

The PolarQuEEEst experiment

20 July - 4 September 2018





Tuesday, 22 May 2018

Wednesday, 23 May 2018

Thursday, 24 May 2018

08:00 Introduction + School presentation

09:30 Presentation CERN - J. Vigen

10:00 Introduction to EEE

10:20 PolarQuEEEst general

10:45 Instructions for PolarQuEEEst con...

11:15 Group subdivision, Start construction

12:00 Lunch

13:00 Construction of two detectors

15:00 High energy astrophysics and blue water cruising - T. Courvoisier

16:45 Extra time for construction

08:30 Visit SC/Exhibition/Globe

11:15 Masterclass: Cosmic Rays and applications - Marco Garbini (Centro Fermi) Ivan Gnesi (Centro Fermi)

12:30 Lunch

13:30 Oscilloscopes/signals for all three telescopes

16:00 Visit to EEE - Despina Hatzifotiadou (CERN) Crispin Williams

17:00 Groups prepare presentations

09:00 HV scan efficiency on detectors

11:00 Masterclass data analysis - Francesco Noferini (INFN)

12:00 Lunch

13:00 Visit SM18/LHC Magnets/AMS/ALICE

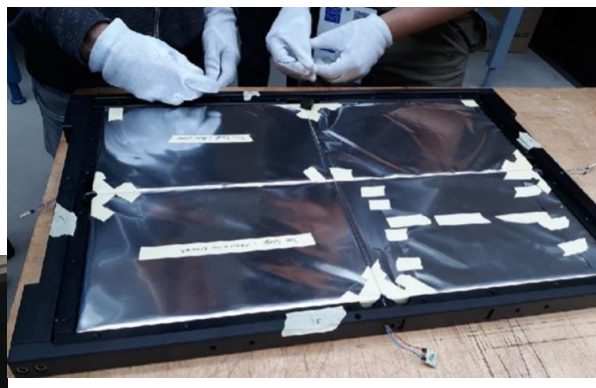
15:30 EEE Extreme Energy Events - Antonino Zichichi

16:30 Prof. S. Ting seminar

18:00 Detector-groups reports/multimedia

19:00 Party

<https://agenda.centrofermi.it/event/80/>



CERN : May 22nd- May 25th

23 students at CERN to build the detectors.

Italy

Liceo Marconi Foggia

Liceo Marconi Parma

Liceo Scacchi Bari

Liceo Duca degli Abruzzi Treviso,
Liceo Galileo Ferraris Torino, Liceo
Giolitti-Gandino Bra)

Norway

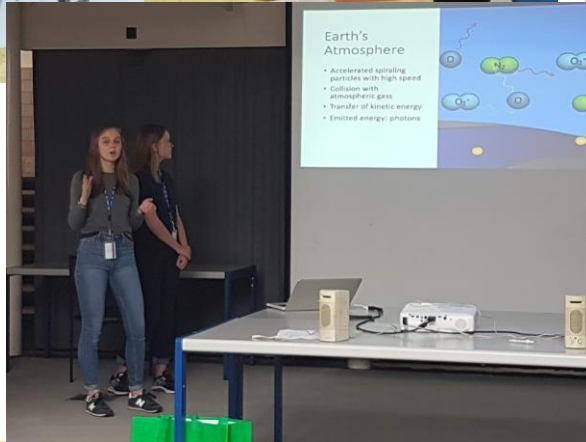
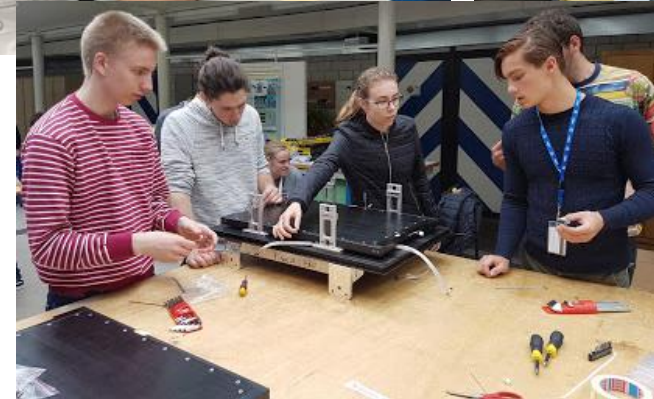
Liceum Horten

Liceum Nesodden

Liceum Sandnes

Switzerland

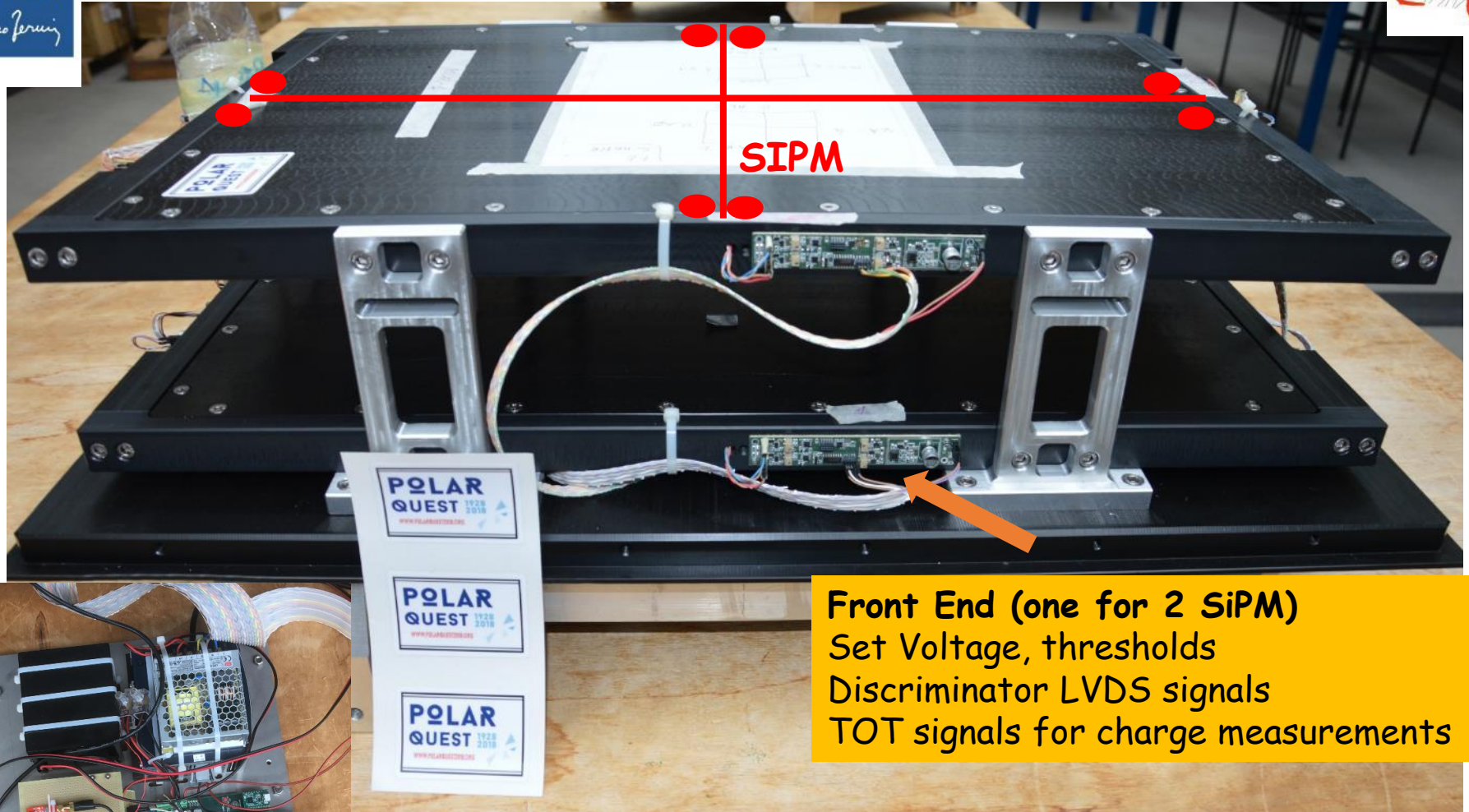
Collège Voltaire Geneve



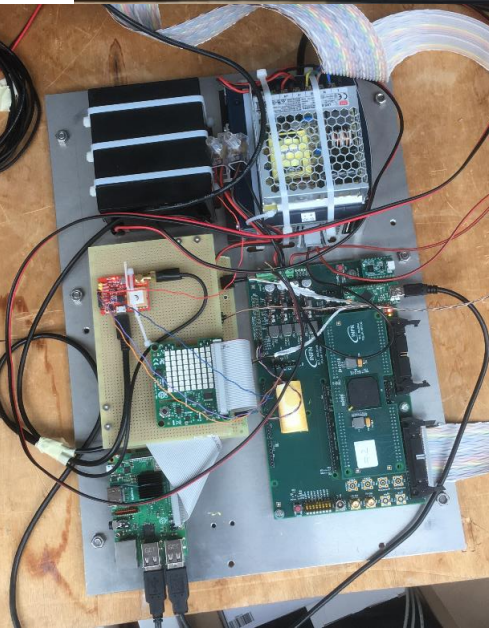
Earth's Atmosphere

- Accelerated spinning particles with high speed
- Collision with atmospheric gases
- Transfer of kinetic energy
- Emitted energy: photons

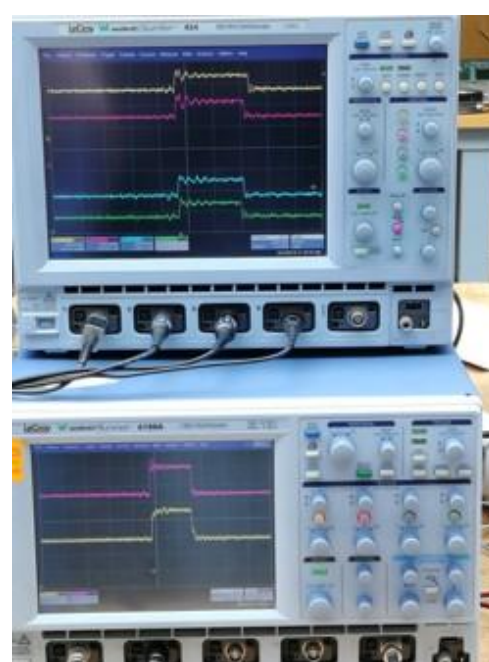
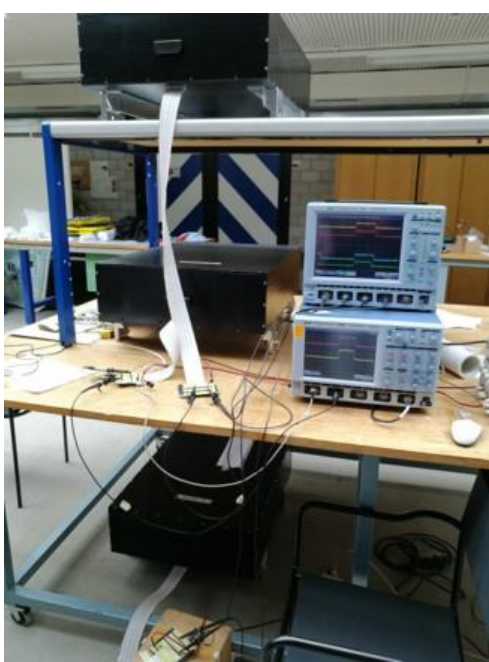
Movie available here
<http://www.polarquest2018.org/adventure-for-climate-change/cosmicrays/>



Front End (one for 2 SiPM)
Set Voltage, thresholds
Discriminator LVDS signals
TOT signals for charge measurements



Total power consumption 12,5 W
16 ch TDC-TOT , Trigger, DAC, GPS, Controls



Polar-01-02-03
Cosmic rays Telescope



Polar-01 on boat Nanuq



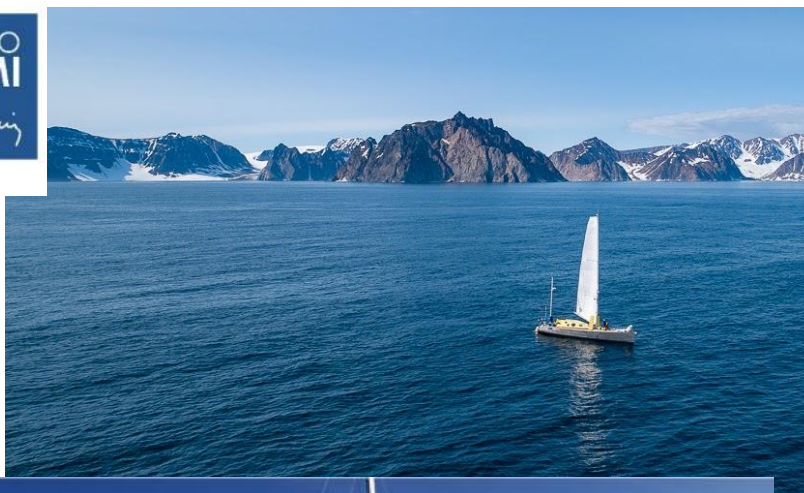
**Polar-02
Nesodden (Oslo)**



Polar-03 Bra (Turin)

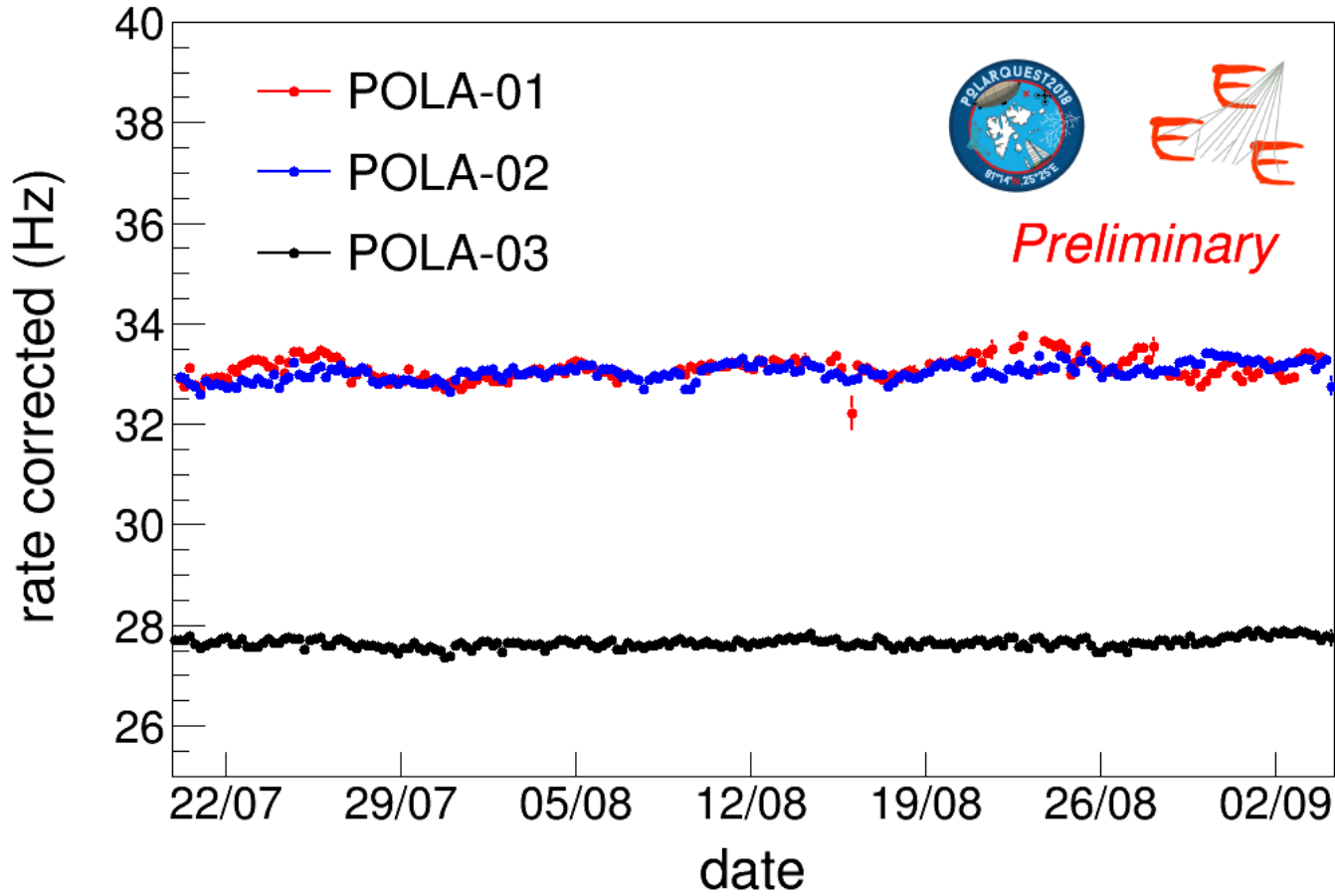
CENTRO
FERMI

Enrico Fermi



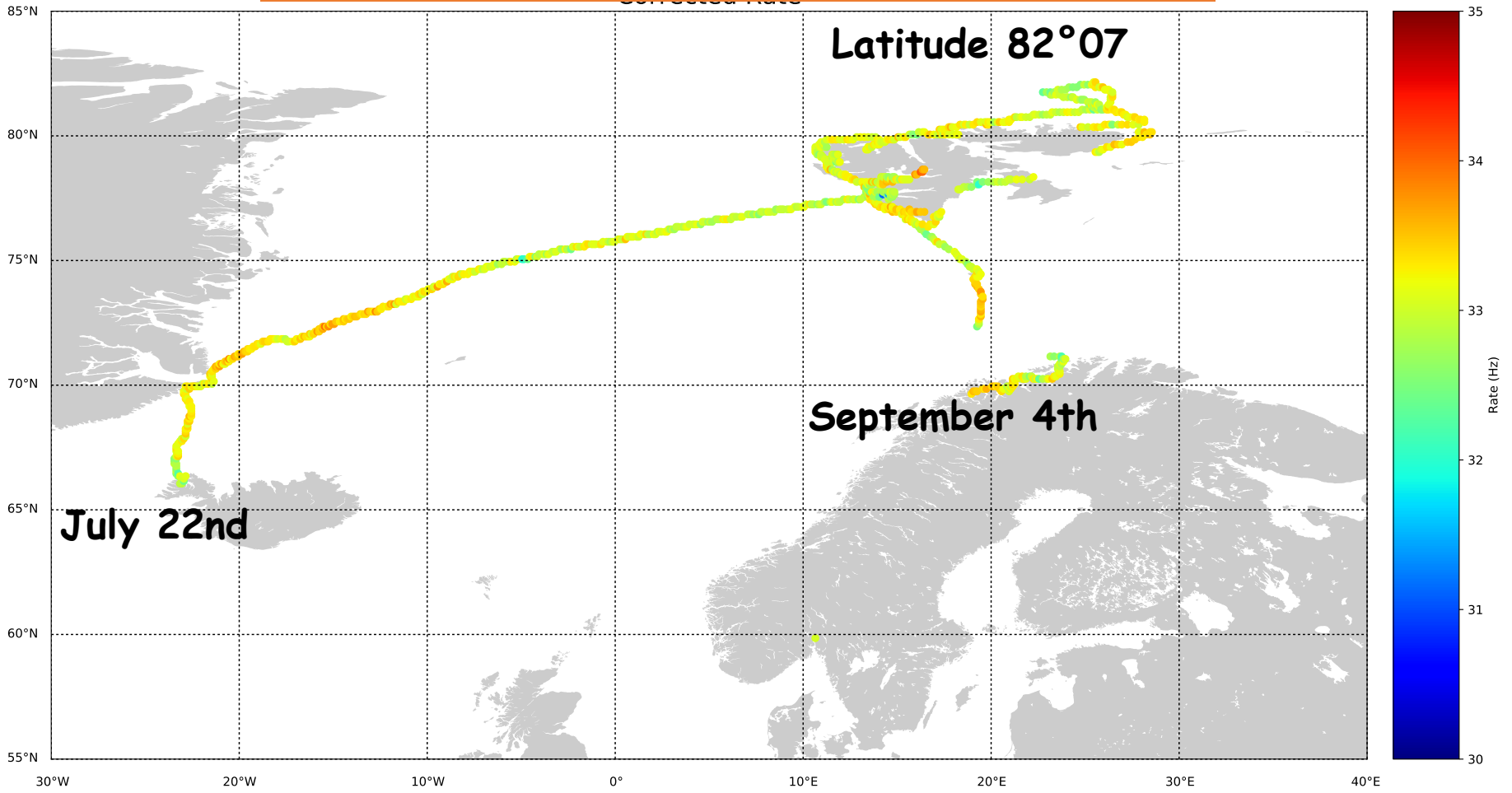


PolarQuEEEst : Rate (corrected)



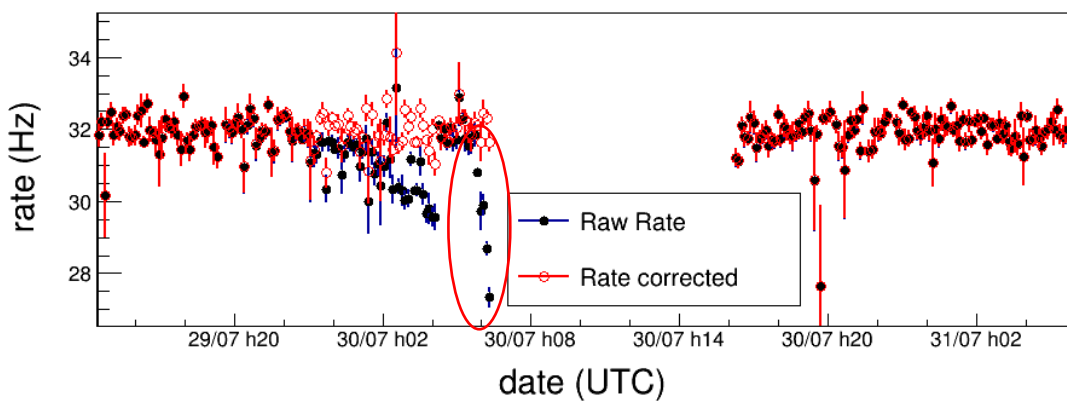
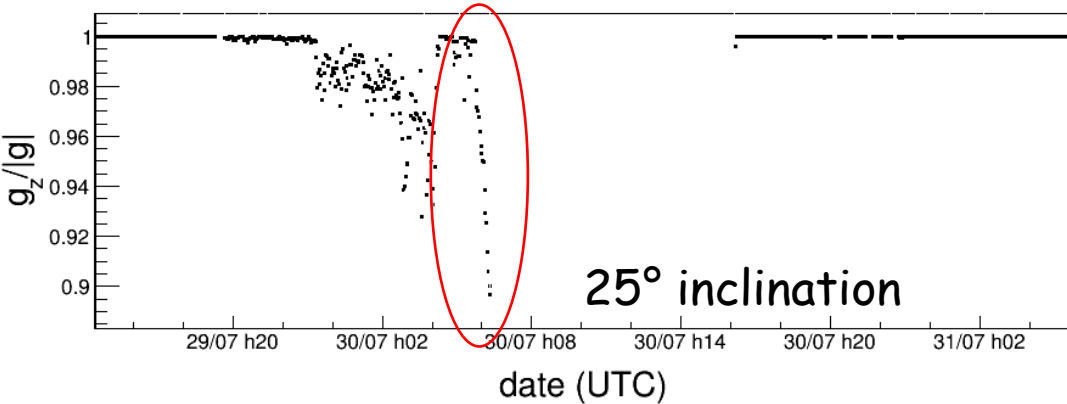


PolarQuEEEst : Rate (corrected)



Orientation correction: an example

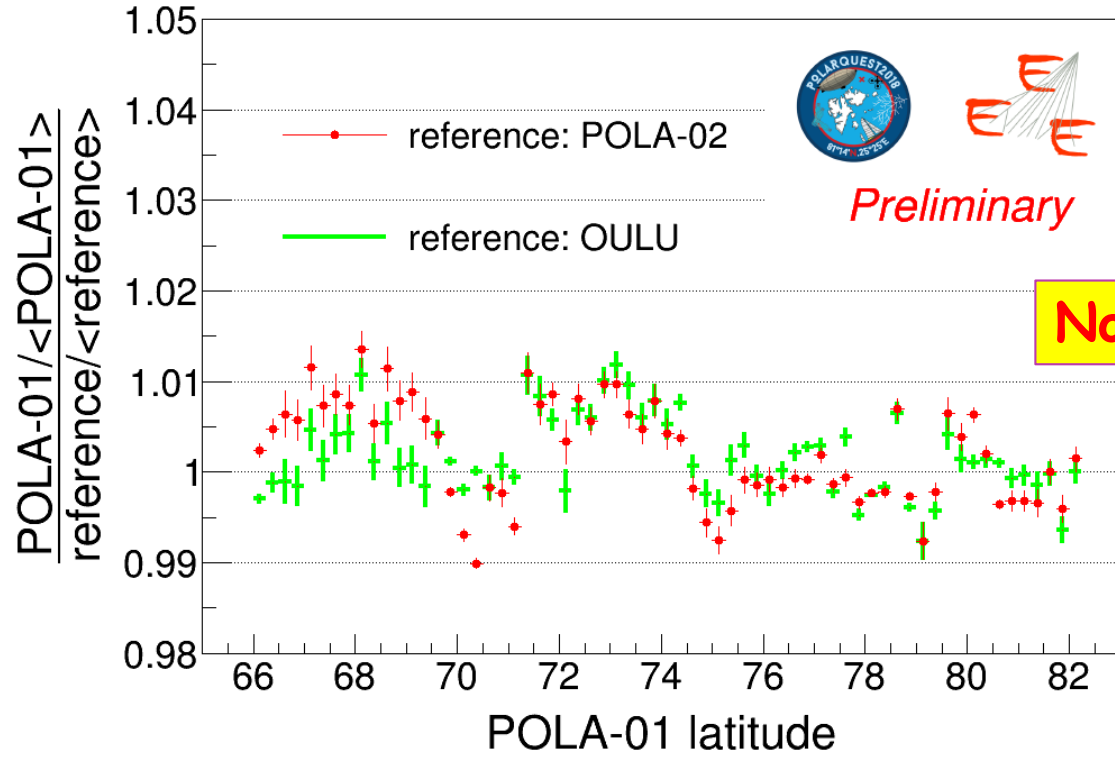
On 30 July a problem occurred for Nanuq (during low tide) ...



Rate vs. latitude

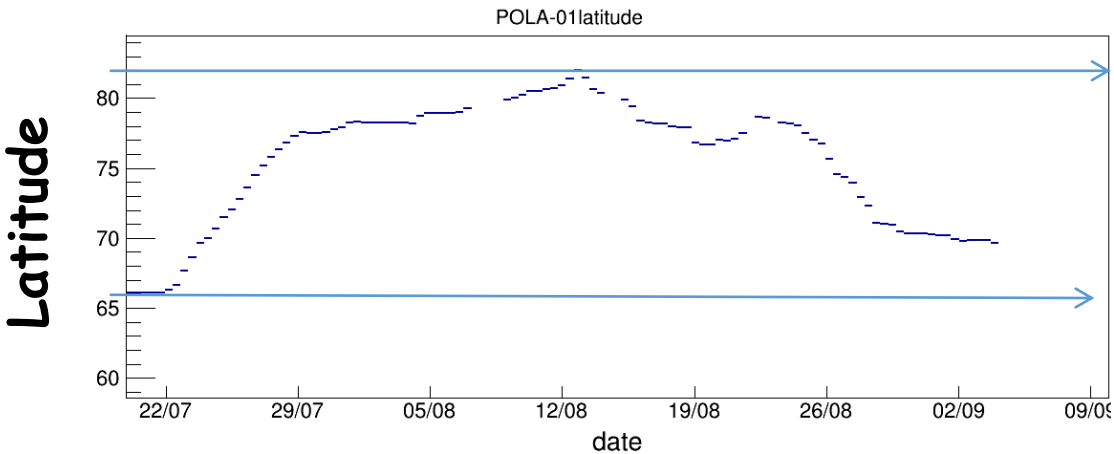


Bin width = 0.5 grad



References:
POLA-02 (Oslo @ 59° N)
OULU neutron detector (Finland)

No significant variation (< 1%)



82° N (max)
POLA-01 on Nanuq
66° N (min)

Date

The PolarQuEEEst teams...



... at construction at CERN



... on board of Nanuq

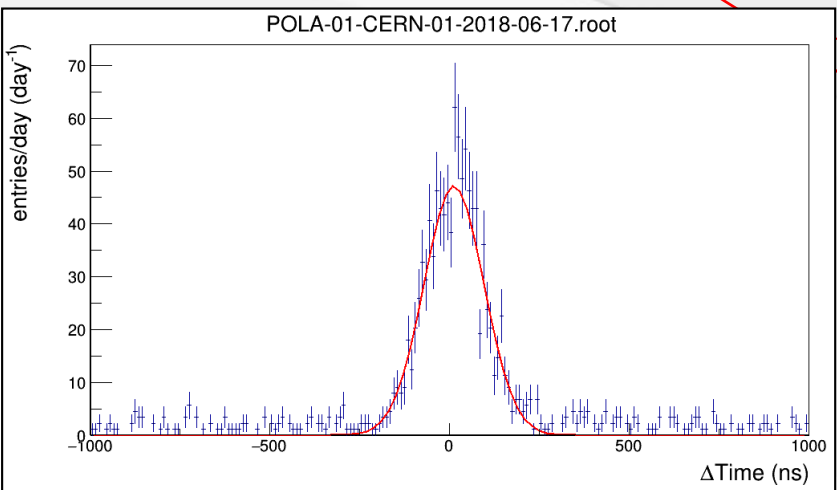
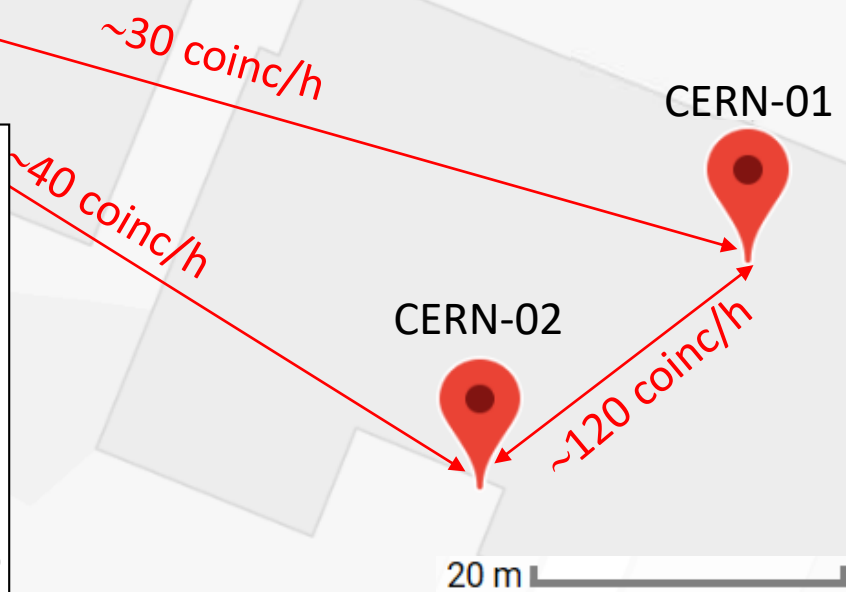
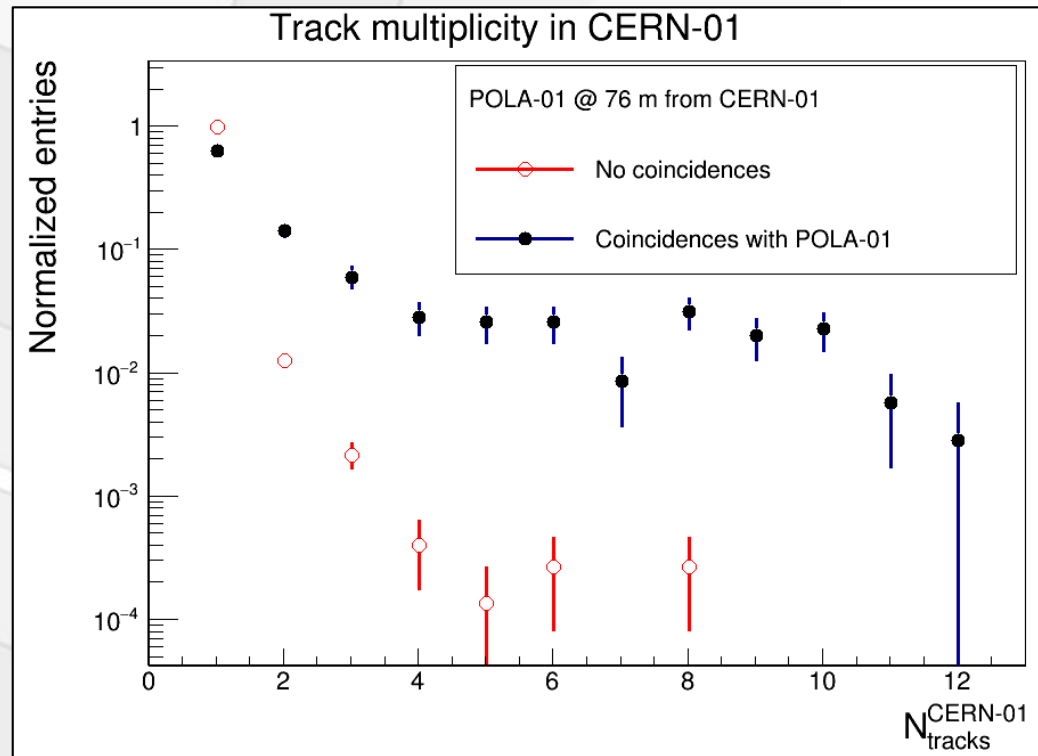
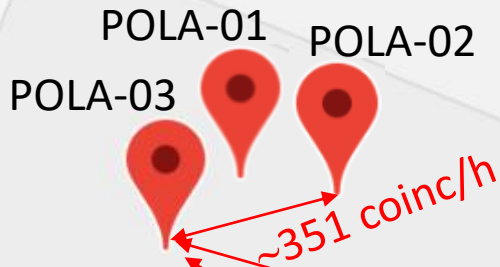
See also:

L. Cifarelli Colloquium at CERN 26/9
<https://indico.cern.ch/event/756626/>

Media coverage /Events
<http://www.polarquest2018.org/events-at-cern/>
<http://www.polarquest2018.org/media/>

BACK UP

≥ 3 SiPMs coincidence required
 \rightarrow Single POLA rate ≈ 30 Hz



GEOGRAPHIC STUDY OF COSMIC RAYS

Ions/ cc s
in standard air

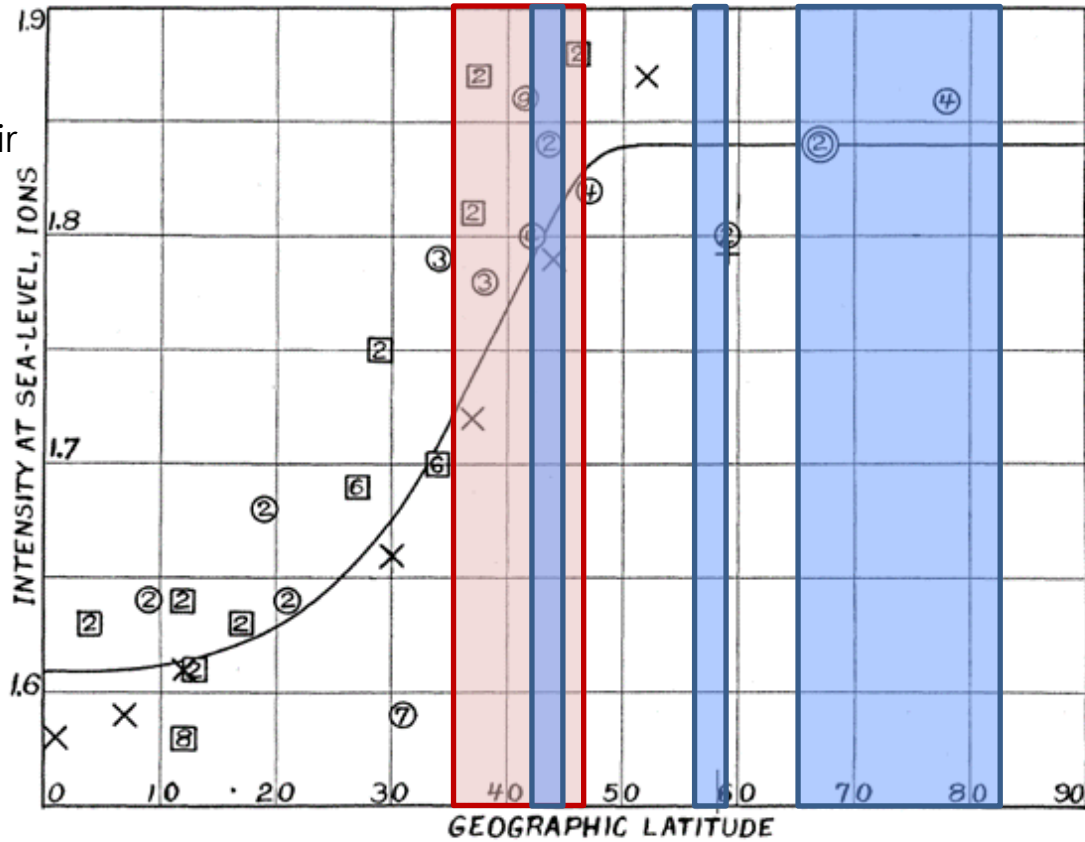


FIG. 8. Intensity vs. geographic latitude.



PolarQuEEEst latitude coverage



EEE latitude coverage (36°N – 46°N)