Specific OEP calibration runs

Can complement <u>normal calibration runs (10 KHz)</u>

$\rightarrow$ **more accurate determination of the same quantities, but nothing really specific compared to ROM calibration (for electronics, at least)**

<u>Compared to physics events:</u>

- **genuine ΔT_0 determination**
- **genuine channel efficiency drifts determination**
- **easier noise level measurement**

- **Electronics tests possible** (but not recommended)
  - **crosstalk measurement**
  - **pattern test**
  - **ADC/TDC linearity**
  - **TDC calibration**

- **test of the calibration system itself (difficult in ROM)**

Monitoring using physics events

Data available

ADC	**~ 1 per 64 channels**
TDC	**1 per gamma**

A) Calibration related quantities

Data	Monitored quantity	
	DIRC standalone	DIRC+subdetectors (OEP)
ADC spectrum	gain *(per analog chip)* shape (sigma...) Channel readout frequency	
TDC	$N\gamma$ / trigger 'raw' channel occupancy in time noise out time noise Cross talk (?: need statistics)	channel efficiency drifts ΔT_0 ? coherence DIRC/subdetectors

B) Internal coherence tests

Data	Test
ADC,TDC	data integrity (word counts, etc..) DIRC trigger time coherence TDC read when ADC read Hardware addresses coherence
ADC+TDC+HV	correlation gain/HV *(per 16 PMTs)*

DIRC electronics Monitoring

What can we check in the DIRC electronic chain using 'physics' events and specific OEP calib runs ?

Physics: A few figures....

Background source	**Track-equivalent/ev**
Event (primary tracks)	5.7
Event (secondary tracks)	≈ 4.7
Beam gas (10x)	0.6
Bhabha	0.11
PMT noise	0.02

(1 track=30 photons, 50 ns readout time)

Rates

L1 (ROM)	2 Khz
L3 (OEP)	100 Hz

→ **One can expect around 10 trk-eq/ev photons distributed more or less uniformly on the PMT array: ≈ 0.03 γ /ev/pmt**

This means one needs of the order of 10^4 - 10^5 ev to get a correct statistics in each PMT.

→ **certainly within reach of L1 (ROM) events and probably also of L3 (OEP)**