

24th ALICE RRB

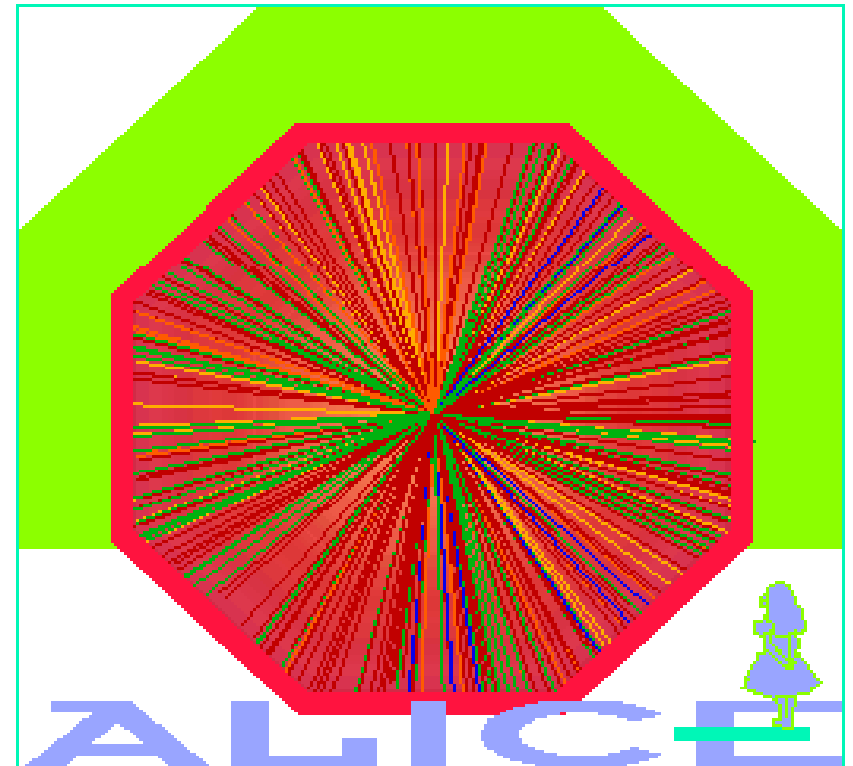
- **Collaboration News**

- **Project Status**

- ⇒ **Production (TOF, TRD, PHOS, PMD)**

- ⇒ **Installation**

- ⇒ **Commissioning**





Collaboration News



● New Institutes

- ⇒ **Purdue (USA)**
- ⇒ **Tennessee (USA);**
- ⇒ **Yonsei (Korea)**
- ⇒ **Pusan (Korea):** replaces Pohang which left end 2007

- ⇒ **Istanbul (Yildiz Technical University, Turkey)**
 - ★ **associate member** while looking for increased funding

EMCAL
EMCAL
TRD, Physics
Physics

Physics

● Institutes leaving

- ⇒ **IPE Karlsruhe (Germany) leaving ALICE**
 - ★ **associate member, completed its technical contribution** to the TRD electronics

● Ongoing discussions

- ⇒ **Houston (USA, awaiting DOE approval)**
- ⇒ **Comsats, Pinstec (Pakistan)**

EMCAL, Grid computing
Physics, computing

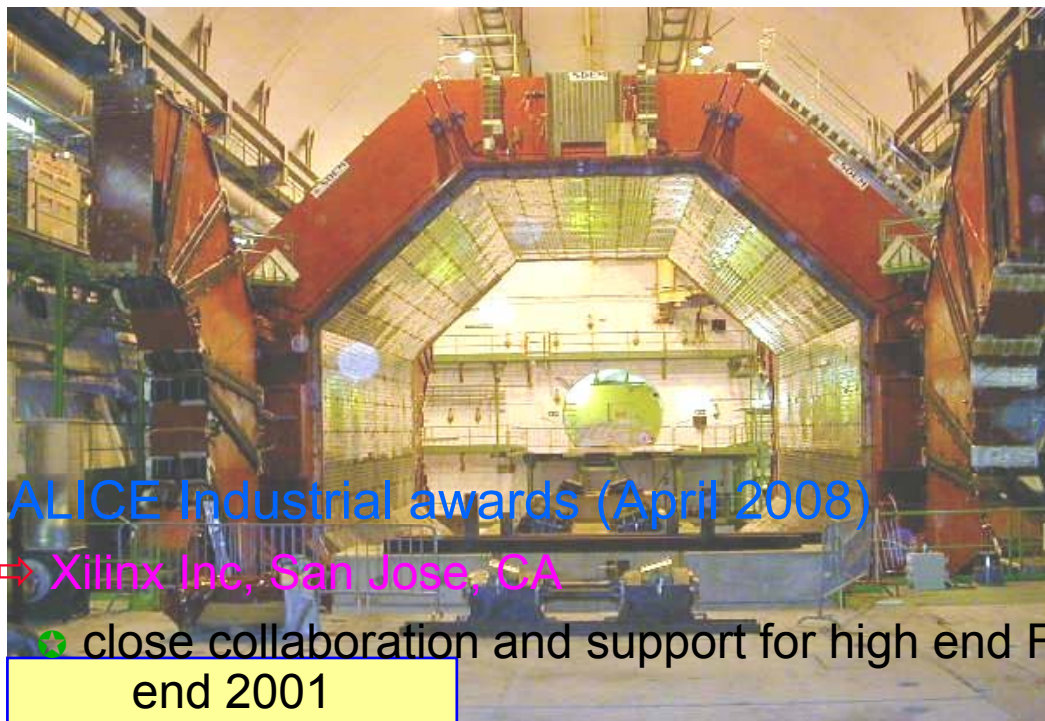


Collaboration News



● Elections/Nominations

- ⇒ **Management Board: 4 members** re-elected 1.6.2008 for 3 years
 - ★ E. Nappi (Bari), R. Kamermans (NIKHEF/Utrecht),
 - ★ Y. Schutz (Nantes), J.P. Revol (CERN)
- ⇒ **Editorial Board chair:**
 - ★ H. A. Gustafsson (Lund) re-elected 1.4.2008 for 3 years
- ⇒ Since 5 April: **Technical Coordinator: L. Leistam; Deputy TC: W. Riegler**
- ★ **Special thanks to C. Fabjan, who lead ALICE as TC from 2001 to 2008**



● ALICE Industrial awards (April 2008)

⇒ Xilinx Inc, San Jose, CA

★ close collaboration and support for high end FPGAs used in HL-T and TRD

end 2001

early 2008



Funding: EMCAL



- DOE CD2/3 review of EMCAL 18/19 December

⇒ outcome: **EMCAL is now approved and funded** in the US !

- ☆ help and participation from France/Italy/CERN recognized and appreciated by DOE

⇒ **Total Project Cost: 13.5 M US\$**

- ☆ not including R&D money, emcal support, CF contribution (~ 500 k CHF), computing

⇒ **Schedule:**

- ☆ **production started** in April

- ☆ trying to accelerate by 1 year (cash flow)

ALICE Installation Window	No. of Super Modules Available US+EU
Winter 2009	1+1
Winter 2010	2+2
Winter 2011	3
Winter 2012	1 2/3

⇒ **Computing Resources:** proportional to PhDs (~ 7% for 40 PhD's in 2012)

- ☆ computing plan submitted to DOE, under discussion



Funding: UK



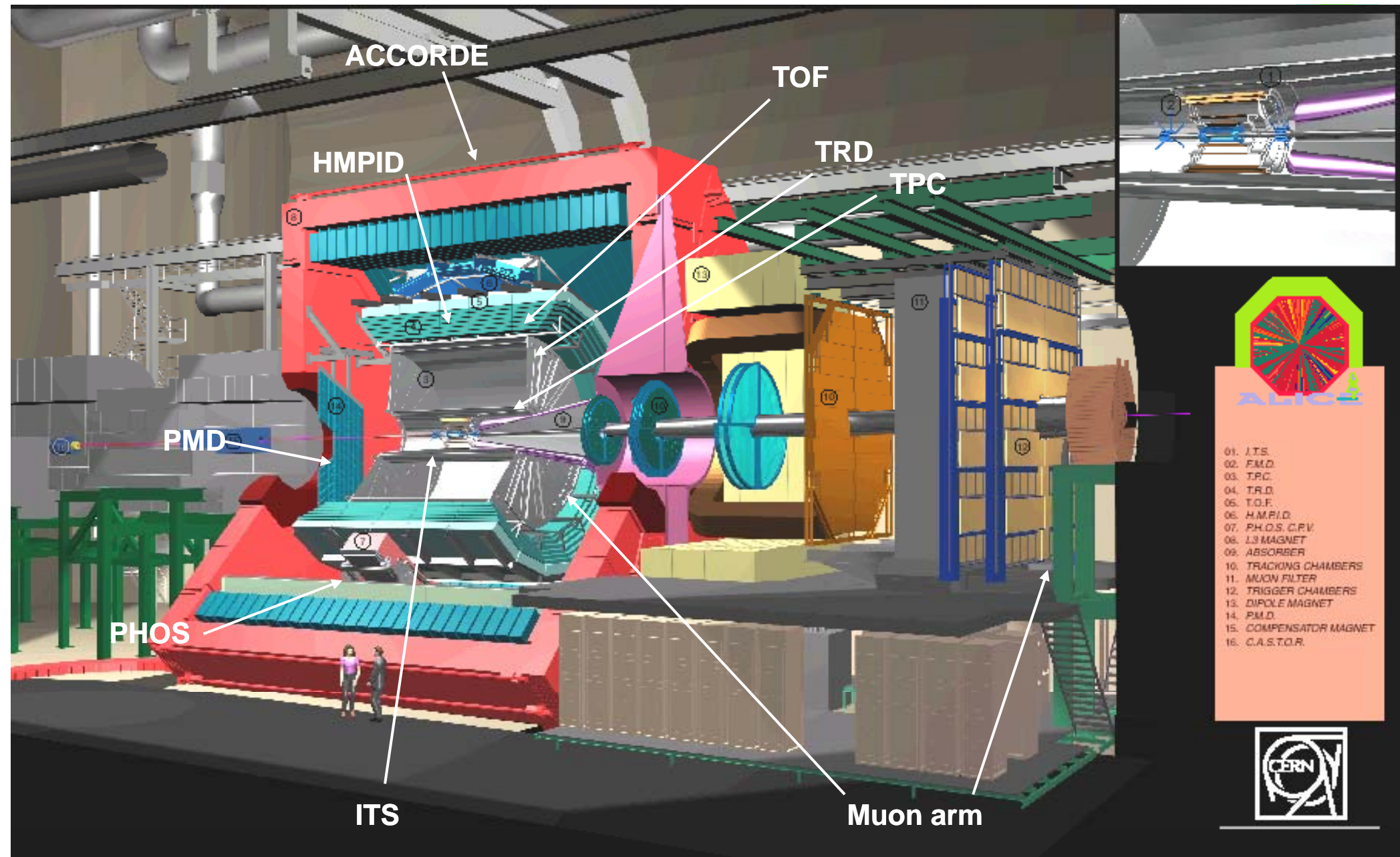
● Biennial STFC Programmatic Review March 2008

- ⇒ had to deal with a very significant **funding shortfall** (80 M £ /3 y)
 - ☆ => classification & 're-prioritisation' of all scientific activities & grants in 4 categories
- ⇒ **ALICE/STAR lower priority** => **Funding at risk**
 - ☆ consultation period ended 21 March, under consideration. Final outcome 1 July.
 - ☆ reactions submitted by several sources/individuals (ALICE, NuPECC, ...)

● Impact on ALICE:

- ⇒ 1 UK group (Birmingham, 10th biggest group in ALICE since merger with STAR!)
 - ☆ **physics**: significant role in analysis (particle production, strangeness, cross sections,...)
 - ☆ **hardware**: **sole responsible** for **production/commissioning/expert operation** of **trigger**
- ⇒ trigger: hardware (electronics) + 'firmware' (specialized low level code) + software (UI)
 - ☆ hardware: production & installation of components is **complete**
 - ☆ firmware: **commissioning just started**, complete only some time after Pb run (end 2009)
 - ☆ expert operation & intervention: required throughout the lifetime of ALICE

A well commissioned and working **trigger is vital for any operation** of ALICE
Disengagement or **disintegration** of the trigger group would be a **disaster** !



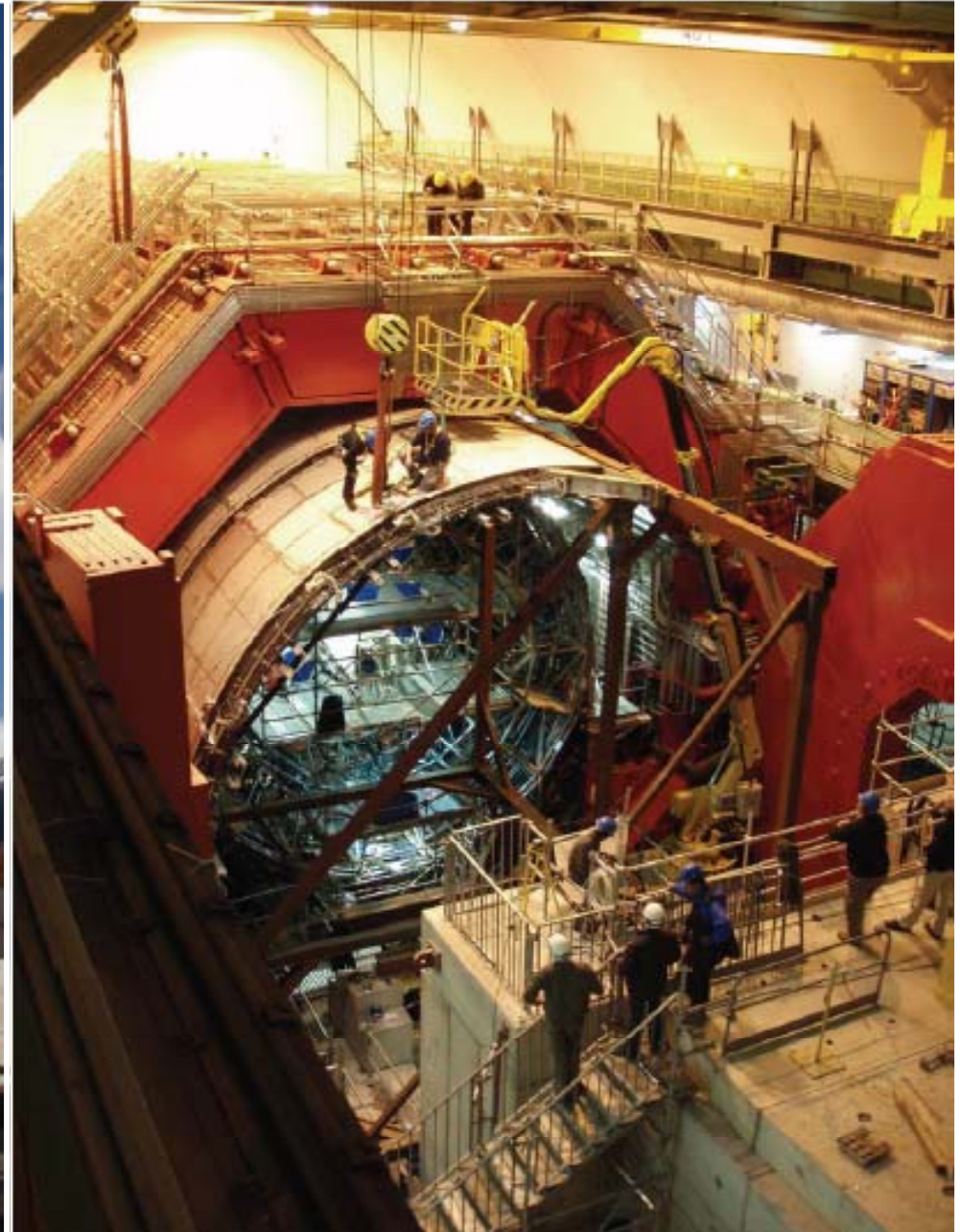
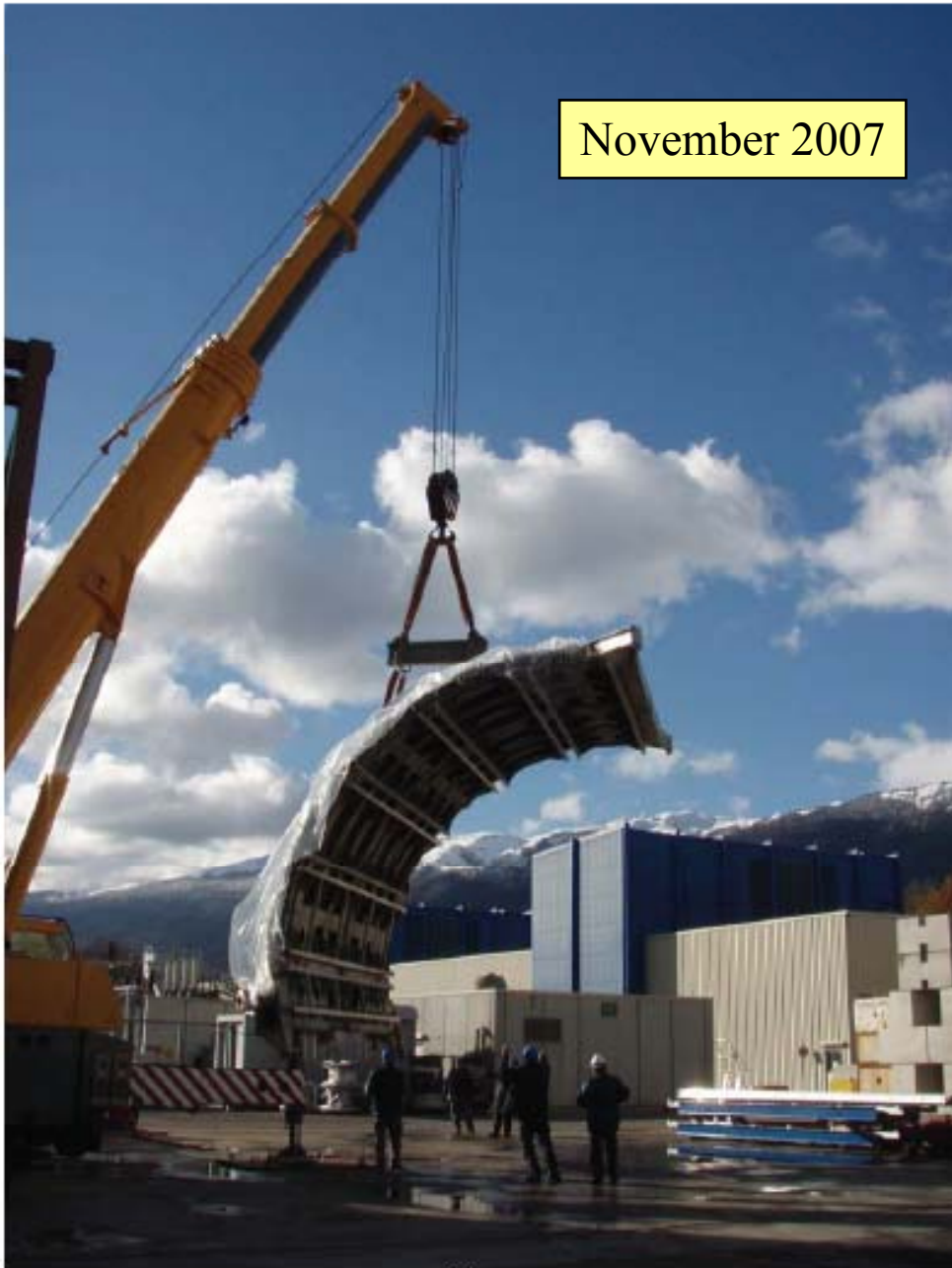
ALICE Detector



EMCAL support



November 2007



'Mini frame'

29 Nov 2007: Descent of the last big structure





TRD (fully funded since 2006)



- **Chambers:** 430 chambers done (~80% completed; expect to be done by Oct. 08)

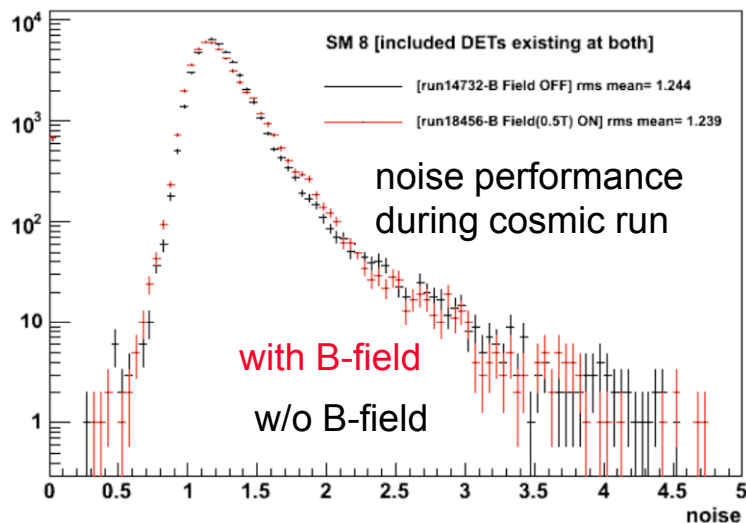
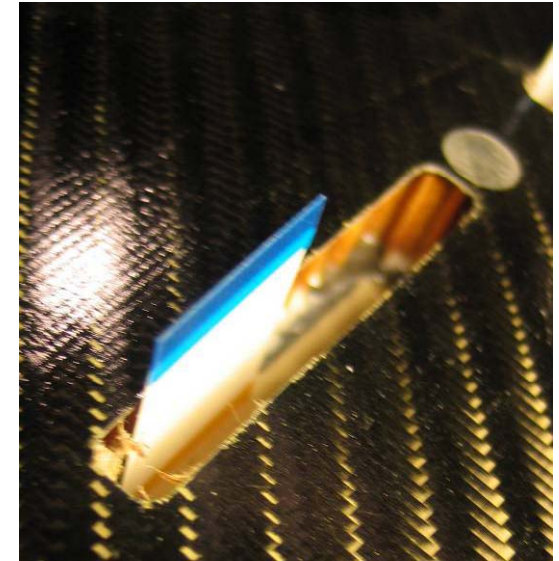
GSI, U. Hd, U. Frankfurt, JINR, Bucharest

- **Electronics:**

- ⇒ R/O board & MCM production transferred to industry
2nd half of production being optimized for yield
- ⇒ TRD pre-trigger: partially installed - under test
- ⇒ GTU fully implemented and debugged

- **Assembly**

- ⇒ 2 super modules installed, 2 more done; end of assembly **March 09**
- ★ 1 SM fully tested at CERN in PS beam
- ★ noise performance identical to lab test



- **Excessive gas leakage discovered during SM test**
- ⇒ TRD chambers have been tested for **diffusive O₂ leaks** and are **within specs**
- ⇒ however, large **viscous leaks** found during supermodule beam test in PS
- ★ leaks localized and all chambers will be repaired (Xenon is expensive !)
- ⇒ **consequence:** only 2 (repaired) SM's will be installed



TOF



- Production

- ⇒ module production : 100 %
- ⇒ Electronic r/o cards: 94-100 %

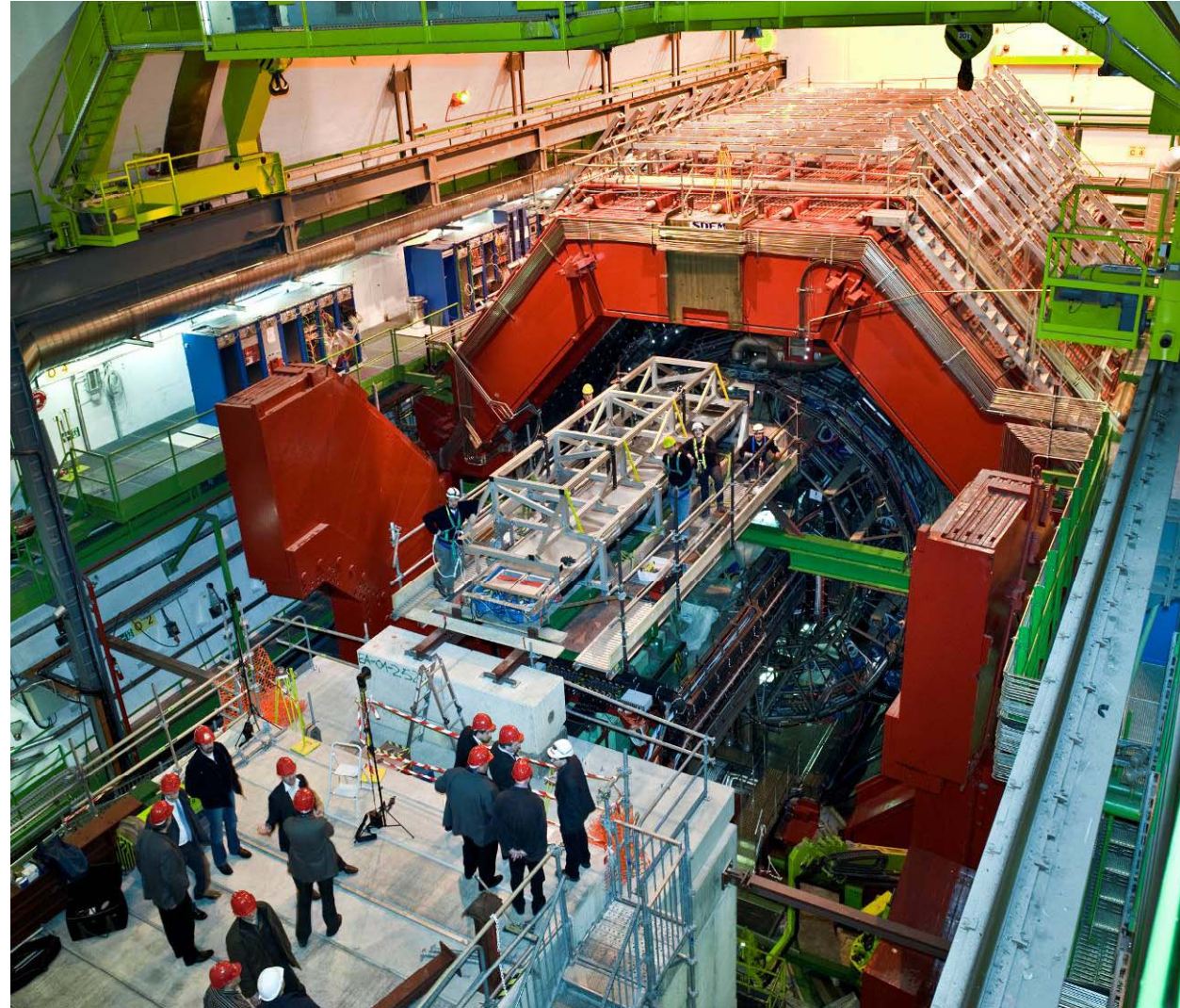
- Assembly & Installation

- ⇒ Supermodule assembly: 17/18

- ⇒ 15 SMs installed

- Schedule

- ⇒ production complete: **April**
- ⇒ **installation complete:**
April/May



Installation of SM15 in the upper Sector (March 31,2008)



Photon Spectrometer (PHOS)

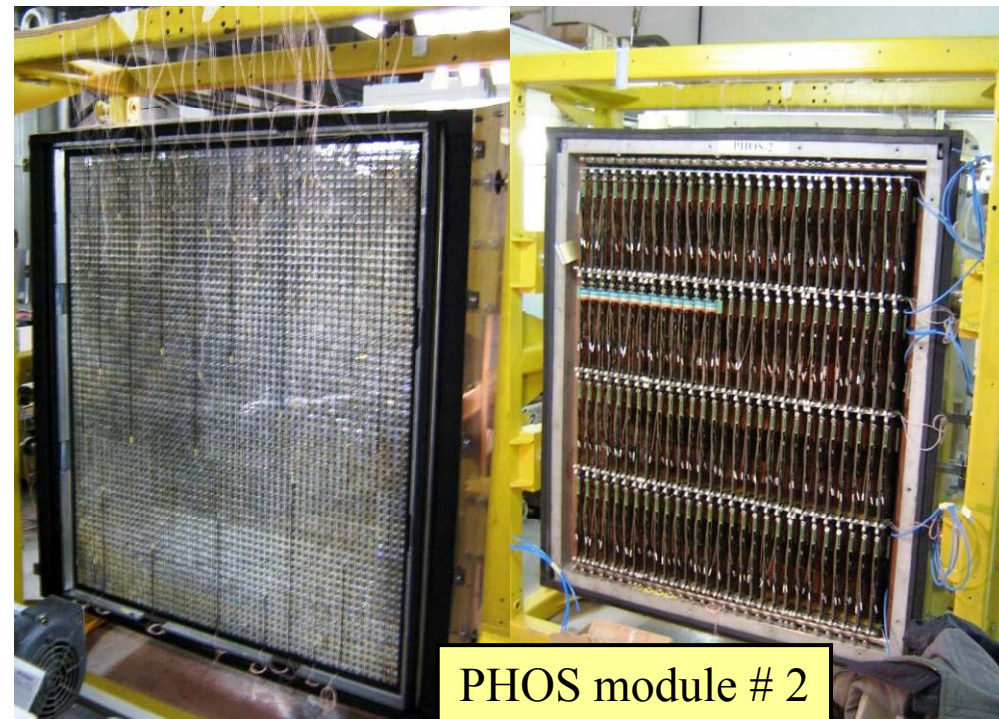


● Detector status:

- ⇒ **Module 1**: ready since mid 2006, tested & calibrated with cosmics and test beam
 - ★ assembly & operation experience => improved mechanical/electrical design
- ⇒ **Modules 2,3**: all elements (crystal, mechanics, electronics) produced, most at CERN
- ⇒ **Cooling plant**: produced and commissioned, installed in April
- ⇒ **Condensation observed during warm-up after 2 month cold operation of Mod #1 end 2007**
 - ★ flushing with dry nitrogen insufficient => design new airtight enclosure & feedthroughs
 - ★ first casing ready only end of April => too late for 2008 installation

● Revised installation schedule

- ⇒ 1 module installed in April
 - ★ system commissioning & pp physics
 - ★ operated at +18°C,
 - ★ to be upgraded during first long shutdown
- ⇒ 2 modules completed and calibrated during 2008 for installation in first long shutdown





PMD

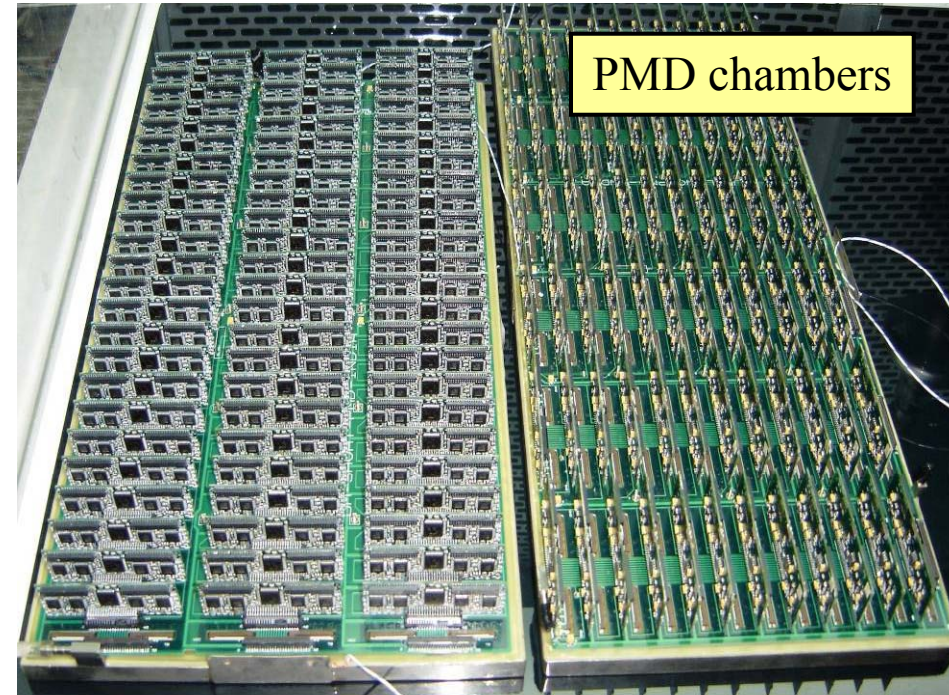


● Detector production

- ⇒ all modules produced, tested, at CERN
- ⇒ FEE all produced, mostly at CERN
 - ★ FRT board tests ongoing
 - ★ support and Pb converter ready

● Installation postponed

- ⇒ long term tests show that some MANAS FEE gets damaged by repeated sparks
- ⇒ implement additional protection diodes
 - ★ delivery delays => not ready by April
- ⇒ Install few module for 2008 (commissioning)
 - ★ rest in WS 08/09 for HI run end 2009
 - ★ PMD needed mainly for heavy ion physics





Planning 2008



PHASE	Detector	Start	Finish
PHASE 4 ✓	V0-A/T0-A/TOF/L3 magnet test	7.1.2008	17.2.2008
✓	Cosmic Run II	18.2.2008	9.3.2008
ongoing	TOF/TRD/PHOS/PMD	11.3.2008	4.5.2008
	Cosmic Run III,	5.5. 2008	start of beam
	Mobile shielding, close vacuum	T0 – 6 weeks	T0 – 3 weeks
	Start of beam	T0	

● Expected start-up configuration May 2008

- ★ **complete**: ITS, TPC, TOF, HMPID, muon arm, FMD, trigger dets (V0, T0,ZDC, Acorde),...
- ★ **partially complete**: PHOS(1/5), TRD (3/18), PMD (few/48), DAQ/HLT (20-30%),

● Beyond 2008

- ⇒ complete **DAQ/HLT** capacity (shifted from 2008 to 2009) in line with expected LHC running
- ⇒ complete modular detectors: **PMD (2008)**, **TRD (2009)**, **PHOS (2010)**, **EMCAL (2011)**



Commissioning



● Commissioning runs (24/7)

⇒ **Cosmics I** (2 weeks, Dec 2007)

- ✪ local (individual detectors) and start of global (several detectors) commissioning

⇒ **Cosmics II** (3 weeks, Febr/Mar 2008)

- ✪ local/global commissioning, first few days of alignment 'test' run
- ✪ TPC was turned off after ~ 1 week (Drift HV instability, now understood & corrected)

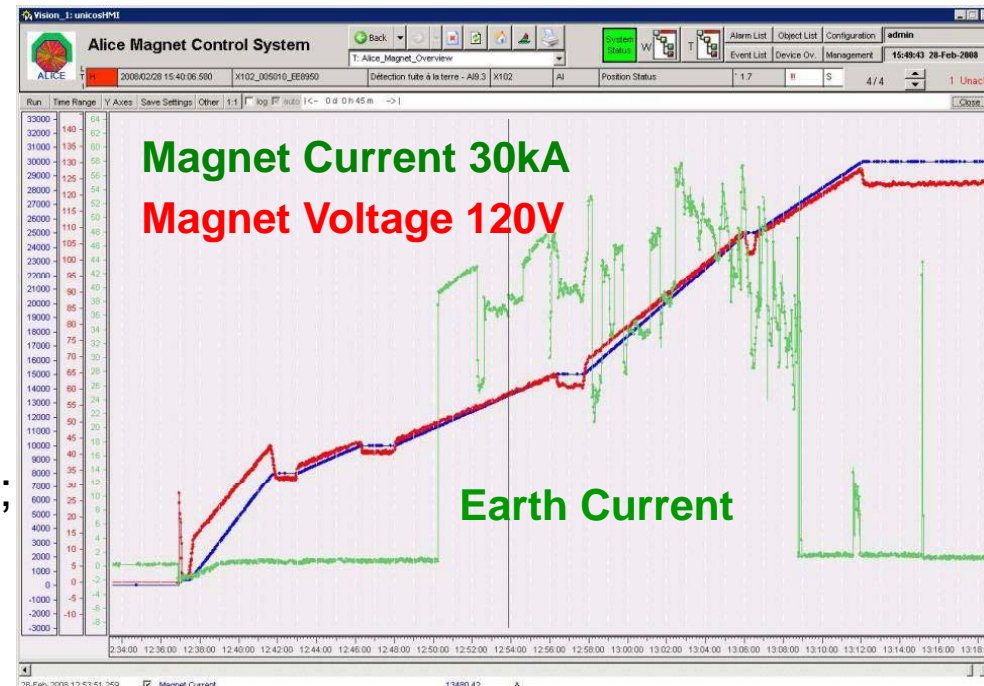
⇒ **Cosmics III** (> 6 weeks, early May 2008)

- ✪ global commissioning, calibration, alignment production run for all detectors

● Magnet status

⇒ both **Muon Dipole** (run I) and **L3** (run II) retested and **commissioned to full field**

- ✪ the old 'L3 short' still shows up intermittently; not a concern for operation (< 100 mA)





Cosmic runs Dec. '07 & March '08



Operation from ALICE Control Room



DAQ and HLT



Data archive
Registration on the GRID



AliEn²
@GRID

Control

Raw Data



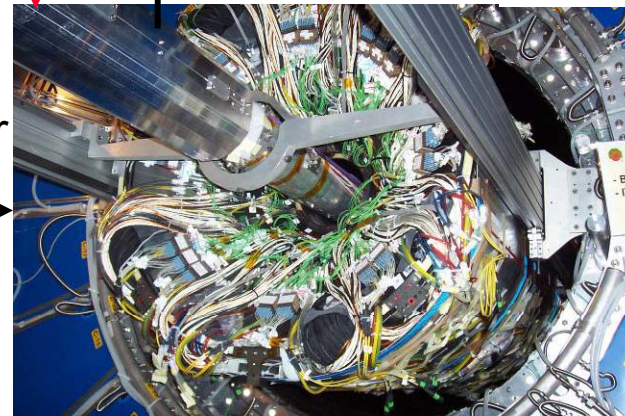
ACORDE
(Cosmic Trigger)

Trigger input



Trigger in UX-C area

Trigger



ALICE detectors



Cosmic Runs



- 14 detectors could run standalone and in some global runs:
 - ⇒ SPD, SSD, SDD, TPC, TRD, TOF, Muon TRK, Muon TRG, HMPID, FMD, V0, T0, ACORDE, ZDC (missing: PHOS/CPV, PMD, EMCAL)
 - ☆ R/O for a subset of the installed detector (limited by services, connections, power supply..)
- Global runs with multiple detectors (up to 11):
 - ⇒ All with pulser or ACORDE as Trigger detector and the Central Trigger Processor
 - ⇒ Event building on several GDCs
 - ⇒ Data recording:
 - ☆ ROOT format
 - ☆ Migration to CASTOR
 - 82TB from 14/02 to 09/03 (26 days)
 - ☆ Registration in AliEn 90 k files
- ⇒ Electronic Logbook

ALICE Electronic Logbook - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

https://alice-logbook.cern.ch/logbook/date_online.php?p_cont=sb&p_rsob=time_start&p_rs...

Red Hat, Inc. Red Hat Network Support Shop Products Training

ALICE Electronic Logbook v1.16

Welcome Pierre Vande vyvre (PH/AID)

Run Statistics

1-20 of 27 (Page 1 of 2) Time LAST HOUR Run #

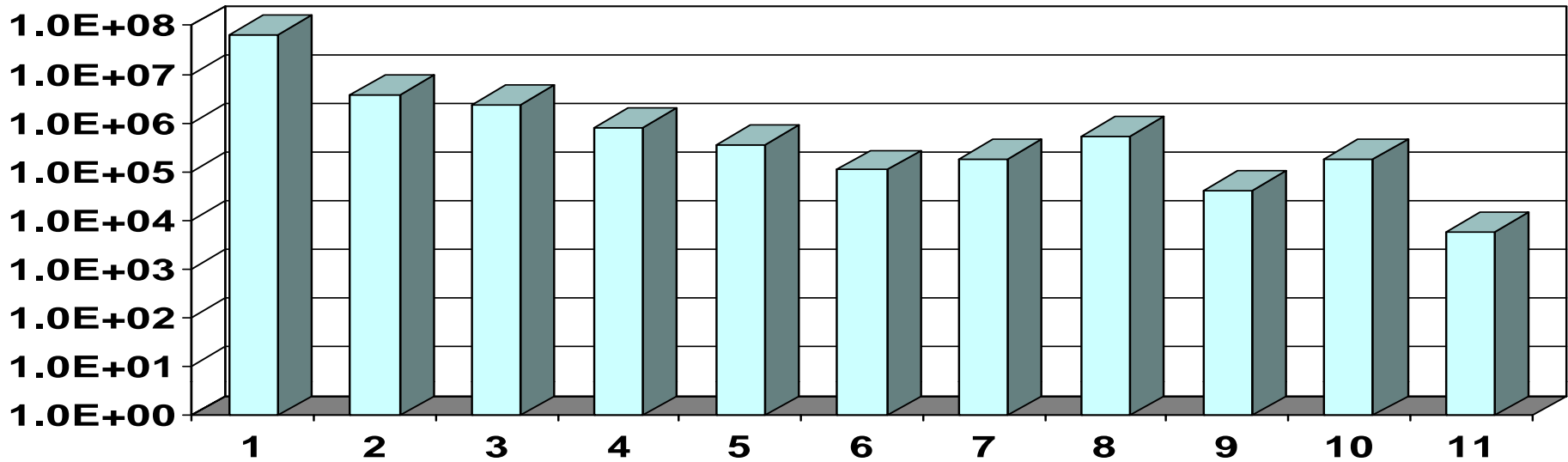
	Run	Start Time	Duration	LDCs	GDCs	Detectors	Total Events	Events/s	T
(1)	10030	10/12/2007 09:57:55	na	1	1	MUON_TRK	na	na	
(1)	10029	10/12/2007 09:56:03	na	1	1	TRD	na	na	
(2)	10028	10/12/2007 09:55:20	36 s	1	1	MUON_TRK	2	0.06	
(1)	10027	10/12/2007 09:52:20	na	2	1	SDD	na	na	
(2)	10026	10/12/2007 09:51:24	3 m	1	1	MUON_TRK	10	0.06	



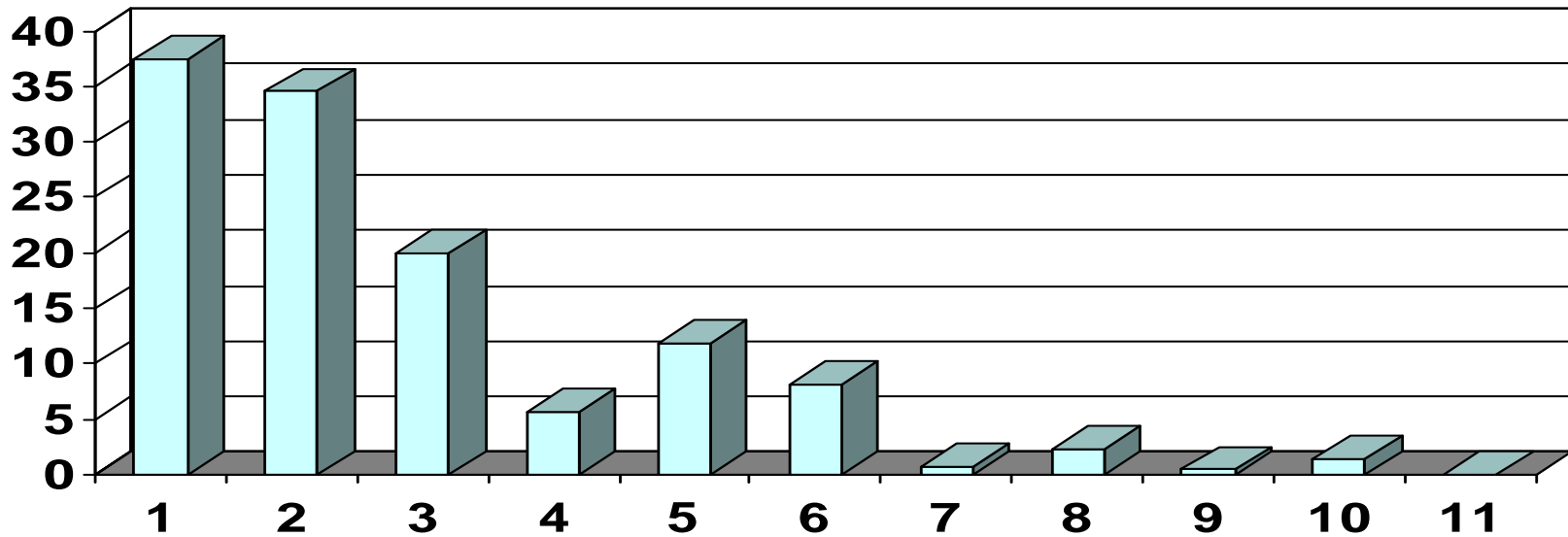
Global Runs December '07



Events



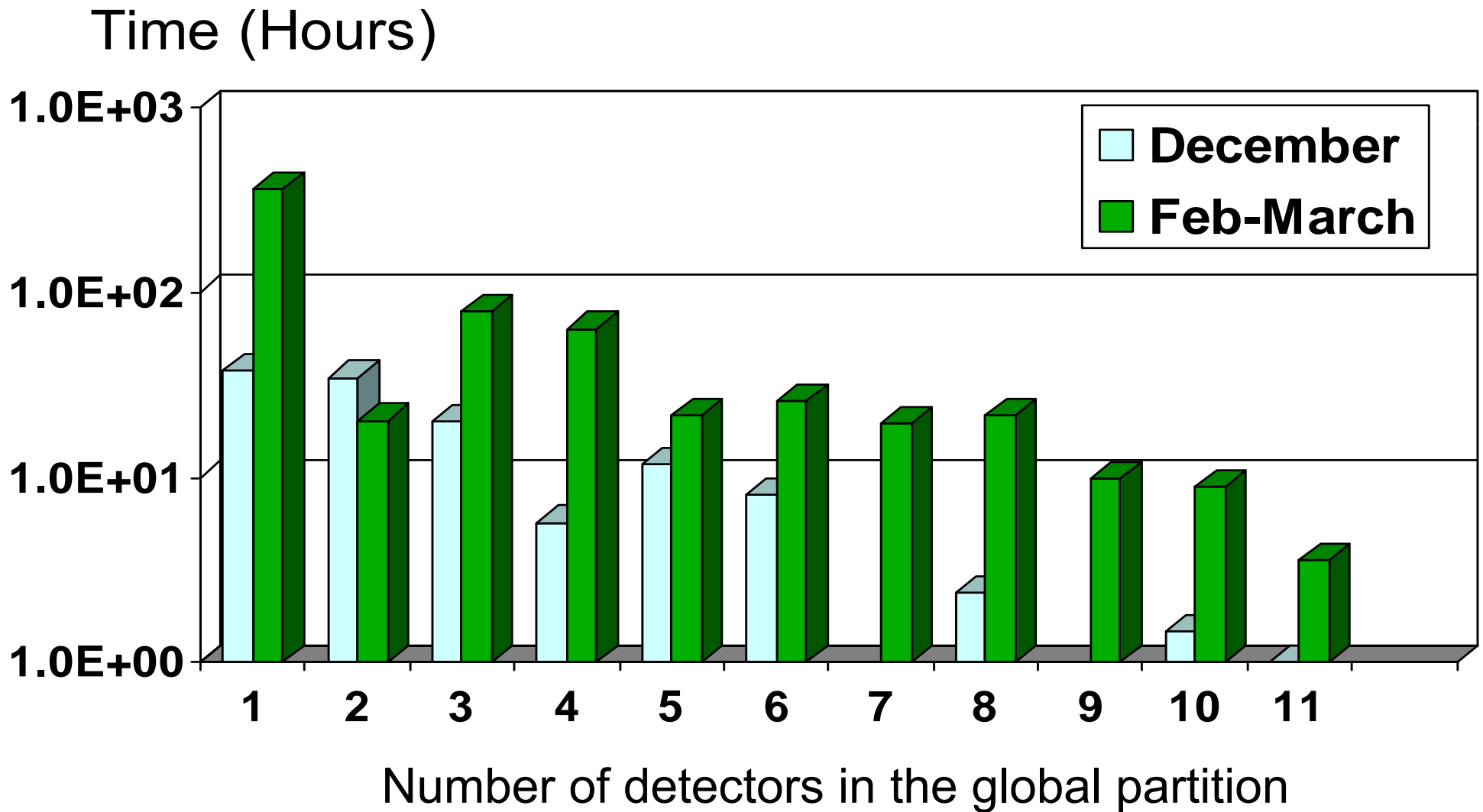
Duration (hours)



Number of detectors



Global Runs March '08





Detector/DAQ integration



<ul style="list-style-type: none"> - DATE V5, DDL SIU + RORC delivered - Detector algorithms framework ready October 07	S P D	S S D	S D D	T P C	T R D	T O F	M U O N T K	M U O N T G	H M P I D	P H O S I C P	F M D	T O	V O	Z D C	P M D	A C O R D E	E M C A L
Final electronics with DDL & DATE	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Trigger with LTU and TTC	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red
Common Data Header (TRG info)	Green	Green	Green	Yellow	Red	Green	Green	Green	Green	Yellow	Yellow	Green	Green	Green	Green	Green	Red
Data format check	Green	Green	Green	Yellow	Red	Green	Green	Green	Red	Yellow	Yellow	Green	Red	Green	Green	Green	Red
SOD, EOD	Green	Green	Green	Red	Red	Green	Green	Green	Green	Red	Red	Green	Red	Red	Red	Green	Red
Data quality monitor. (MOOD)	Green	Green	Yellow	Green	Yellow	Green	Green	Green	Green	Red	Red	Green	Red	Red	Green	Red	Red
Detect. Algorithms in DAQ	Green	Red	Red	Yellow	Red	Green	Red	Red	Red	Red	Red	Yellow	Red	Red	Red	White	White



Detector/DAQ integration



<ul style="list-style-type: none"> - DATE V5, DDL SIU + RORC delivered - Detector algorithms framework ready March 08	S P D	S S D	S D D	T P C	T R D	T O F	M U O N T K	M U O N T G	H M P I D	P H O S I C P	F M D	T O	V O	Z D C	P M D	A C O R D E	E M C A L
Final electronics with DDL & DATE	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Trigger with LTU and TTC	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red
Common Data Header (TRG info)	Green	Green	Green	Yellow	Green	Green	Green	Green	Green	Yellow	Yellow	Green	Green	Green	Green	Green	Red
Data format check	Green	Green	Green	Yellow	Green	Green	Green	Green	Green	Yellow	Yellow	Green	Green	Green	Green	Green	Red
SOD, EOD	Green	Green	Green	Red	Green	Green	Green	Green	Green	Red	Red	Green	Green	Green	Red	Green	Red
Data quality monitoring	Green	Green	Green	Green	Yellow	Green	Green	Green	Green	Red	Red	Green	Green	Green	Green	Green	Red
Detect. Algorithms in DAQ	Green	Green	Green	Green	Red	Green	Green	Red	Yellow	Red	Red	Green	Yellow	Red	Red	White	White



Detector/ECS Integration



ECS October 07	S P D	S S D	S D D	T P C	T R D	T O F	M U O N T K	M U O N T G	H M P I D	P H O S C P	F M D	T O	V O	Z D C	P M D	A C O R D E
DCS FSM implemented	Green	Green	Green	Green	Green	Green	Green	Red	Green	Green	Red	Green	Green	Yellow	Green	Red
Calibrations runs defined	Green	Green	Red	Green	Red	Green	Green	Green	Green	Red	Red	Red	Red	Red	White	Red
Calibrations runs implemented in ECS	Green	Green	Red	Green	Red	Green	Green	Green	Green	Red	Red	Red	Red	Red	White	Red
Detect. Algorithms for calibration runs	Green	Yellow	Red	Red	Red	Yellow	Yellow	Red	Yellow	Red	Red	Red	Red	Red	White	Red



Detector/ECS Integration

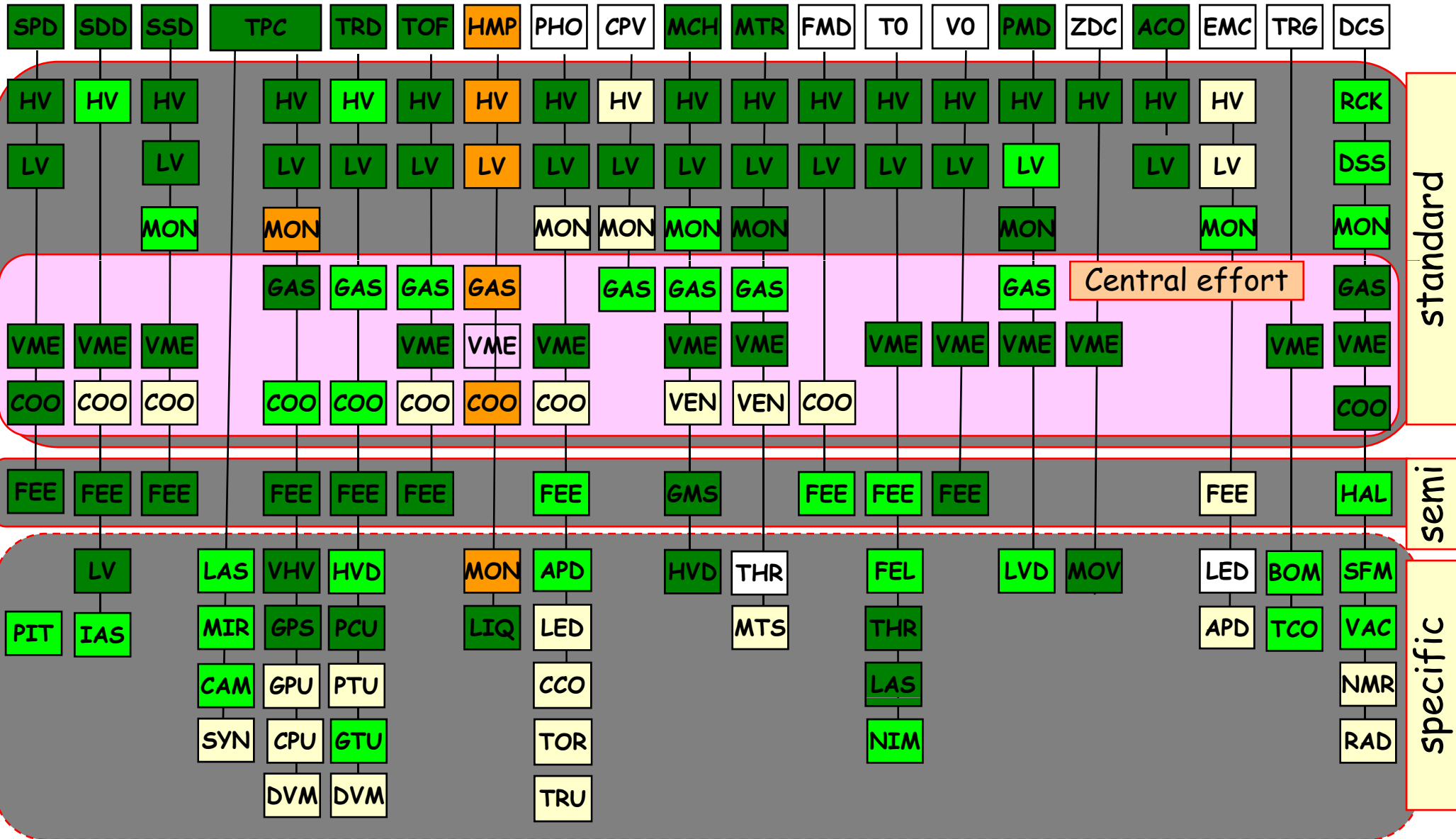


ECS April 2008	S P D	S S D	S D D	T P C	T R D	T O F	M U O N T K	M U O N T G	H M P I D	P H O S S C P	F M D	T O	V O	Z D C	P M D	A C O R D E
DCS FSM implemented	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Green	Green	Green	Green	Green
Calibrations runs defined	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Green	Red	Red	Green	White	Red
Calibrations runs implemented in ECS	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Green	Red	Red	Green	White	Red
Detect. Algorithms for calibration runs	Green	Green	Green	Green	Yellow	Green	Green	Yellow	Green	Red	Red	Red	Red	Red	White	Red

Detector Control

September 07

- 1 H/W & low level S/W done
- 2 Basic control with PVSS
- 3 FSM implemented
- 4 Configured and ready for operation





Detector/Trigger integration



Function	ACORDE	CPV	DMTrack	DMTrig	EMCAL	FMD	HMPID	PHOS	ZDC
Receive LTU	Green	Red	Green	Green	Green	Green	Green	Green	Green
Install LTU	Green	Red	Green	Green	Red	Green	Green	Green	Green
Basic Readout	Green	Red	Green	Green	Red	Green	Green	Green	Red
BUSY handling	Green	Red	Green	Green	Red	Red	Green	Red	Red
Header to DAQ	Orange	Red	Green	Green	Red	Green	Green	Red	Red
Calibrations	N/A	Red	Green	Red	Red	Red	Red	Red	Red
Stability	Green	Red	Orange	Green	Red	Green	Red	Red	Red
Error Handling	Red	Red	Red	Red	Red	Red	Red	Red	Red
Trigger toggling	Green	Red	N/A	Green	Red	N/A	N/A	Red	N/A
Trigger Signature	Green	Red	N/A	Green	Red	N/A	N/A	Red	N/A
Retested at Point 2	Green	Red	Red	Red	Red	Green	Green	Red	Red
Function	SDD	SPD	SSD	T0	TOF	TPC	TRD	V0	PMD
Receive LTU	Green	Green	Green	Green	Green	Green	Green	Green	Green
Install LTU	Green	Green	Green	Green	Green	Green	Green	Green	Green
Basic Readout	Green	Green	Green	Green	Green	Green	Green	Red	Red
BUSY handling	Green	Green	Green	Green	Green	Red	Green	Red	Red
Header to DAQ	Green	Green	Green	Green	Green	Green	Green	Red	Red
Calibrations	Green	Orange	Green	Green	Green	Red	Red	Red	Red
Stability	Green	Green	Green	Green	Green	Red	Red	Red	Red
Error Handling	Orange	Green	Orange	Red	Orange	Red	Red	Red	Red
Trigger toggling	N/A	Red	N/A	Green	Green	N/A	Red	Red	N/A
Trigger Signature	N/A	Red	N/A	Green	Green	N/A	Red	Red	N/A
Retested at Point 2	Green	Red	Red	Red	Red	Green	Green	Red	Red
DATE	09-07								

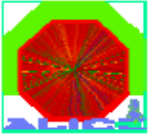


Detector/Trigger integration



Not installed
or missing hw

Function	ACORDE	CPV	DMTrack	DMTrig	EMCAL	FMD	HMPID	PHOS	ZDC
Receive LTU	Green	Red	Green	Green	Red	Green	Green	Green	Green
Install LTU	Green	Red	Green	Green	Red	Green	Green	Green	Green
Basic Readout	Green	Red	Green	Green	Red	Green	Green	Red	Red
BUSY handling	Green	Red	Green	Green	Red	Green	Green	Red	Red
Header to DAQ	Green	Red	Green	Green	Red	Green	Green	Red	Red
Calibrations	N/A	Red	Orange	Green	Red	Red	Red	Red	Red
Stability	Green	Red	Orange	Green	Red	Green	Green	Red	Red
Error Handling	Red	Red	Red	Red	Red	Red	Red	Red	Red
Trigger toggling	Green	Red	N/A	Green	Red	N/A	N/A	Red	N/A
Trigger Signature	Green	Red	N/A	Green	Red	N/A	N/A	Red	N/A
Retested at Point 2	Green	Red	Green	Green	Red	Green	Green	Red	Red
Function	SDD	SPD	SSD	T0	TOF	TPC	TRD	V0	PMD
Receive LTU	Green	Green	Green	Green	Green	Green	Green	Green	Green
Install LTU	Green	Green	Green	Green	Green	Green	Green	Green	Green
Basic Readout	Green	Green	Green	Green	Green	Green	Green	Green	Red
BUSY handling	Green	Green	Green	Green	Green	Green	Green	Green	Red
Header to DAQ	Green	Green	Green	Green	Green	Green	Green	Green	Red
Calibrations	Orange	Orange	Orange	Green	Orange	Red	Red	Red	Red
Stability	Green	Green	Green	Green	Green	Green	Green	Green	Red
Error Handling	Orange	Green	Orange	Red	Orange	Red	Red	Red	Red
Trigger toggling	N/A	Red	N/A	Green	Green	N/A	Red	Green	N/A
Trigger Signature	N/A	Red	N/A	Green	Green	N/A	Red	Green	N/A
Retested at Point 2	Green	Orange	Green	Green	Green	Green	Green	Green	Red
DATE	04-08								



Detector – TRG - DAQ issues

	S P D	S S D	S D D	TP C	T R D	T O F	MU O N T K	M U O N T G	H M P I D	F M D	T0	V0	Z D C	A C O R D E
CDH errors														
Empty event or missing event fragment														
Trigger sequence err.														
Trigger pattern err.														
Mini-event ID error														
Detector busy														
Errors at high rate														

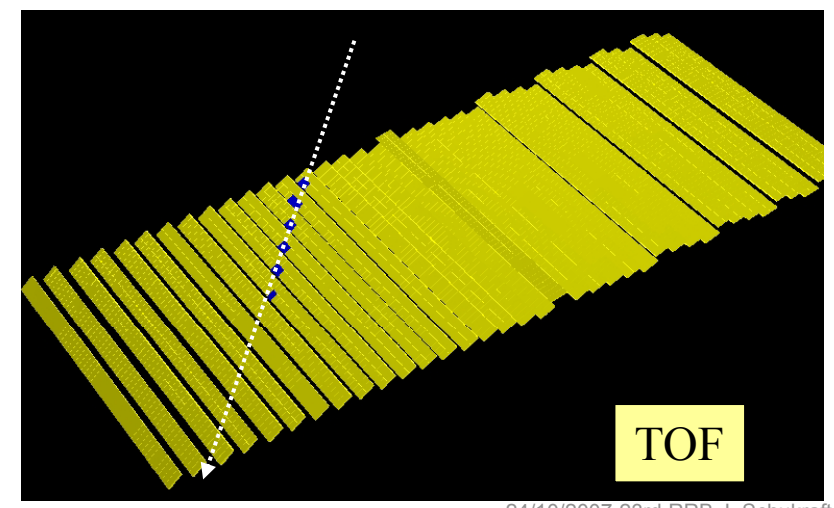
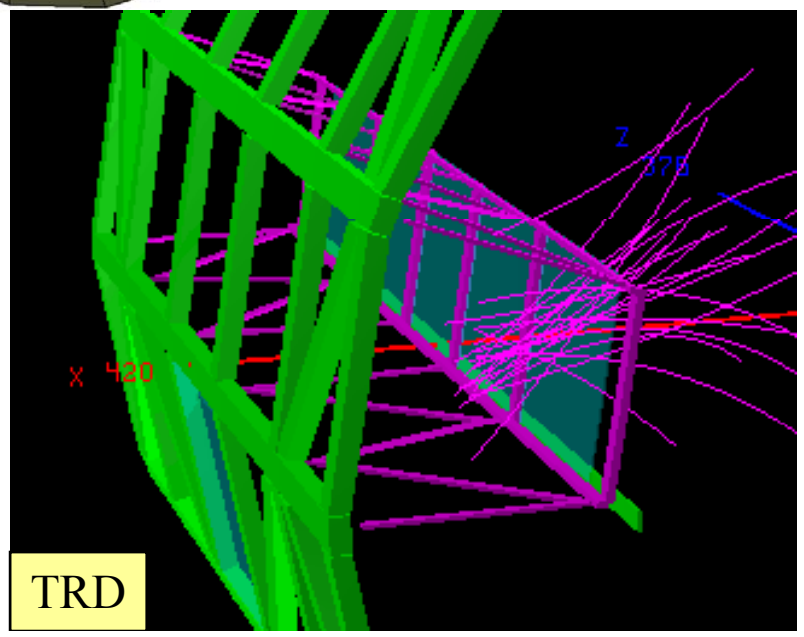
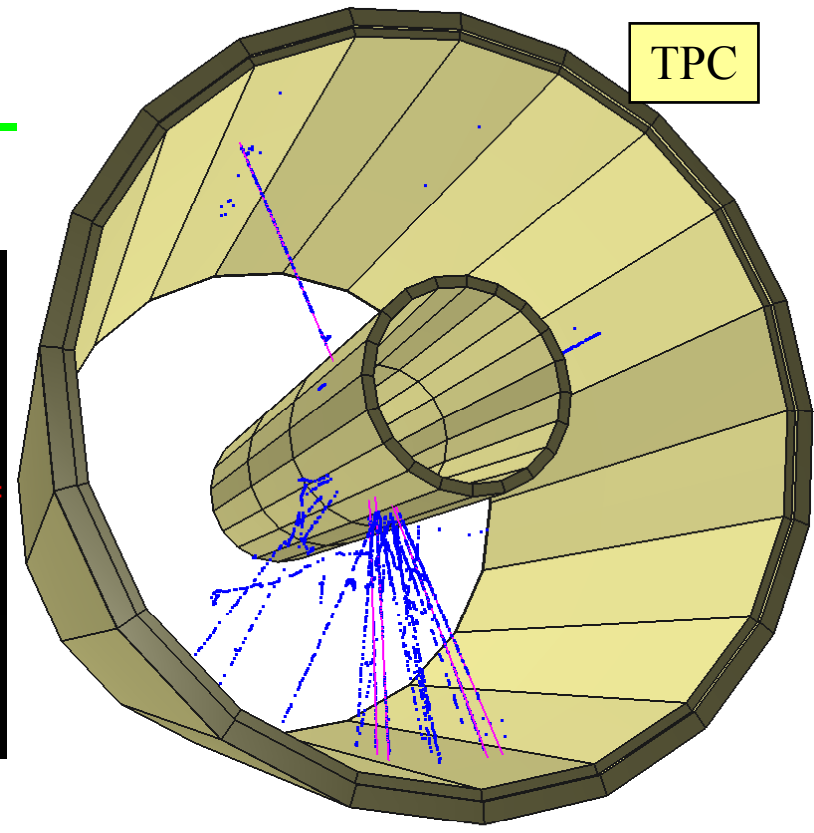
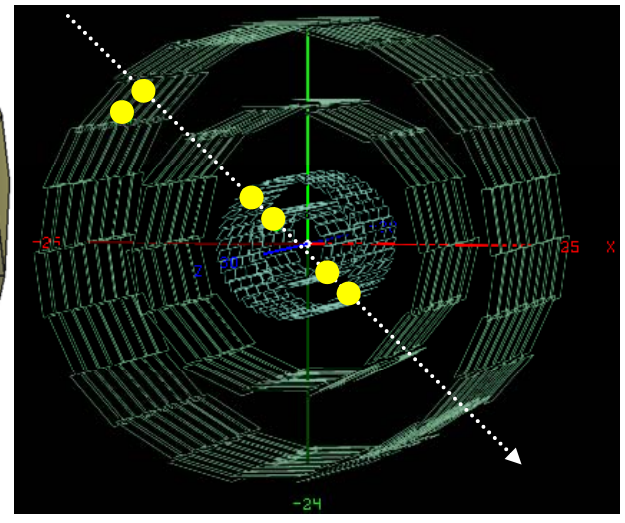
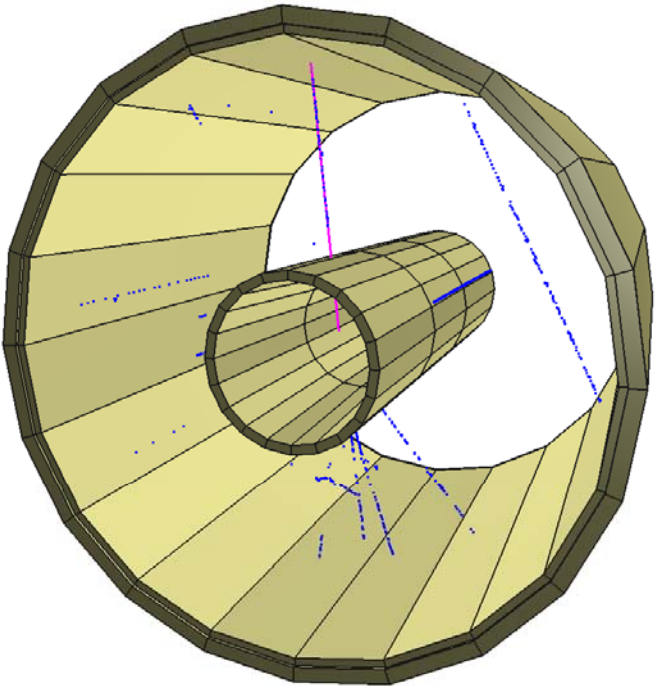
next level of 'debugging': working \neq error free !
 now chasing rare or conditional errors



Event Displays

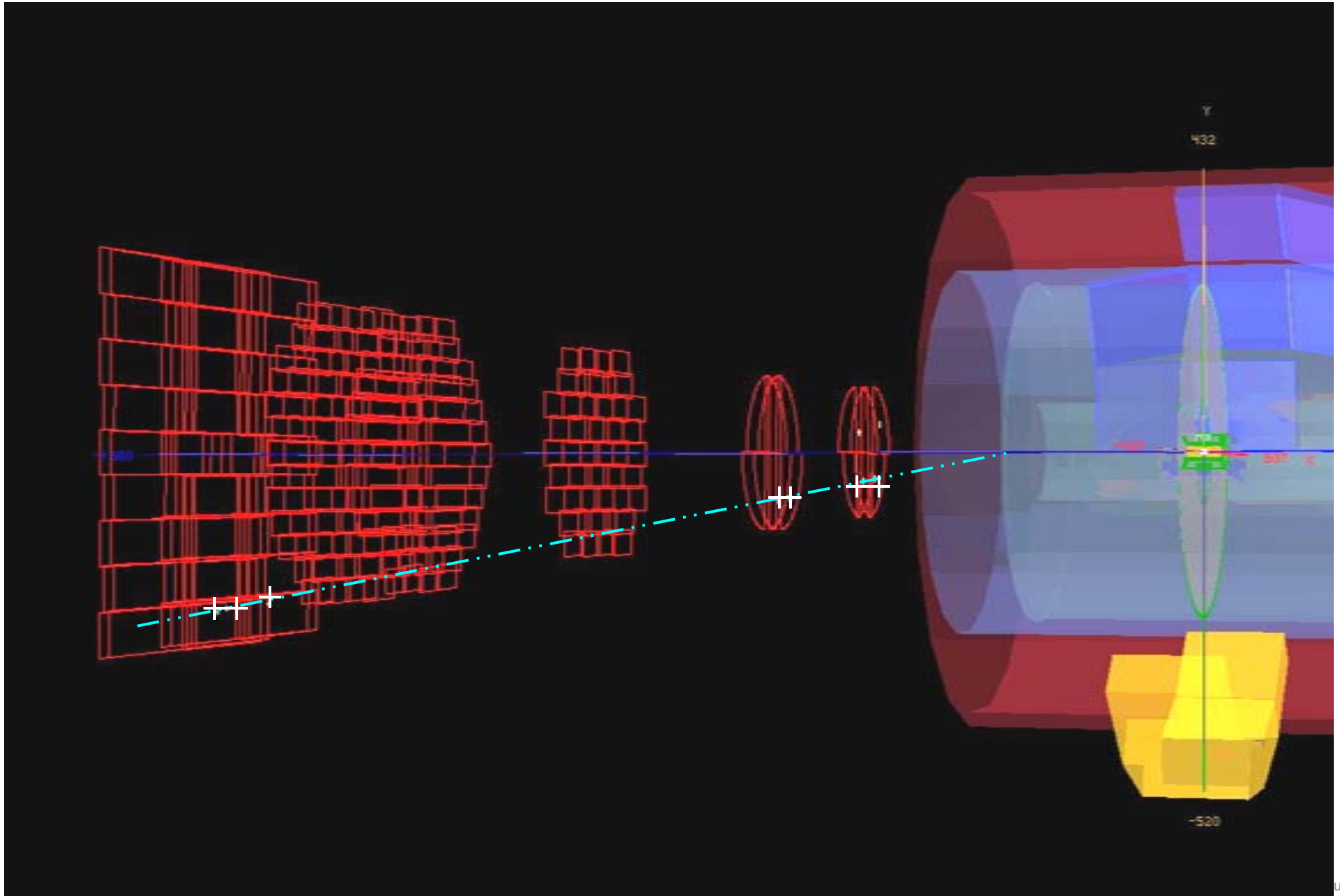
TPC

SDD + SPD





Muon Arm



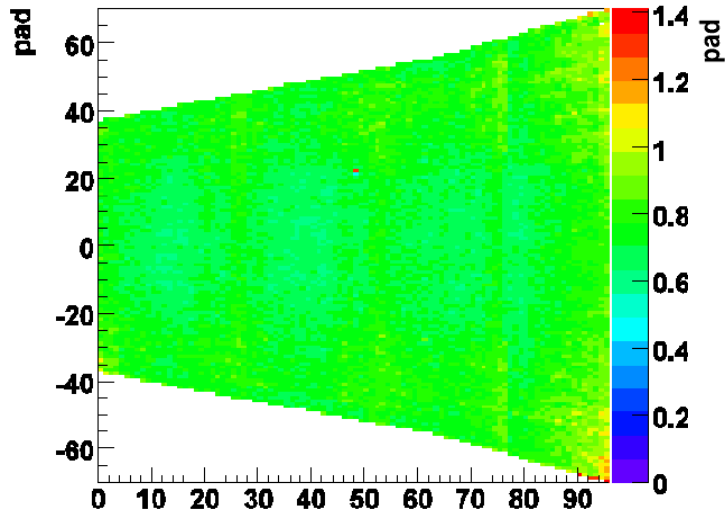


TPC commissioning

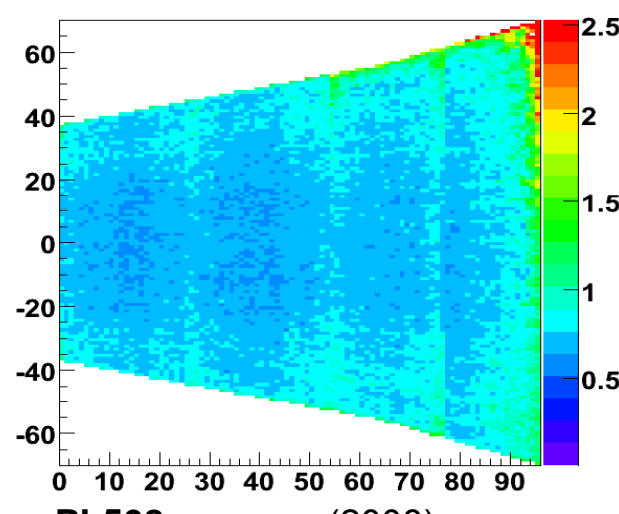


● Noise studies

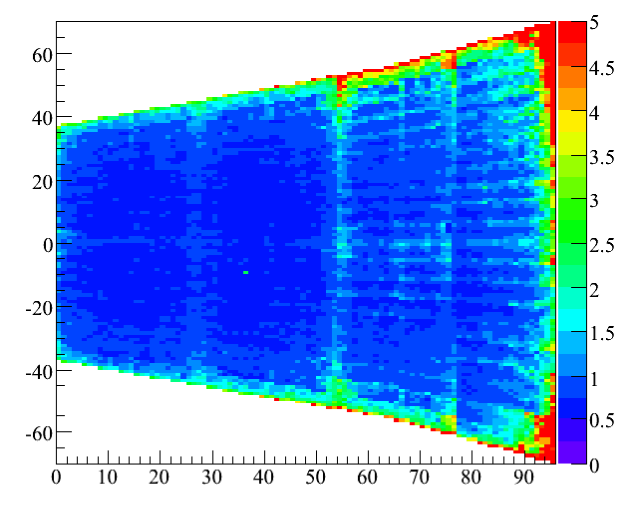
(TPC, TRD, muons. Under investigation with producer of power supply)



PL508 – clean room (2006)



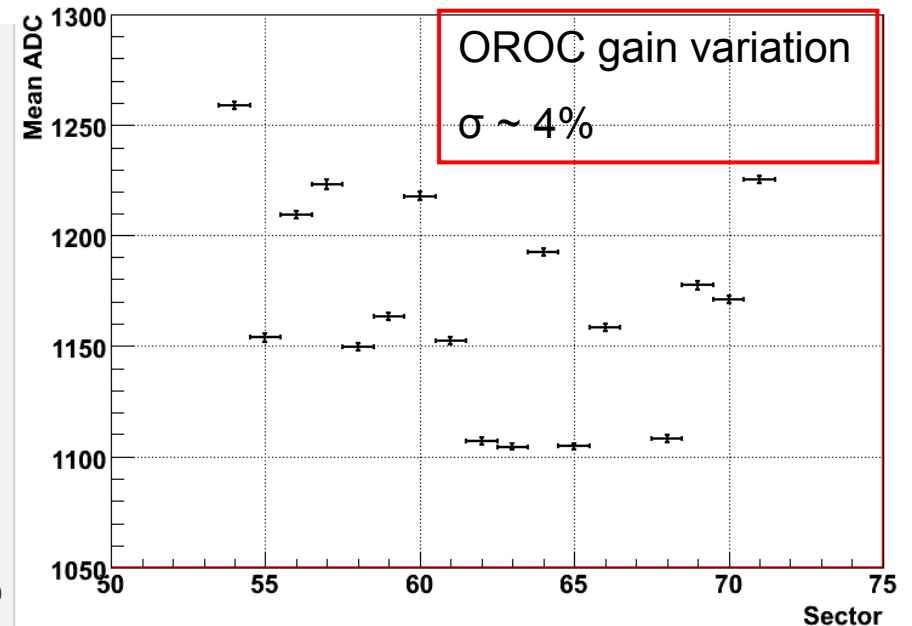
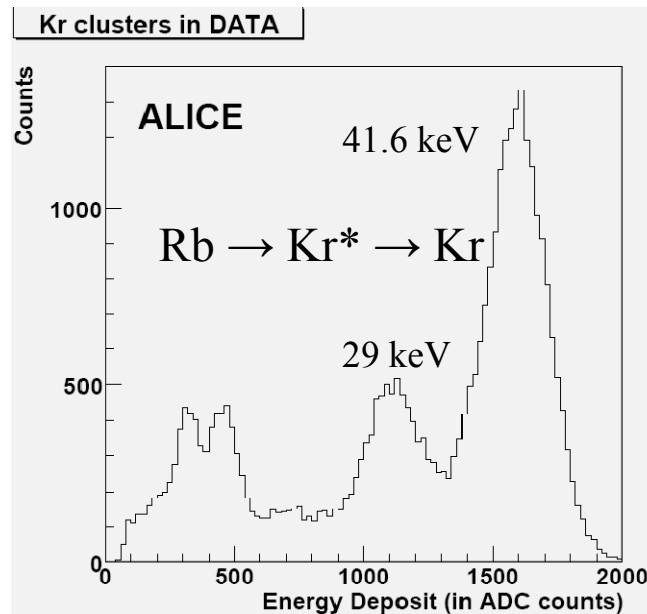
PL508 – cavern (2008)



PL512 (final) – cavern

● Calibration

⇒ Krypton decay





SDD Calibration



Drift speed calibration

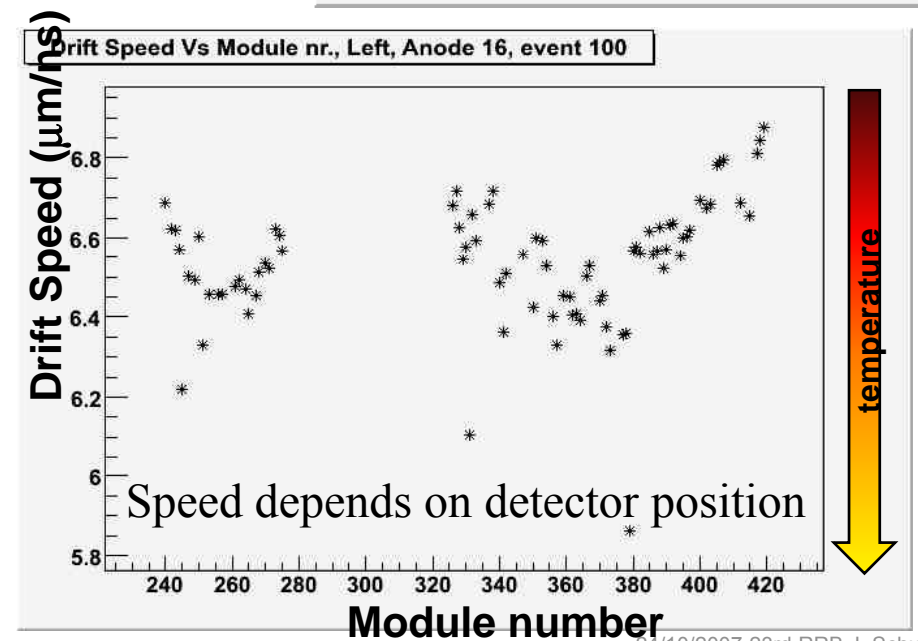
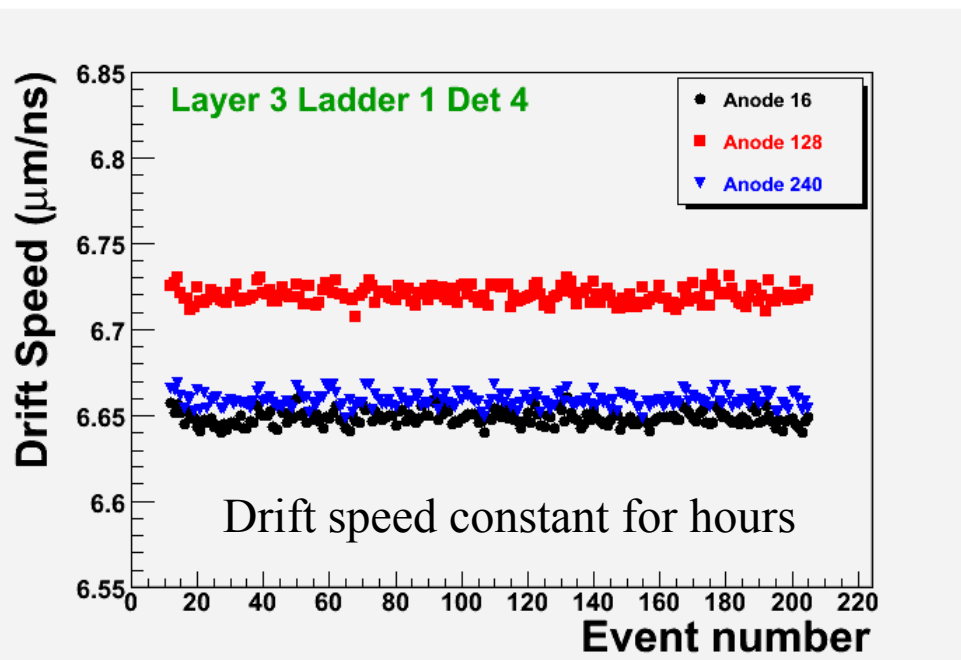
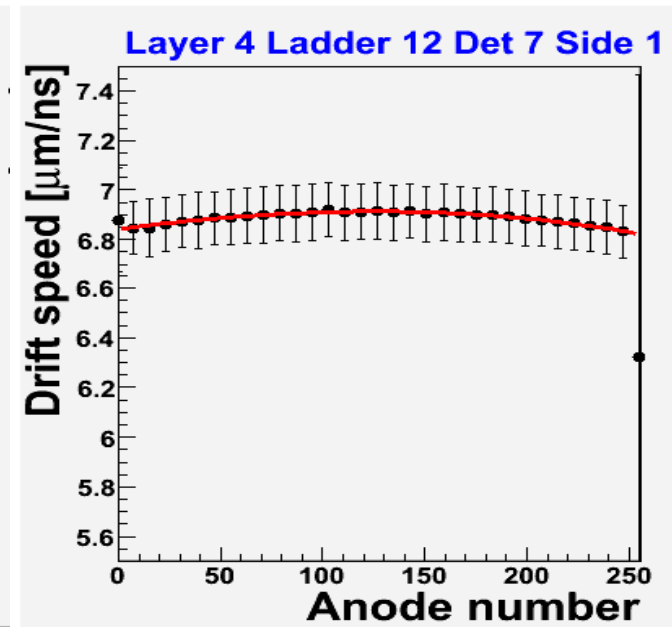
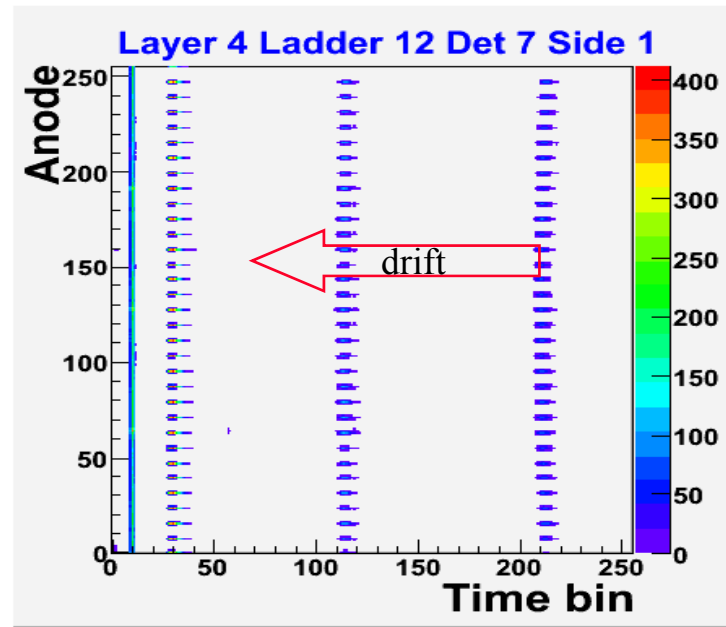
⇒ dependence on temperature ($\Delta T < 0.1^\circ\text{C}$!)

☆ $v_{\text{drift}} = \mu_e E$ with $\mu_e \propto T^{-2.4}$

☆ heat sources on detector edges

⇒ dependence on position

☆ heat goes up !

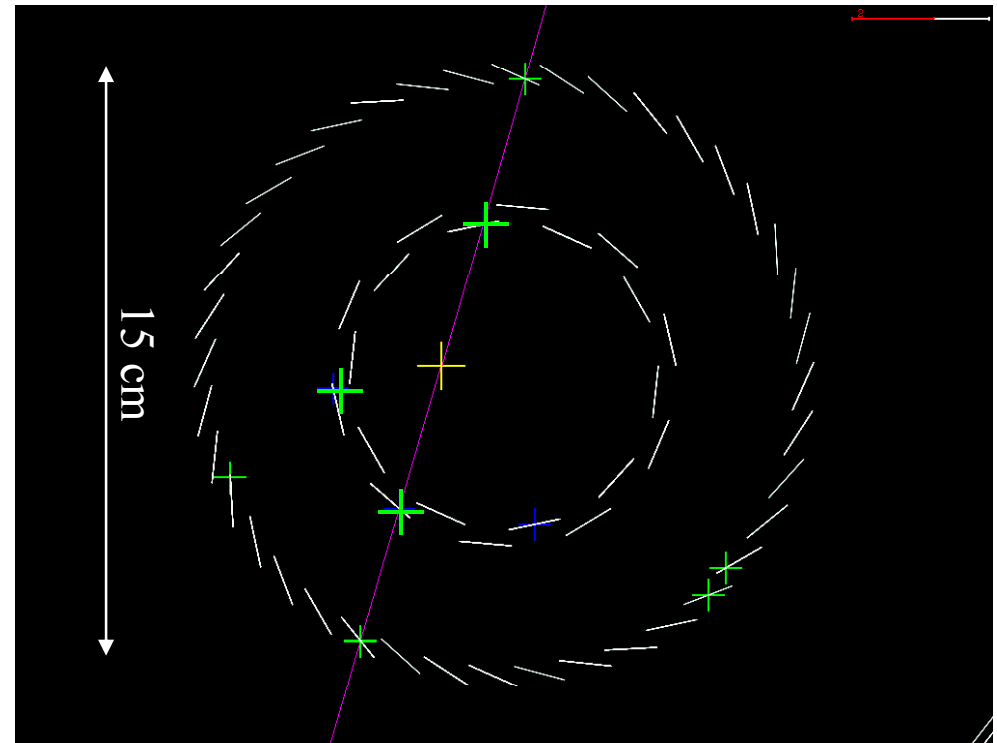
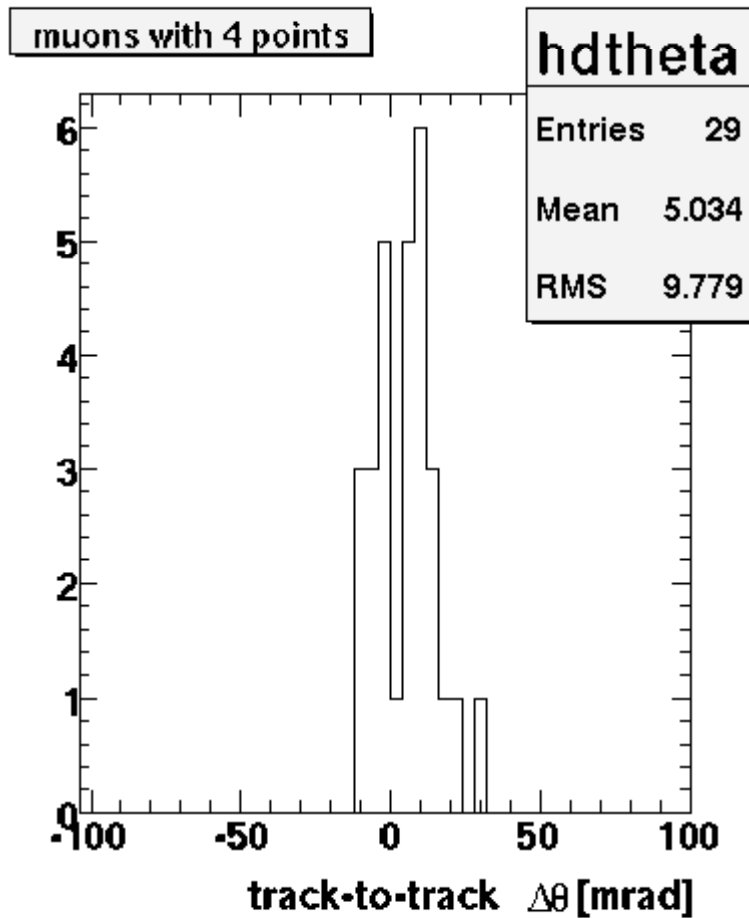




Alignment Tests



- SPD: testing alignment programs with cosmics
 - ⇒ very small statistics (SPD is very small !), needs pixel trigger or beam particles





Computing



● Computing Resources

		Pledged by external sites versus required (new LHC schedule) all											
		2007		2008		2009		2010		2011		2012	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
CPU	Requirement (MSI2K)	3,2	4,6	10,1	12,5	19,9	14,3	23,5	25,0	30,5	32,5	39,7	42,2
	Missing %	-45%	-5%	-31%	-37%	-47%	-20%	-39%	-40%	-53%	-54%	-64%	-65%
Disk	Requirement (PB)	1,3	0,7	4,0	1,7	6,8	4,0	12,0	4,3	16,6	5,6	22,4	7,3
	Missing %	-43%	4%	-33%	5%	-37%	-22%	-50%	-3%	-64%	-25%	-73%	-43%
MS	Requirement (PB)	1,4	-	5,8	-	12,5	-	19,7	-	27,0	-	33,7	-
	Missing %	-23%	-	-32%	-	-36%	-	-41%	-	-57%	-	-65%	-

● CCRC'08 ongoing now

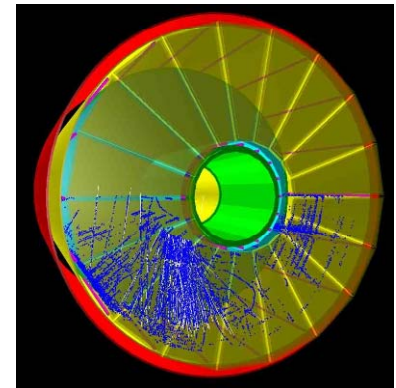
⇒ ALICE **deficit in 2008/9** (after recent updates of pledges/requirements) ~ 30-40%

✚ Active discussion for the **integration of US computing** resources into ALICE

⇒ Discussions **with individual countries** to raise their relative contribution

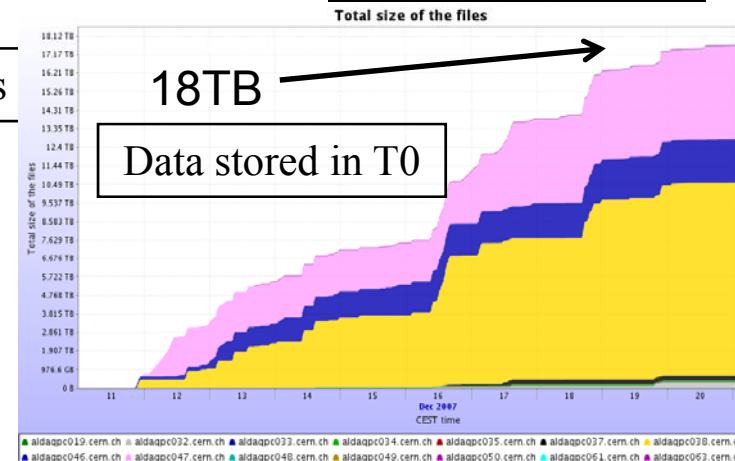
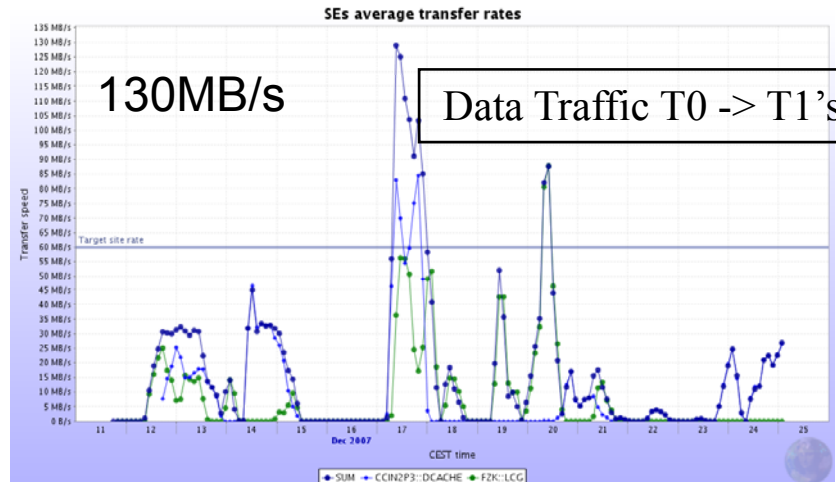
● **Commissioning of the Offline successfully started**

● First tracks from real data at P2 reconstructed



2 week Dec '07 run

- 17.5TB in 23K files (~0.7 GB/file)
- 18MB/sec = 1/3 of the p+p rate





Operating ALICE



● Experience from first global commissioning runs

- ⇒ ALICE operation: 18 different **detector** systems,
- ⇒ 5 online **control** systems: (ECS/DCS/DAQ/HLT/Trigger)
- ⇒ online/offline data **quality assurance**, **offline** tasks (data migration, archiving, reconstruction)
- ⇒ estimated number of people required on shift (24/7):
 - ☆ **initially ~ 30** (commissioning, first data taking periods, 'running in' the detector)
 - ☆ in addition: 'on call' experts (detectors, services)
 - ☆ hope for **significant reduction on the medium term**

● Operation requirements

- ⇒ Institutes are required to participate in '**shifts**' in **proportion to PhD's (authors)**
 - ☆ shifts require presence at CERN
(some offline and data-QA may eventually be done remote ?)
- ⇒ estimated initial requirements : **30** people/shift, ~**800** authors (PhD's + students)
- ⇒ ~ **24 days** of shifts for **each author per year** for a 7 month run (May-Nov)
 - ☆ this is only 'taking shifts', **other tasks, detector work, 'on call experts' are in addition !**

Institutes and Funding Agencies will have to consider the necessary arrangements and resources.
The load will be particularly high in the initial phase !!



Summary



● Major Milestones

- ⇒ **Installation** for 2008 essentially finished !
- ⇒ **Global commissioning** started

● Biggest Concerns

- ⇒ UK commitment to **ALICE trigger**
- ⇒ **Computing resources:**
large deficit projected for 2009 and beyond

