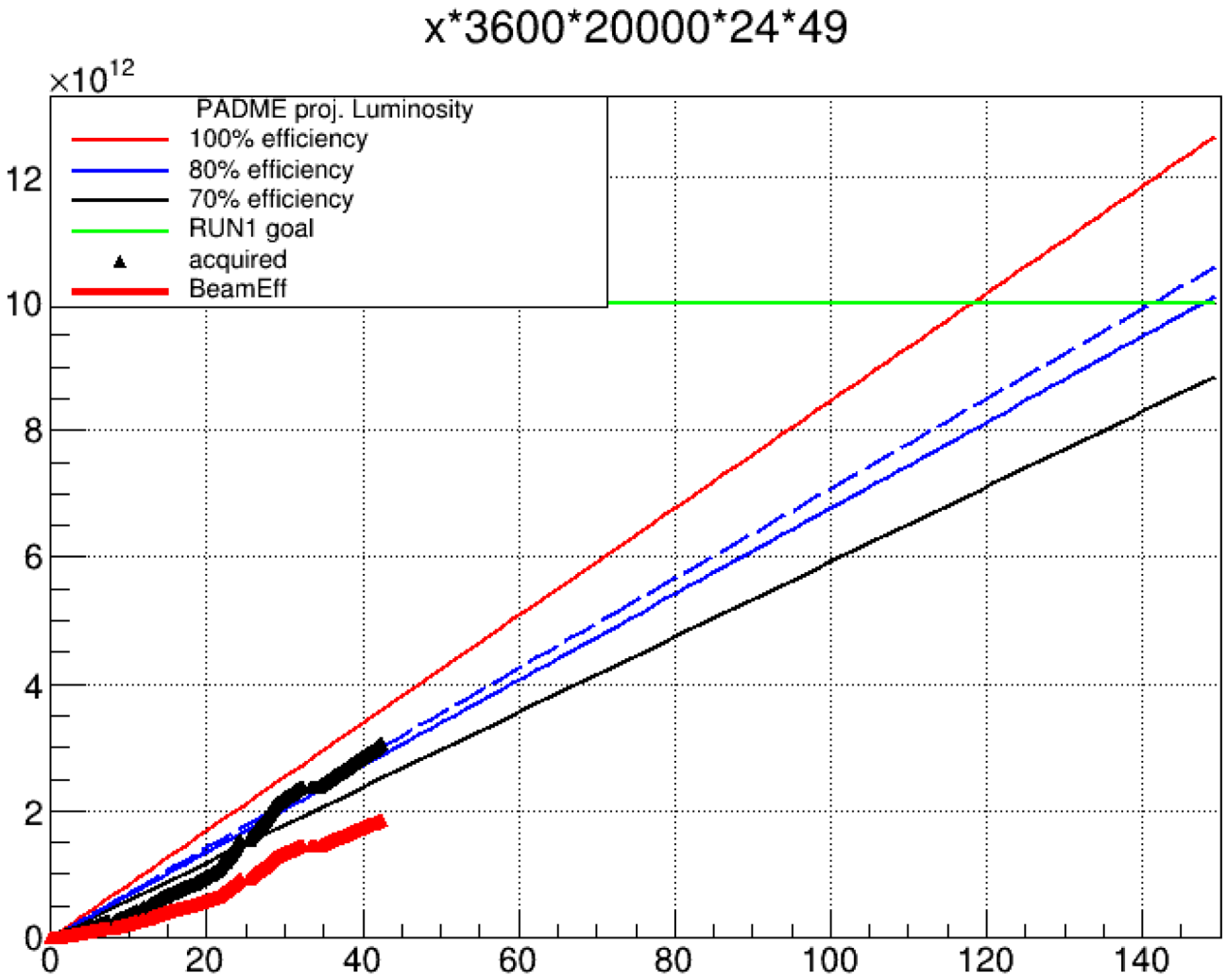
CCD=16.9 μm

I collected column 2 which is overestimated according to cluster calibration. Need to be scaled by 0.6 to get corrected Npot

Total integrated luminosity 2018



Data taking November and December



Conclusions

- Data taking was very stable during November and December
  - Night shift are as good as day shifts (remote shifts work)
- A method has been developed to measure integrated luminosity
- The software based on reco files in working and it's fast
  - 10-15 minutes to process 1 month of data
- Big uncertainties related to target calibration are still affecting the final number of POT
- Acquired #POT 2-3 10^{12}