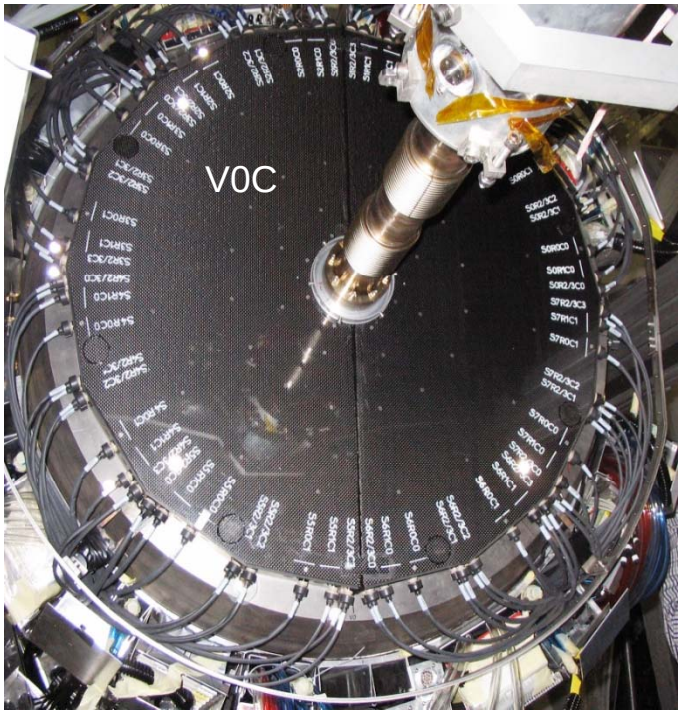
V0 DA Report

1. V0 Calibration DA and SHUTTLE Preprocessor

2. Run Types



1. Calibration DA

The calibration DA has been defined and committed to Aliroot

/*

- Contact: Brigitte Cheynis b.cheynis@ipnl.in2p3.fr
- Link: /afs/cern.ch/user/c/cheynis/public/run546.dat
- Run Type: PHYSICS
- DA Type: LDC
- Number of events needed: >=100
- Input Files: argument list
- Output Files: local files V00Log.txt, VZERO_Histos.root, V0_Ped_Width_Gain.dat
  FXS file V0_Ped_Width_Gain.dat
- Trigger types used: PHYSICS_EVENT

*/

The calibration DA VZEROda.cxx

- reads data of **PHYSICS runs** from DAQ LDC
- selects calibration-dedicated information within that PHYSICS run
- creates ADC histograms for each channel and both sets of integrators (i.e. 64x2 channels)
- provides pedestal, gain, and sigma values to the FXS in the form of a txt file named **V0_Ped_Width_gain.dat**

... and SHUTTLE Preprocessor

The SHUTTLE Preprocessor retrieves

- High Voltages mean values from DCS
- ADC pedestal, gain, and sigma values from DAQ through the FXS

and stores them into CDB

DA and SHUTTLE Preprocessor have been installed and tested on

raw files during the cosmics run of february'08, but not configured for production yet.

2. Special runs (to be implemented)

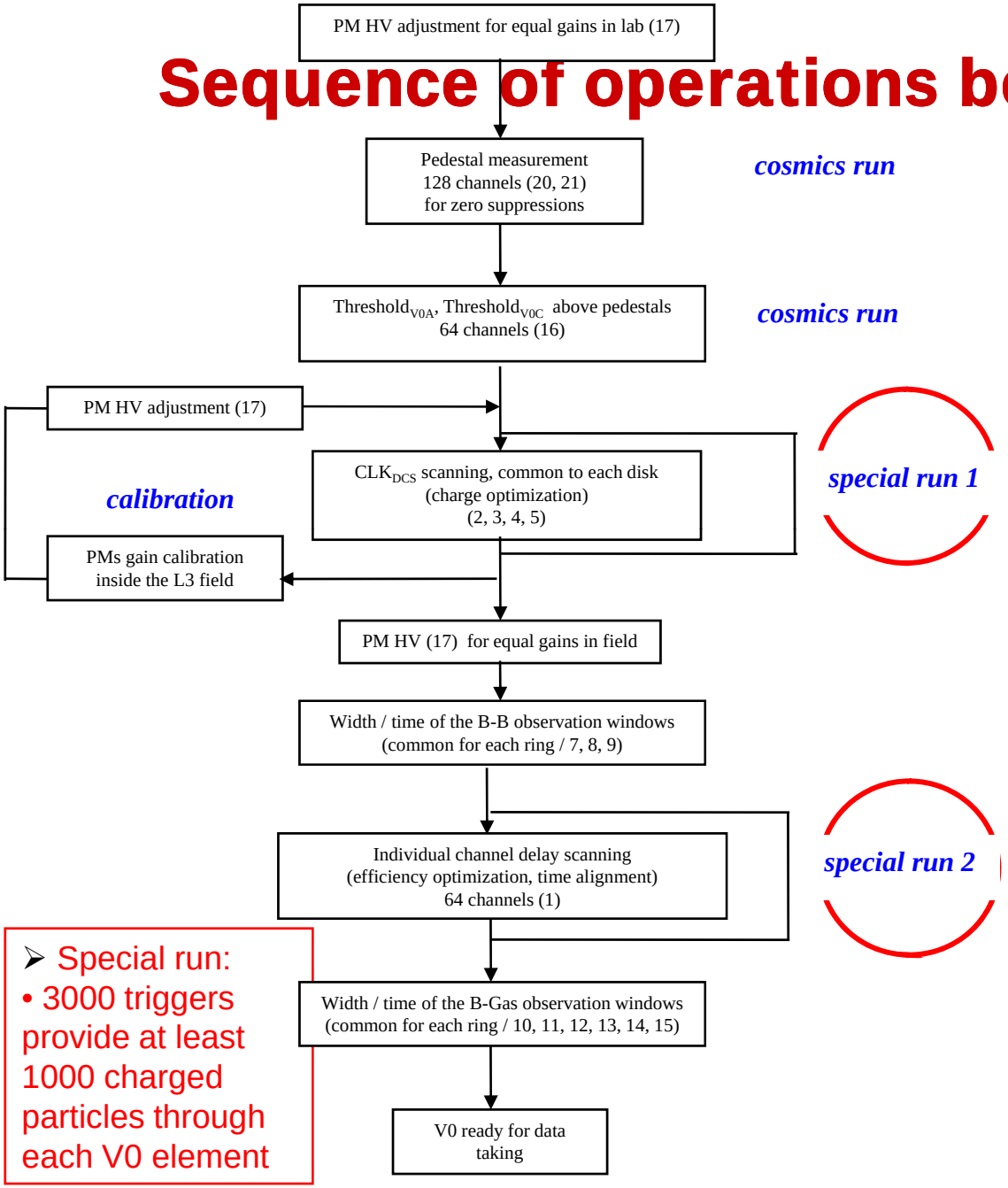
After measuring pedestals and adjusting thresholds using cosmics events, we foresee two **special runs** for **TUNING the FEE parameters** before data taking :

Run 1 - for setting charge integration gates (common to each disk) and intercalibration of the 64 channels in situ

Run 2 - for setting individual discriminator signals within time windows (common to each ring i.e. each CIU)

*Special runs will need to be done whenever the **magnetic field** will be changed.*

Sequence of operations before data taking



➢ Special run:
• 3000 triggers provide at least 1000 charged particles through each V0 element

➢ Trigger ACORDE

➢ Set-up from pedestal values

➢ **Integration gates:** trigger BB (25 ns windows)
• $(\sum_n Q_n)/n = f(T_{gate})$ (n number of triggers) as a function of the time position of gates (25 ns width) for events with $\Delta t_{A\text{-}C} = 0$ ns
• final T values given for $(\sum_n Q_n)/n = Max$
• 3-4 HV values between 2200 and 1600 V for the calibration of channels in situ

➢ **Time windows:** trigger CTA1 (low threshold)
• $(\sum_n f_{BB}=1)/n = f(delay)$ (n number of triggers) as a function of the delay value of discriminator signals for events with $\Delta t_{A\text{-}C} = 0$ ns
• 64 final delay values for $(\sum_n f_{BB}=1)/n = Max$

➢ Set-up according to BB windows
• trigger BG

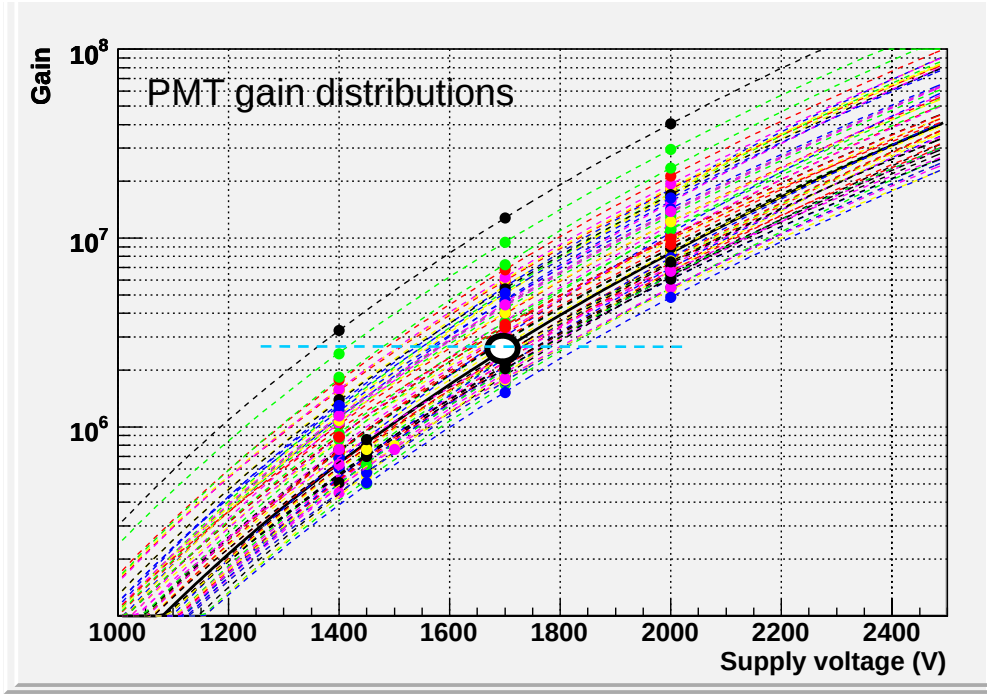
DAQ DA - status overview (mar 08)

x: no recent activity

	ACORDE	CPV	EMCal	FMD	HMPID	MUON_TRG	MUON_TRK	PHOS	PMD	SDD	SPD	SSD	T0	TOF	TPC	TRD	V0	ZDC
Code existing (number of DAs)	0	0	0	2	1	1	1	1	1	3	2	1	2	3	3	2	1	2
DAs in Aliroot																		
Validation requested																		
Test file available																		
RPM documentation available																		
Corresponding ECS run types defined																		
Packaging and interface validated																		
DA installed at Point 2				X												X		X
DA tested manually ok on real data																		
DA in production							1			3	2	1	2	3	2			

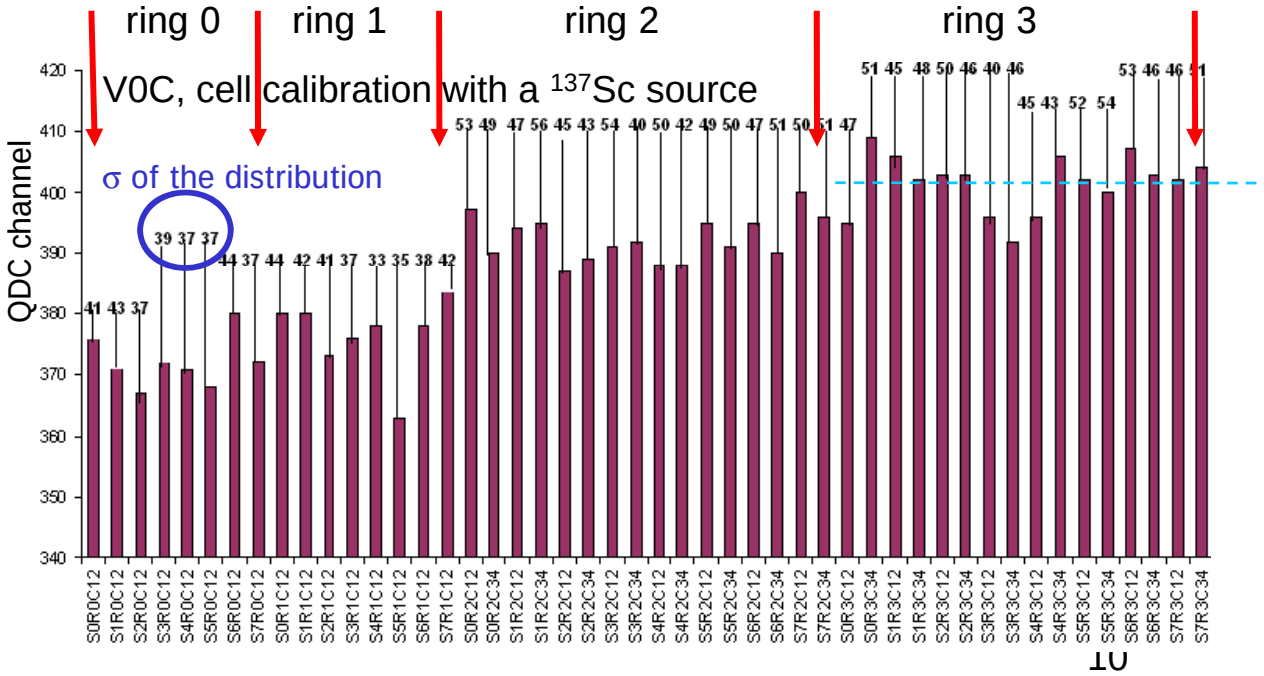
Backup slides

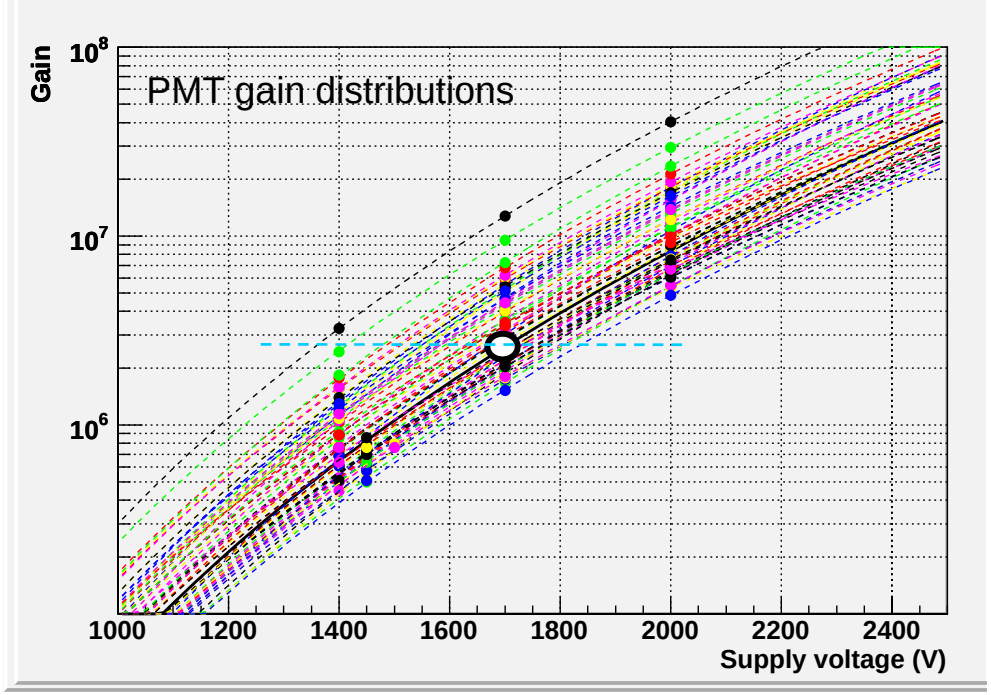
	Name	function	Number
1	Channel_delay	Individual delay used for the timing alignment of the hit with the observation windows (programmable by step of 20ps)	64
2	Source_clock	Parameter allowing to choose the reference clock from several possibilities (a quartz on DCS or on CCIU board, clock40, clock40Des1 or clock40Des2 from the TTCrx).	1
3	CLK_{DCS}_delay	Delay of the CLK_{DCS} clock used as reference clock by the HPTDC, but also for the generation of the observation windows (TTCrx parameter programmable by step of 104ps).	1
4	CLK_{V0C}_delay	Delay of the CLK_{V0C} clock used as timing reference for the charge integration on V0C side (programmable by step of 20ps).	1
5	CLK_{V0A}_delay	Delay of the CLK_{V0A} clock used as timing reference for the charge integration on V0A side (programmable by step of 20ps).	1
6	$CLK_{trigger}$_delay	Delay of the clock used for the synchronization of the trigger signals (programmable by step of 20ps).	1
7	BB_window_profile	Main profile of the BB window (built with 5 segments of 5ns)	1
8	Start_V0BB	Delay applied on the main profile window (BB) to define the start time of the BB window (one parameter per ring / CIU board).	8
9	Stop_V0BB	Delay applied on the main profile window (BB) to define the stop time of the BB window (one parameter per ring / CIU board).	8
10	BGA_window_profile	Main profile of the BGA window (built with 5 segments of 5ns)	1
11	Start_V0ABG	Delay applied on the main profile window (BGA) to define the start time of the BGA window (one parameter per ring for the CIU board on the V0A side).	4
12	Stop_V0ABG	Delay applied on the main profile window (BGA) to define the stop time of the BGA window (one parameter per ring for the CIU board on the V0A side).	4
13	BGC_window_profile	Main profile of the BGC window (built with 5 segments of 5ns)	1
14	Start_V0CBG	Delay applied on the main profile window (BGC) to define the start time of the BGC window (one parameter per ring for the CIU board on the V0C side).	4
15	Stop_V0CBG	Delay applied on the main profile window (BGC) to define the stop time of the BGC window (one parameter per ring for the CIU board on the V0C side).	4
16	Discri_threshold	Threshold of the discriminator (1 threshold per channel)	64
17	High_voltage	High voltage applied to the photomultipliers (1 parameter per channel)	64
18	Reset_mask	Definition of the integrator reset (this 10 bits parameter represents one reset cycle period (50ns) cut in 10 segments of 5ns)	1
19	Charge_int_Clk_mask	Definition of the charge integration clock (this 10 bits parameter represents one clock cycle period (50ns) cut in 10 segments of 5ns)	1
20	Sigma_pedestal	These parameters defines the sigma of the pedestal gaussian distribution on each channel	64
21	Average_pedestal	These parameters defines the pedestal average value on each channel.	64
22	Nb_sigma_for_0	This parameter defines the number of sigma below the average pedestal value where the integration charge is considered as 0	1
23	Enable_sigma_sup	This parameter enable/disable the pedestal suppression on the output data (collected through the DDL)	1
24	Multi_Threshold	This parameters defines the multiplicity trigger threshold. There is 2 thresholds for V0A (corresponding respectively to the multiplicity triggers 1 & 2) and 2 for V0C (corresponding respectively to the multiplicity triggers 1 & 2).	4
25	BG_threshold	This parameters defines the beam-gas threshold for V0A and V0C. There is 2 thresholds for V0A (corresponding to a beam-gas coming from RB24 and RB26 side) and 2 for V0C (corresponding to a beam-gas coming from RB24 and RB26 side).	4
26	MB_threshold	This parameters defines the minimum bias trigger threshold. There is one threshold for and one for V0C.	2
27	pp_multi_threshold	This parameters defines the proton-proton multiplicity trigger threshold. There is 2 thresholds for V0A (corresponding to the upper and lower threshold of the zone where the proton-proton multiplicity trigger is generated) and 2 for V0C (corresponding to the upper and lower threshold of the zone where the proton-proton multiplicity trigger is generated).	4
28	Trigger_select	This parameter allows to choose 5 triggers among 6	1
29	Enable_channel	This parameter enable/disable the taking into account of each channel for the trigger generation.	1
30	HPTDC_conf	Definition of the general configuration of the HPTDC.	1
31	H_size_measurement	Defines the histogram data size sent with the interaction data to the DAQ	1
32	H_size_calibration	Defines the histogram calibration data size sent with the interaction data to the DAQ (these data corresponds to a minimum bias (1 multiplicity) and pedestal value of each channel)	1
33	mode	- operational (normal mode) - special trigger generation for the CTP synchronization (available for the 5 triggers output) - test of the QDC - test of the TDC	1
34	Active QDC channel	a parameter to enable/disable each channel to participate to the trigger generation using the QDC information	64
35	Active TDC channel	a parameter to enable/disable each channel to participate to the trigger generation using the timing information (through the observation window) and to enable/disable the timing measurement.	64
35	spares		20



HV setting (V0C)

- ➢ Measure of cosmic MIP crossing a cell of ring 3 at 12 pC (60 mV) at the input of FEE
  - • final configuration (optical fibres, signal cables)
  - • reference PMT at 1700 V / gain 2.5 10^6
- ➢ All other PMTs at the same gain through HT value
- ➢ Then adjustment to take into account attenuations due to:
  - • magnetic field (a few tens %)
  - • counter geometry / shifting fibre (up to 10%)
- ➢ Uncertainties not corrected:
  - • optical fiber transmission effect (±5%)
  - • preamplifier gain effects (a few %)





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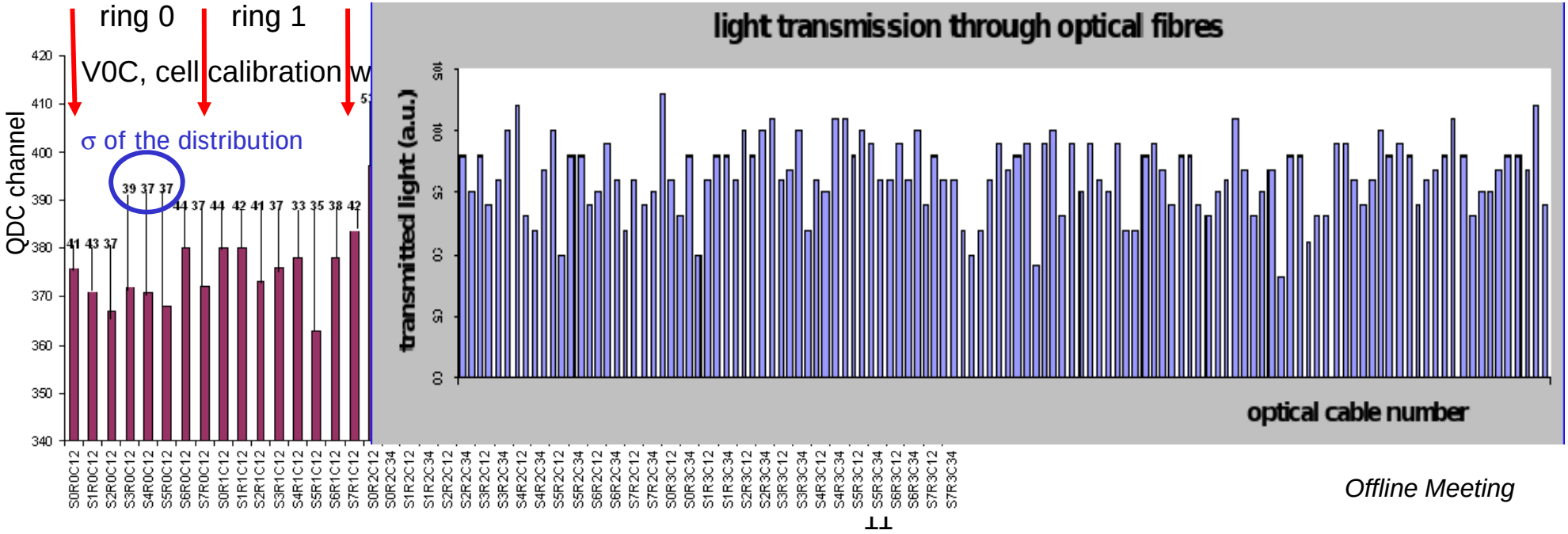
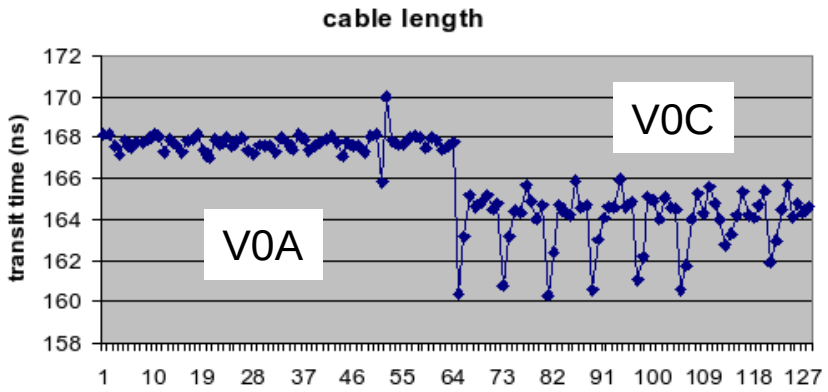
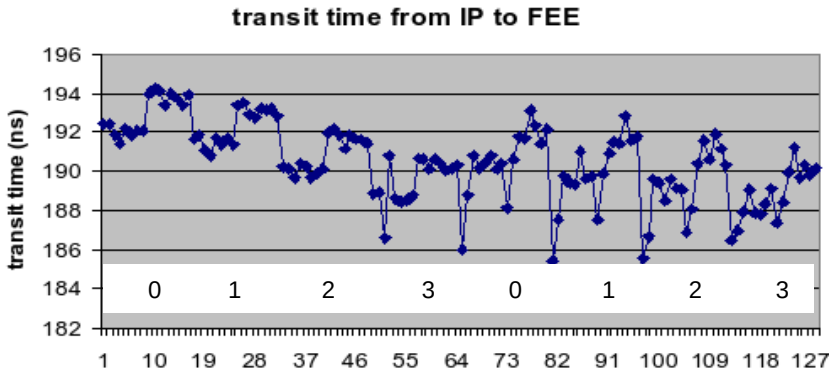


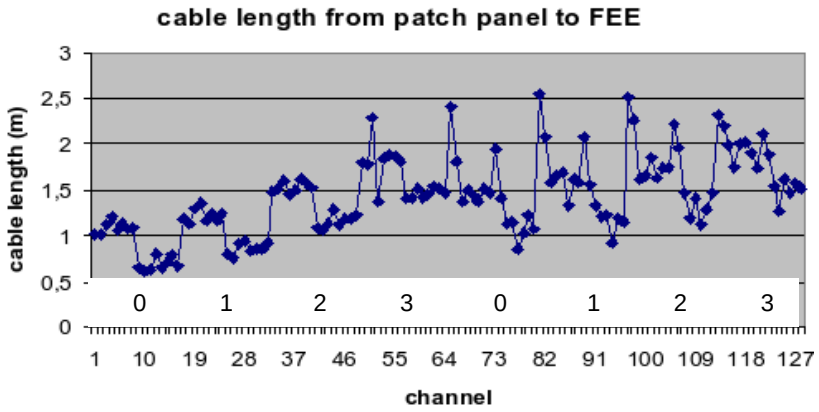
V0A/V0C time setting



➢ Effect due to cable characteristics
- 39 meters to V0A (4.3 ns/m)
- 36 meters to V0C (4.6 ns/m)



➢ Effect due to different transit times
- through shifting fibres (ring dependent)
- preamplifier (channel dependent)
- position of CIU within the VME crate
- (with equal transit time through PMTs)



➢ Compensation with the length of cables at the input of FEE