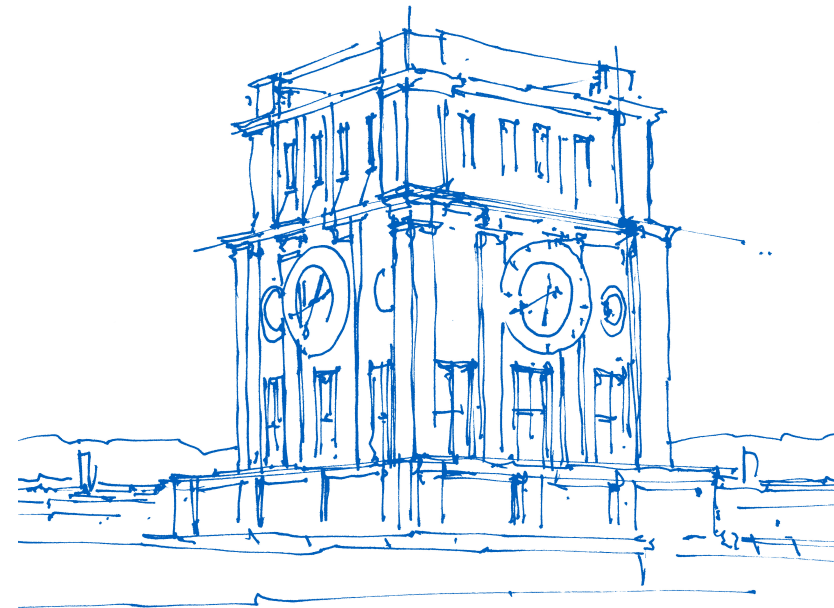


# DAQ and FEs for 2018 Drell-Yan Run and Beyond

Igor Konorov

Technical Board Meeting

CERN, September 4-th



*Uhrenturm der TUM*

# Features of Drell-Yan Data Taking

## Trigger rate

- 130k Triggers/spill => 30kHz , 12% DAQ dead time due MWPC
  - for comparison 2017 run 85k Triggers/spill => 20kHz , 8% DAQ dead time due to MWPC
- Significantly worse radiation condition around target region
- Many detectors had unstable read out

## Detector setup in 2015 :

2,3, 16,19-22, 65-68, 70-79	- Trigger Master, Scalers	480-482	- MW1
128-129, 144-149, 242-246	- SciFi, BMS	501-509	- RICH-MAPMT ?
250	- CEDAR	606, 608, 609	- HCAL1 ?
256-260	- DC0-4	736-740, 750	- GEM, PGEM
271-274	- W45	800-801	- GANDALF Master time ADC, TDC
320-324, 330-332	- Straws	810-811	- GANDALF CEDAR ADC
380-382	- PMM	850-857	- GANDALF VERTEX
416, 417	- MW2	860-861	- GANDALF Beam Monitor
432	- RW	881	- GANDALF SciFi
448-455, 460	- MWPC	884-889	- GANDALF DC5

# RADIATION CONDITIONS in 2015

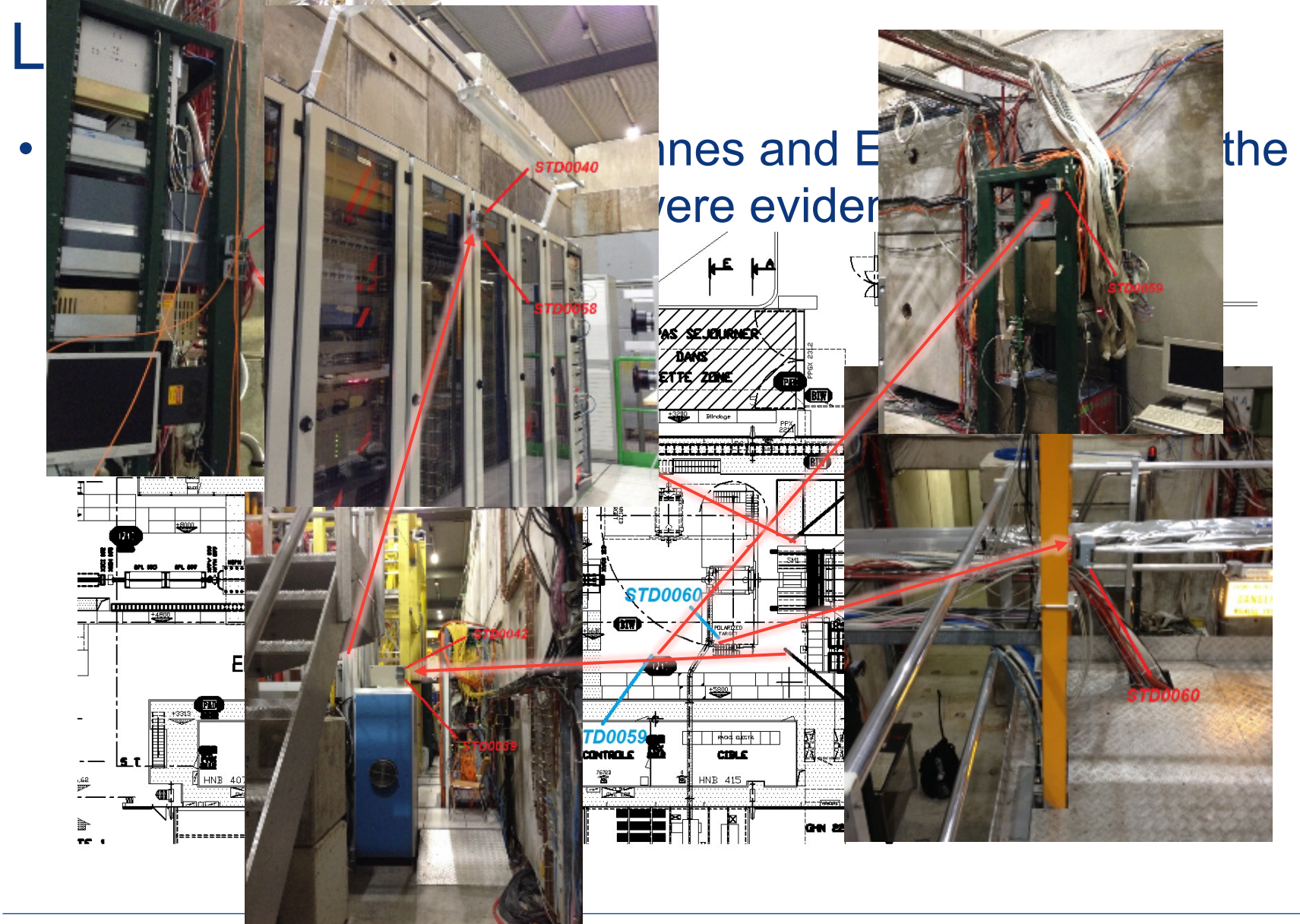
# What has been installed at COMPASS

- The lack of structured cabling (WorldFIP network) imposes to use a standalone version of the RadMon
- The **BatMon** is a battery powered RadMon.
- The BatMon has to be read MANUALLY, thus requiring an access.
- The BatMon is capable of reading the three axes of the radiation effects (SEE, TID and DD)
- We have measured only the HEH fluence because the SRAM memories are the most sensitive sensors



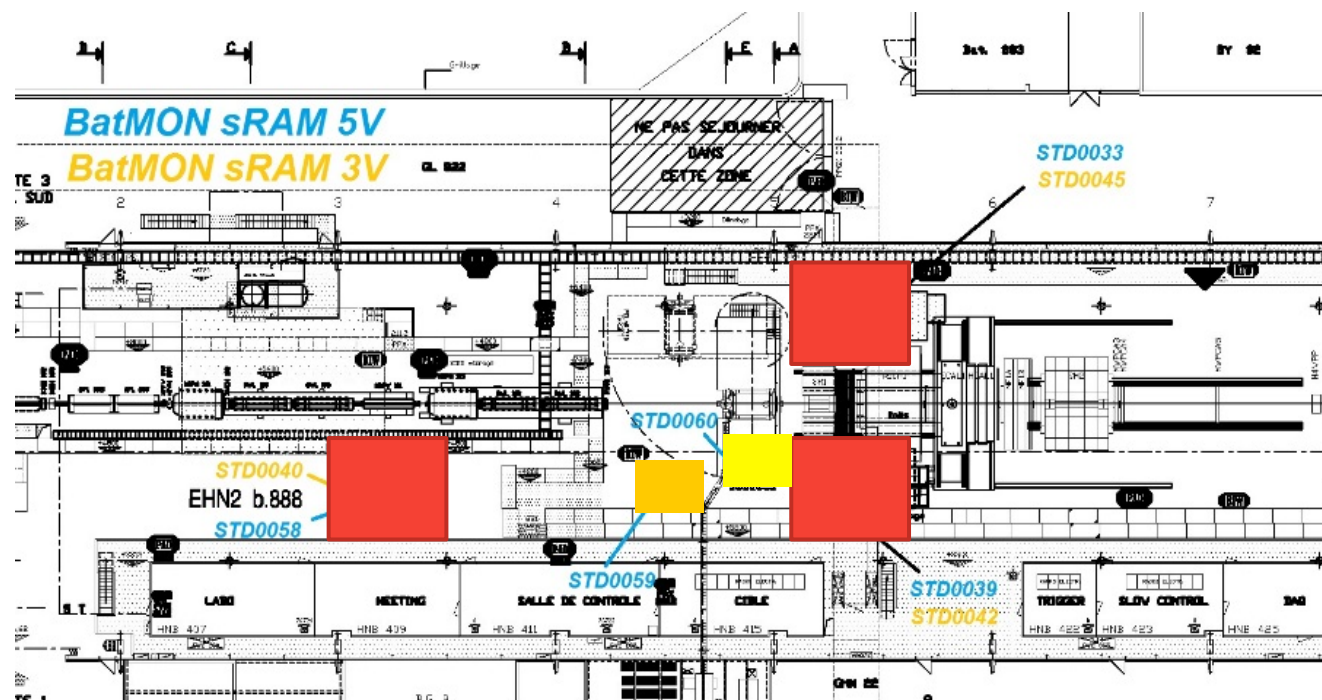
# Radiation Level measured at COMPAS:

- Photos and Engineering drawings of COMPAS show the presence of radiation levels. The photos show the physical equipment and the drawings show the layout of the COMPAS system. The photos and drawings are annotated with red arrows pointing to specific locations where radiation levels were measured. The photos show the physical equipment and the drawings show the layout of the COMPAS system. The photos and drawings are annotated with red arrows pointing to specific locations where radiation levels were measured.



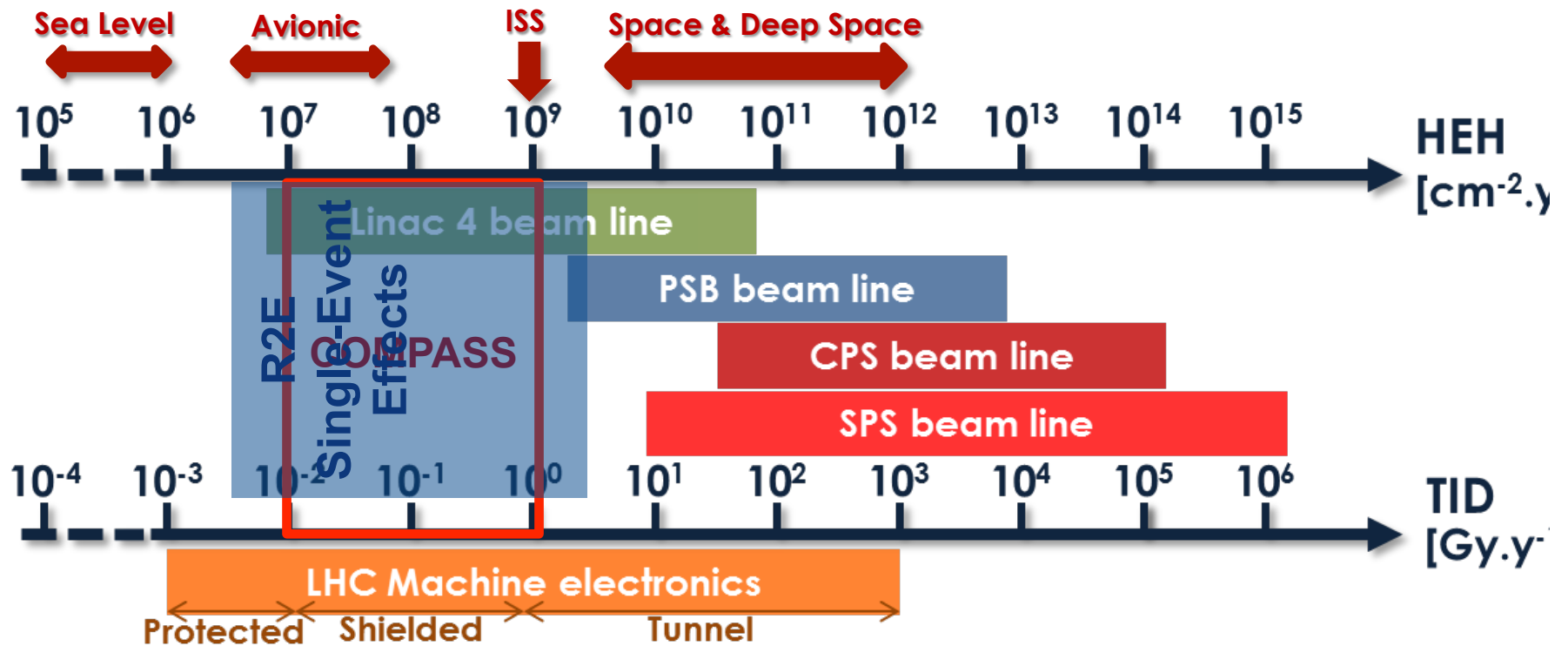
# Radiation Level measurements: Thermal Neutrons

- Shielding is effective but the thermal neutron contribution is very high
- In red the zones where the R factor is higher



# Projection

	Behind the wall on the left		PLC Saleve side		Shadow of the target		Facing the target	On the first floor facing the target
	STD045	STD033	STD040	STD058	STD042	STD39	STD59	STD60
	Thermal Neutron/cm	HEH/cm2	Thermal Neutron/cm	HEH/cm2	Thermal Neutron/cm	HEH/cm2	Thermal Neutron/cm	HEH/cm2
Total particles/cm2 /6week	1.10E+08	2.85E+07	1.67E+07	1.84E+06	2.59E+08	4.92E+07	9.54E+07	2.29E+08
Total particles/cm2/pot	2.41E-06	6.24E-07	3.65E-07	4.03E-08	5.69E-06	1.08E-06	2.09E-06	5.02E-06
Estimation of the 2015 Considering 40 weeks of operation	<b>7.33E+08</b>	<b>2.07E+08</b>	<b>6.03E+07</b>	<b>2.96E+07</b>	<b>7.98E+08</b>	<b>3.91E+08</b>	<b>6.93E+08</b>	<b>1.69E+09</b>



# Measures to Improve RO Stability for 2018

Ask EN department to install radiation monitors around the target region

Radiation related changes

- Move Ethernet switch from SM1 area to another position
- Investigate whether VME crate can be reallocated from target region

Data rate related changes:

- Remove all Slink MX modules and install DAQ MUX modules
- May require installation of additional fiber patch panels

IFTDC test with MWPC

- Plan to test IFTDC card during this year run
- If test results positive one may consider to replace part of F1 MWPC cards by IFTDC



# FEE and DAQ Architecture for 2020

## Features :

- Micro pattern detectors (GEM, MM and Silicon) read out based on APV25
- Bernhard is in a process of getting last 400 chips for COMPASS

## FEE-DAQ performance :

- 100kHz trigger rate
- 3.5 us trigger latency

## FEE design concept except micro pattern detectors

- FPGA based TDC with time resolution down to 50 ps
- Sampling ADC with feature extraction
- FEEs provides two data streams : **trigger less for trigger processor** and **triggered for DAQ**
- Any detector can be included in trigger logic

## Trigger Processor

- FPGA module(s) data processor with programmable coincidence, veto and OR logic
- The same module can be used to process Calorimeter information

# DAQ/FE/Trigger for COMPASS Beyond 2020 Workshop

Place : Prague

Date : November 9-10

Goal : start coherent development of FEEs, Trigger and DAQ

Organizational Video meeting on September 11-14

THANK YOU