

Technical Board 25 July 2001

Bernhard Schwingenheuer

## VDS Status

Superlayer 8: broken modules exchanged or repaired,  
status = all but 2 links are working (1 fixable)

Outer Quadrant SL1+2: Helix 3.1 installed (2x double-sided)  
status = working

all other detectors: not exchanged  
status = working like last year (<1% dead chips)

SlowControl + DAQ + Manipulators are working

commissioning plans: pot movements under Lumi conditions  
pedestal data without beam  
data for alignment

**Status of the ITR chamber upgrade**

- MS01-      reinstalled**
- MS01+      reinstalled**
- MS03-      reinstalled**
- MS03+      reinstalled**
- MS05-      will be finished after end of LSD**
- MS05+      will be finished after end of LSD**
- MS06-      is finished, not yet installed due to missing OTR**
- MS06+      is finished, not yet installed due to missing OTR**
- MS11-      reinstalled**
- MS12-      reinstalled**
- MS11+      reinstalled**
- MS12+      reinstalled**
- MS13+      reinstalled ---> Trigger electronics was tested in HERA-B**
- MS10+      reinstalled                      ---> good performance !!**
- MS13-      --> will be finished until 1st August**
- MS10-      --> will be finished until 15th August**

**Trigger Link electronics already installed and tested for MS10±,  
MS13± and MS14-**

## Further chamber upgrade

### HEIDELBEG:

Production of 20 new MSGCs in July

--> 6 x Type-1 for Magnet --> **finished**

--> 14 x Type-3 for TC area --> **ongoing**

### Helix + PCBs:

GMA has finished the production of currently existing chips  
--> enough to complete all PC trigger stations

Helix-3.1a chips for TC stations will be produced until end of July  
by AMS --> **delayed** --> **now: mid of August**

### Assembly and installation of ITR TC Trigger Stations:

All finished and installed until end of 2001

## ITR STATUS AND TASK LIST

### HV

#### **Hardware:**

In general ok.

5 cables must be repaired. --> **done**

We want 4 additional cables between trailer and Mgn. --> **ongoing**

We want 4 additional cables between trailer and MPF. --> **ongoing**

#### **Software:**

Programs were upgraded and are under test now (looks good so far)

Update of web lists and config files ->in LSD

**START-UP: OK for the moment**

#### STATEMENTS:

- 1) In case there will be beam once or twice per week the ITR will make all possible effort to use this beam in order to make HV-training with the chambers and carry out all possible commissioning.
- 2) Nevertheless, most probably there is no way to bring the MSGCs close to their operation points if there is not continuous beam for 2 - 3 weeks.

### LV

#### **Hardware:**

All power supplies are upgraded.

Filters and ferrite rings for the 220 V net are installed. **!!!!**

**THE PERFORMANCE OF THE LV SYSTEM MIGHT STILL CAUSE SERIOUS PROBLEMS IN THE FUTURE --> BIGGEST ITR RISK**

#### **Software:**

Communication between LV and Helix programming should be realised: LV has to tell if it was off and works now again -> start of new Helix programming. BUT: first new/fast Helix programming must be finished.

**START-UP: OK for the moment**

## **Water Cooling**

Some modifications and tests are outstanding concerning: float, temp. sensor, connection to SPS --> not critical

**Gas** (Hans-Bernd Dreis left mid of July)

### **Hardware:**

Circuits for MS14+ and MS15+ (plumbing, electric, program) are completed --> all circuits, mixing station and distribution station completed

### **Upgrade of programs and documentation:**

Upgrade of graphical interfaces for technicians under work --> ongoing

Good documentation of programs, plumbing and wiring diagrams exists now

### **General:**

Find and train second ITR gas expert (first = C. Krauss)

**START-UP:** status is sufficient/good -> no serious problems expected

## **READOUT (1)**

### **Hardware in the experiment:**

Chamber hardware is 'fixed' and ok.

All optical interfaces IF-6 are now modified.

Functionality will be tested directly after each reinstallation. -> **performance has improved as tested so far !!!!**

### **Hardware in the trailer:**

All components for Mgn and PC stations are installed and were operated last year

There are the following components missing for the TCstations:

sharcs

3 FEDs

Some delays for 4th FED

Some sharc cables

-> B. Schwingenheuer should have all these parts

### **Future hardware work in the trailer:**

Arrange CAN-cables better.

Labelling of components and cables.

Set up TC stations.

**START-UP:** Status of readout hardware and software is satisfying for start-up. Readout speed will be 10 MHz Rclk at the beginning

### **Future work on software:**

- In order to contribute in the SLT a clusterfinder for ROIs must be written (SL MAP <-> PAM works)
- Faster Helix programming not fully finished
- General reset: Interface between ITR and general DAQ will be needed
- ITR on-line monitoring must produce more alarms
- 'Normal' clusterfinder and sparsification will be refined
- ITR data bases must be updated due to repair of stations (new chamber configuration & dead and cut regions)

## **COMMISSIONING**

### **Commissioning without sufficient MSGCs efficiencies:**

Simple checks of the performance of all installed Helix chips  
(carried out directly after each reinstallation)

Tests of readout stability:

- Are there still some chips which gets asynchronous?
- Do general HERA-B resets help?

Testing of cabling and DB configuration. To

Upgrade to 20 MHz Rclk.

Eliminate jitter between clocks.

Identify hot Helix channels --> update of Mask files

Interplay of ITR and DAQ can be tested to some extend.

### **Commissioning with sufficient MSGCs efficiencies:**

Adjust timing

Tests of on-line monitoring: limits, alarms, operation stability

Find remaining interchanges

Optimise alignment

## ALIGNMENT AND EFFICIENCIES

Coarse alignment of chambers can start after stable beam operation, most probably in parallel to chamber training. If the coarse alignment is finished and chambers are operated at nominal HV settings (settings of last year) fine alignment can be done.

As a next step efficiencies can be calculated and adaption of chamber parameters can start to reach with all chambers the needed efficiency level.

For fine alignment of magnet chambers a magnet-off run is planned after reaching stable operation conditions of VDS, ITR and OTR and having an alignment of VDS and ITR/OTR PC chambers.

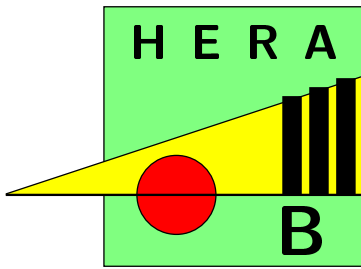
### **Remark:**

We should foresee and request a downscaled storing of unsparified data to have a chance to find problems of clustersearch later.



## **OUR OVERALL GOALS ARE:**

- 1. Stable chamber operation at efficiencies above 90%**
- 2. Stable readout (also at 20MHz Rclk)**
- 3. Efficient contribution to SLT (clustersearch on ROI and understood alignment)**
- 4. Reliable monitoring of detector and data status**



Technical Board Meeting  
July 25, 2001  
DESY Hamburg

# OTR Repair Status & Commissioning Plans

H. Kapitza (DESY/Dortmund)

## Topics:

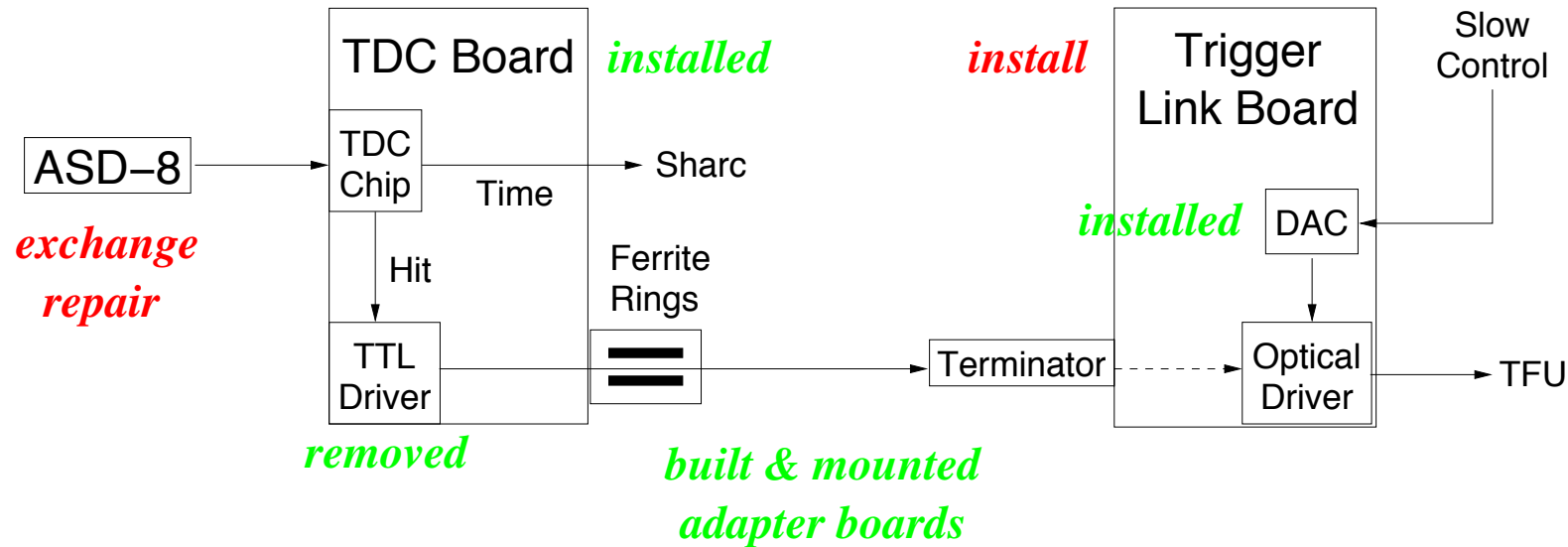
1. OTR Chamber Assembly Status
2. OTR Electronics Repair
3. OTR Commissioning Tasks

# OTR Chamber Assembly Status

Step	MC34	MC8+	PC	TC	MC8-	MC6-	MC6+
disassembly		✓			Aug	Jul	✓
C exchange		✓				-	-
first test		✓					✓
build mod.		81					1
repair/test		✓					busy
reassembly		✓					Jul
installation		✓			Oct	Sep	Aug

- There is still a **major gas leak in TC2-** (500 ℓ/h at 0.4 mbar).
- **No general disassembly of MC6** (Old HV boards  $\rightsquigarrow$  No C exchange)

# OTR Electronics Repair



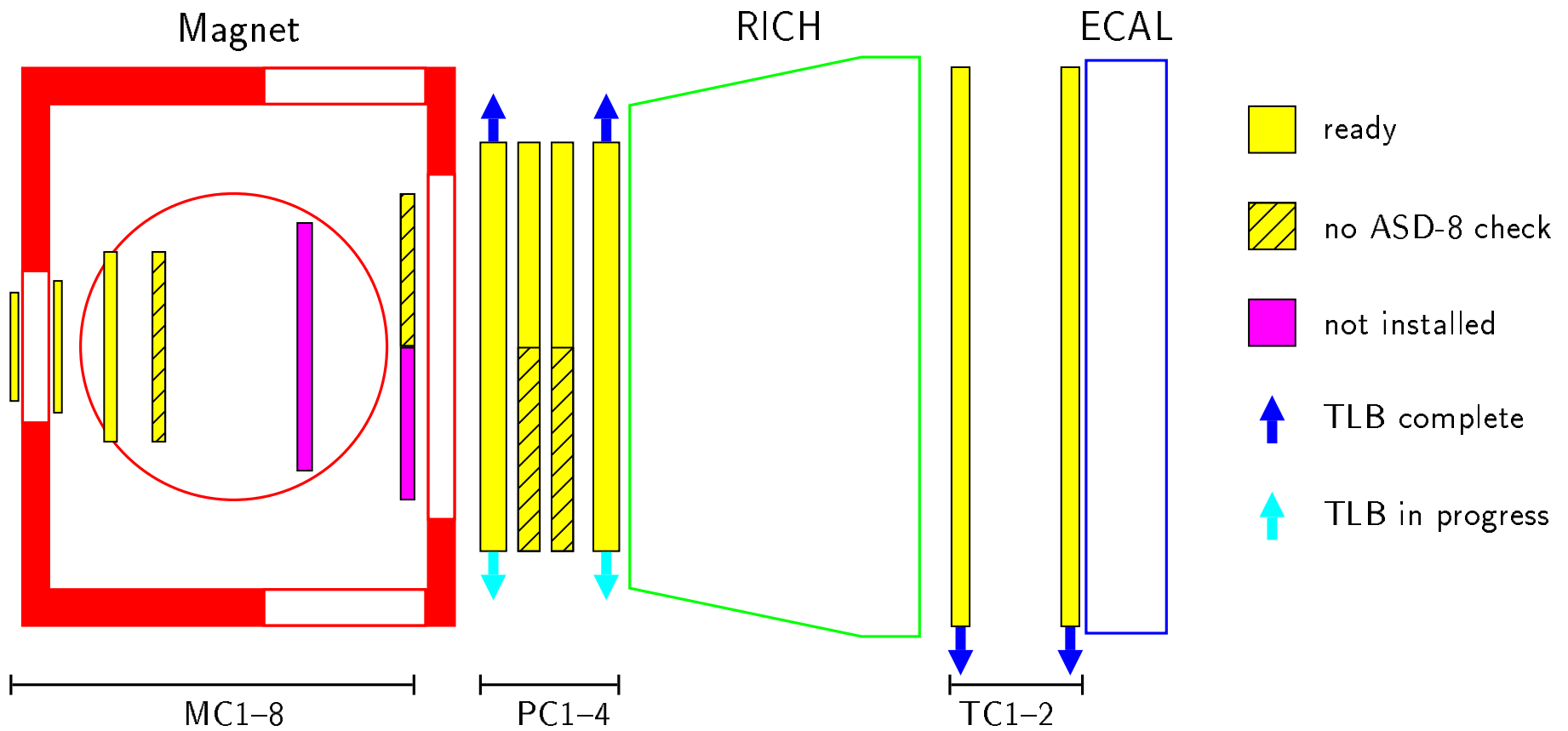
**ASD-8:** MC8+, PC2- and PC3- *remain to be done* ( $\approx 4$  days/chamber).  
ASD-8 check implies *TDC readout test*.

**TLB:** More than 50 % of the modified TLBs are installed.

*New tests* revealed *new problems*:

- stochastic transmitter-receiver mismatches
- link instability with time  $\rightsquigarrow$  repeat 201 tests for installed boards

# Current OTR Repair Status



- Aim for today was: All PC/TC 

# OTR Commissioning Tasks

For the first commissioning tasks we don't need beam, but most of them require **regular access to the detector** (and probably more than is foreseen now).

## 1. Tasks **without beam**:

- Find **gas leak TC2-**.
- Finish **ASD-8 checks** PC23- and MC8+.
- Finalize **TLB installation**.
- ➔ *Debug TLB-TFU connection.*
- Long term **readout and control tests**.
- Noise runs for **threshold optimization** in full system.
- Install **repaired MC6 and MC8-**.

## 2. Tasks **with beam** (few hours each):

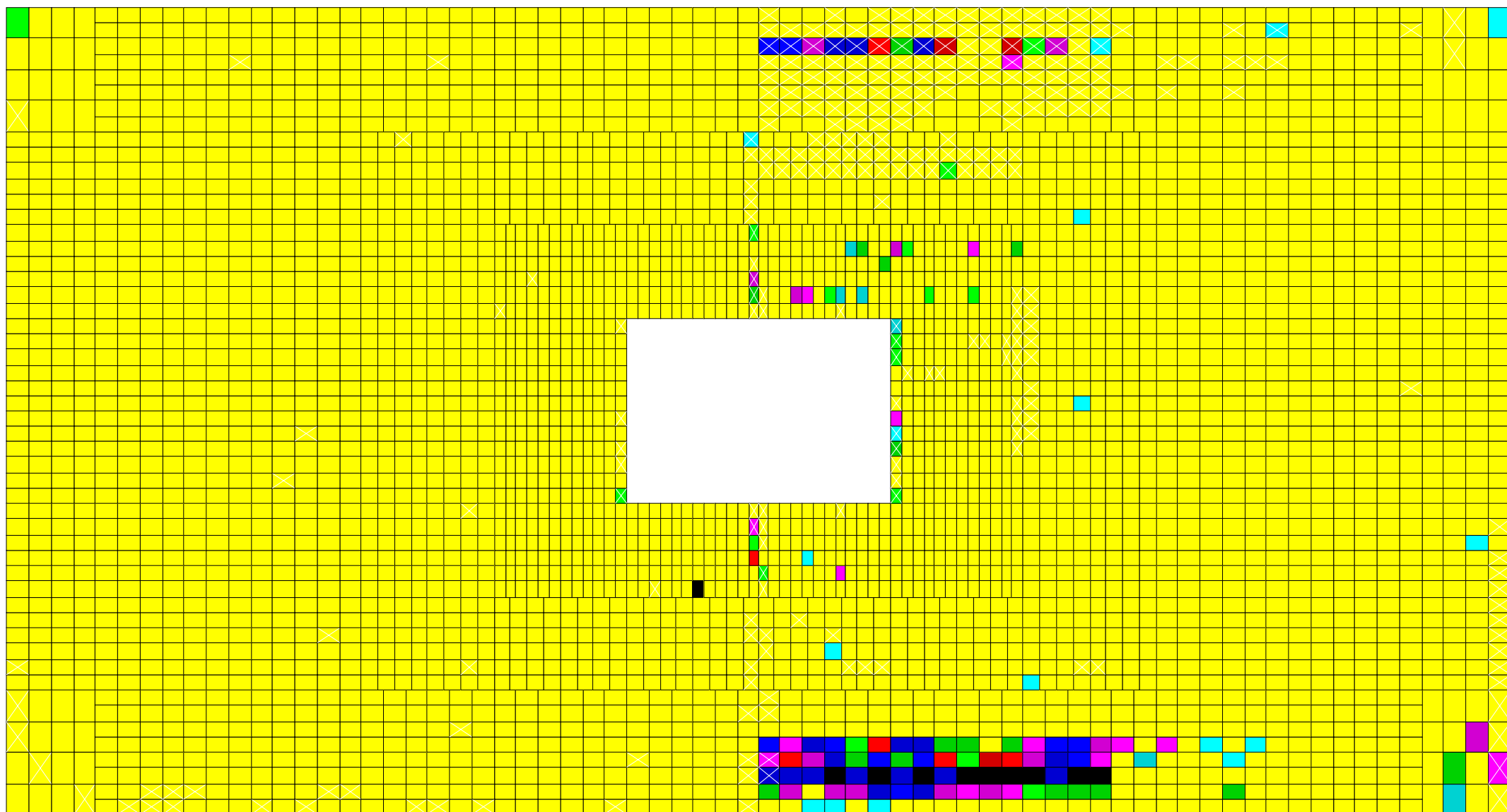
- **OTR calibration and alignment** at old working point (500 000 minimum bias events at 5 MHz).
- HV scan for determination of **efficiency plateau**.
- OTR calibration at **new working point**.

## Status and Plans of Inner High $p_T$ System.

1. All 6 chambers were installed and connected.  
PT3, PT2 with new shielding boxes. PT1 with old shielding.
2. No broken wires. HV training was started.
3. Noise threshold  $\sim 0.7V \implies$

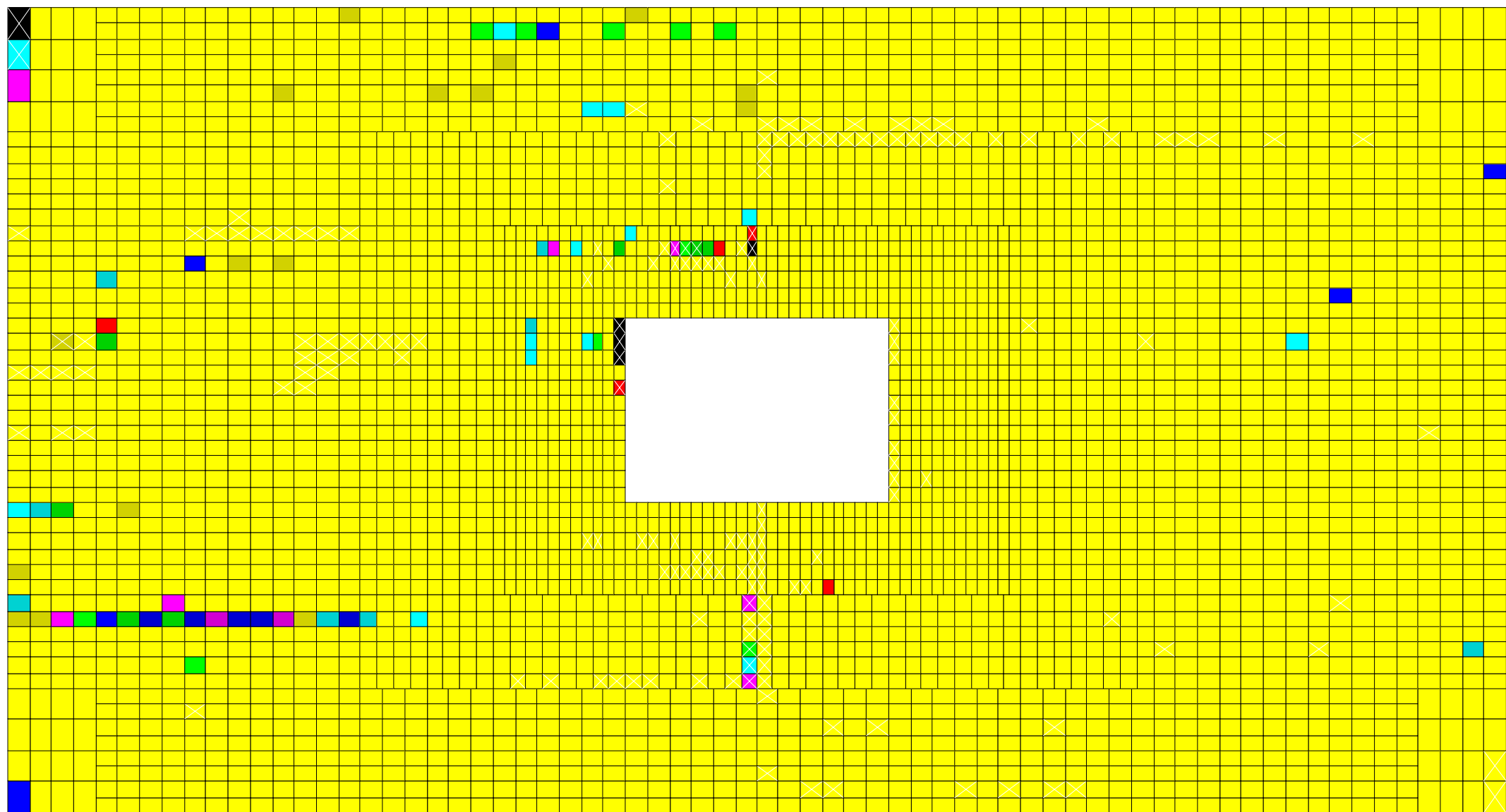
Next steps.

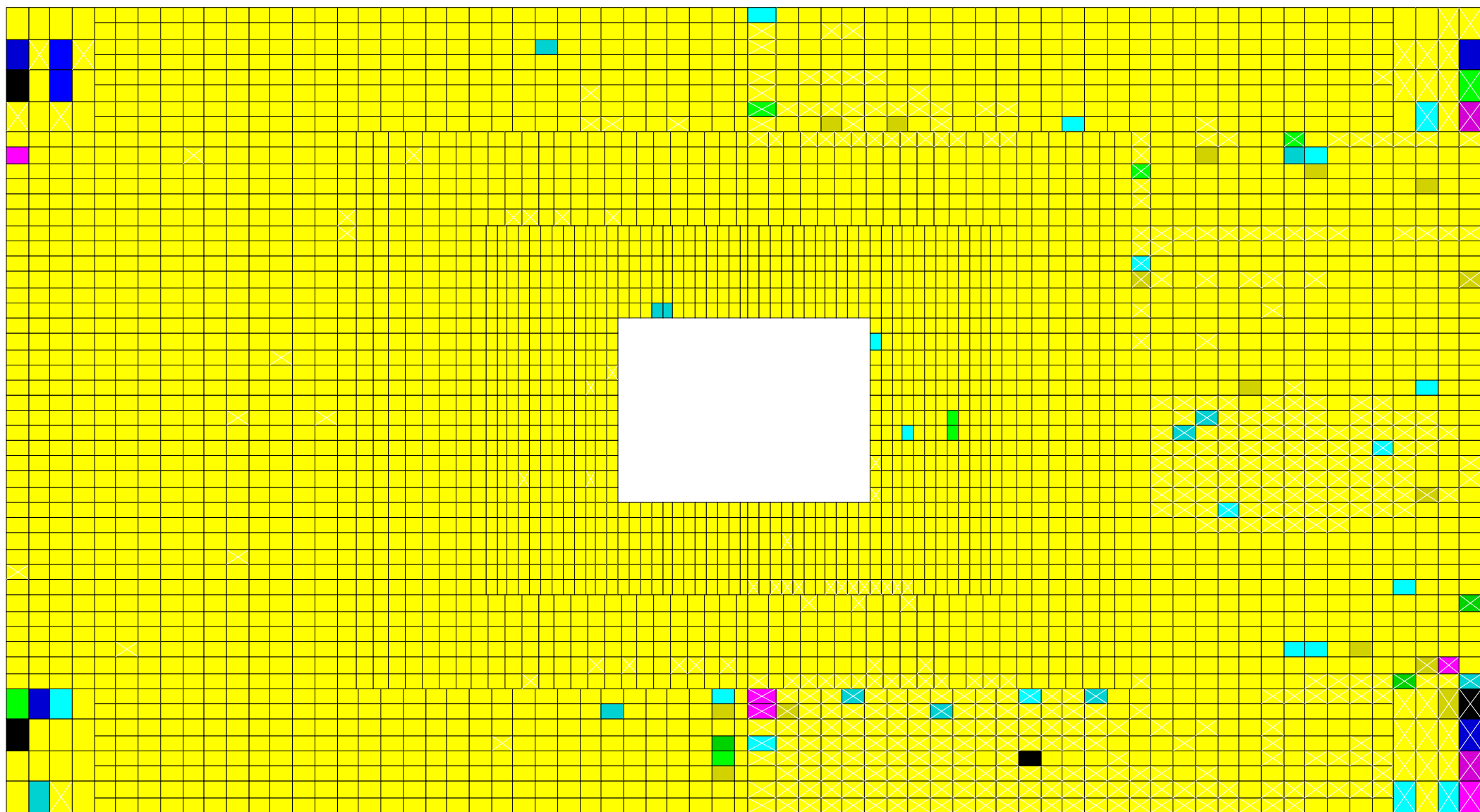
1. Bring chambers to full HV.
2. Watch noise as HERA switches on.
3. Alignment : space, time.
4. Measurement of efficiency.





Layer 2, part 1, #events = 6848 collected on Tue Jul 24 2001 at 17:41:08 ... 21:54:32, exp 4, run 1 (printed on Tue Jul 24 21:54:55 2001)







## **ECAL status 25.07.01**

- 1. Detector upgrade for shutdown 2000 – completed.**
  - Upgrade of Inner HV system**
  - Modification of base – readout coupling**
  - Improvement of cabling**
  - Upgrade of LED test system**
- 2. Tests of ECAL (with R/O disconnected) – OK.**
- 3. ECAL test software package has to be changed to follow last DAQ changes.**
- 4. To be done:**
  - ECAL database update**
  - After completion of R/O tests – detailed test of all ECAL system (extensive use of DAQ).**
  - Software improvement.**



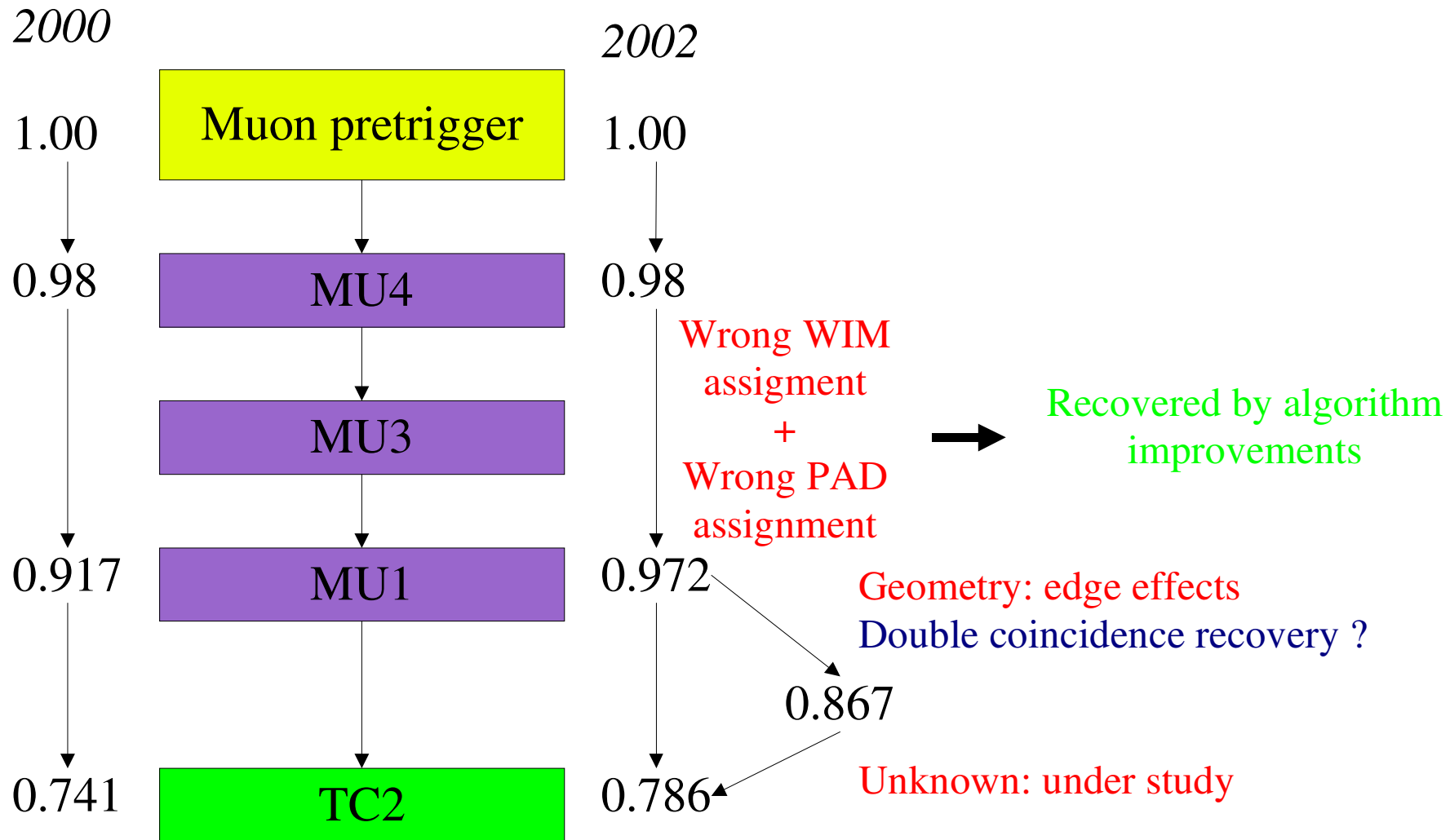
Hera-B technical board  
meeting of July 25 2001

FLT status report

by

Andrea Michetti

# *Muon efficiency studies*



# *Test vector analysis*

- Processing of 2000 data started. Minimum bias at 5 Mhz target rate. Some discrepancies between hardware and simulation found.

A. Ouput of coincidence matrix wrong in special cases:

	Simulation		Hardware
Matrix	0000010111000	-->	0000011111000

Ouput

==> ~10% of events affected but negligible effect on the trigger efficiency because they are highly populated events.

**FIXED !**

B. Starting point of the ROI < 0 ( less than 1% effect) ==>

Simulation	Hardware
Event always lost	Event not always lost.

==> rate in the hardware slightly larger than in simulation.

**NOT YET FIXED**

- Test vector for muons implemented in hardware. Analisis on going.

# *Event by event comparison*

- It allows to check the optical link transmission at event level. Last year only a statistical comparison was available.
- It is technically working. Need to be tested.

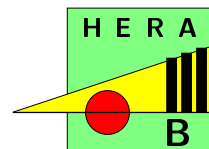


# SLT 2001/2: STATUS AND PLANS

**Peter Kreuzer**  
(for the SLT group)

Hamburg, July 25, 2001  
Technical Board meeting

- ◆ Algorithm upgrades and tuning
- ◆ MC analysis (SLTsim)
- ◆ Main 2002 commissioning plans



## Algorithm upgrades and tuning

1) the MUON-SLT project(s)

Both **MUON efficiency** and **MUON-trigger** projects have some overlap, at least in CnA and hit-preparation.

It takes **1 full-time** task in each SLT and MUON groups.

The steps for the MUON-trigger project are (**Pads+Tubes+Pixels**):

- ◆ introduce MUON Geo and Buffmap in SLT via CnA
- ◆ write PAM-like hit-preparation, first using full MUON-FED
- ◆ introduce FLT-like MUON seeding
- ◆ re-write MUON-SLT (RoI based) tracking code
- ◆ introduce MAP RoI-hit request scheme

⇒ running prototype by mid-September 2001

## Algorithm upgrades and tuning (ctnd)

2) Slicer and Refit fine-tuning on 2000  $J/\psi$  data  $\Rightarrow$

$\Rightarrow$  by mid-August 2001

3) Final upgrades in L2Magnet  $\Rightarrow$

$\Rightarrow$  by end-July 2001

4) Upgrade of the SLT seeding code needed for  $FLT_{single}/SLT_{double}$  mode

$\Rightarrow$  by mid-September 2001

5) Rol tuning in various seeding modes

$\Rightarrow$  by October 2001 (MC) and early 2002 (data)

## MC Analysis (SLTsim)

- ◆ The code has been cleaned and tested
- ◆ Run number (CnAKey) used for SLT-CnA-table initialization (Geo, Buffmap, OTR-Calib, Trig type)
- ◆ Only missing part is a general MC-CnA scheme "a la data" (acread) for the simulation of the detector calibration/masking  
⇒ by end-July 2001
- ◆ If needed, executable from various incompatible summer-2000 periods will be made available
- ◆ For 2002 running, new SLT Makefile for creating executable (Online and SLTsim) directly from SLT repository and generate a tag
- ◆ Before 2002 commissioning starts, plan to upgrade MC-2000 SLT efficiency with best known detector efficiency/masking.  
Add MC-truth matching  
⇒ write an SLT performance note

## Main 2002 commissioning plans

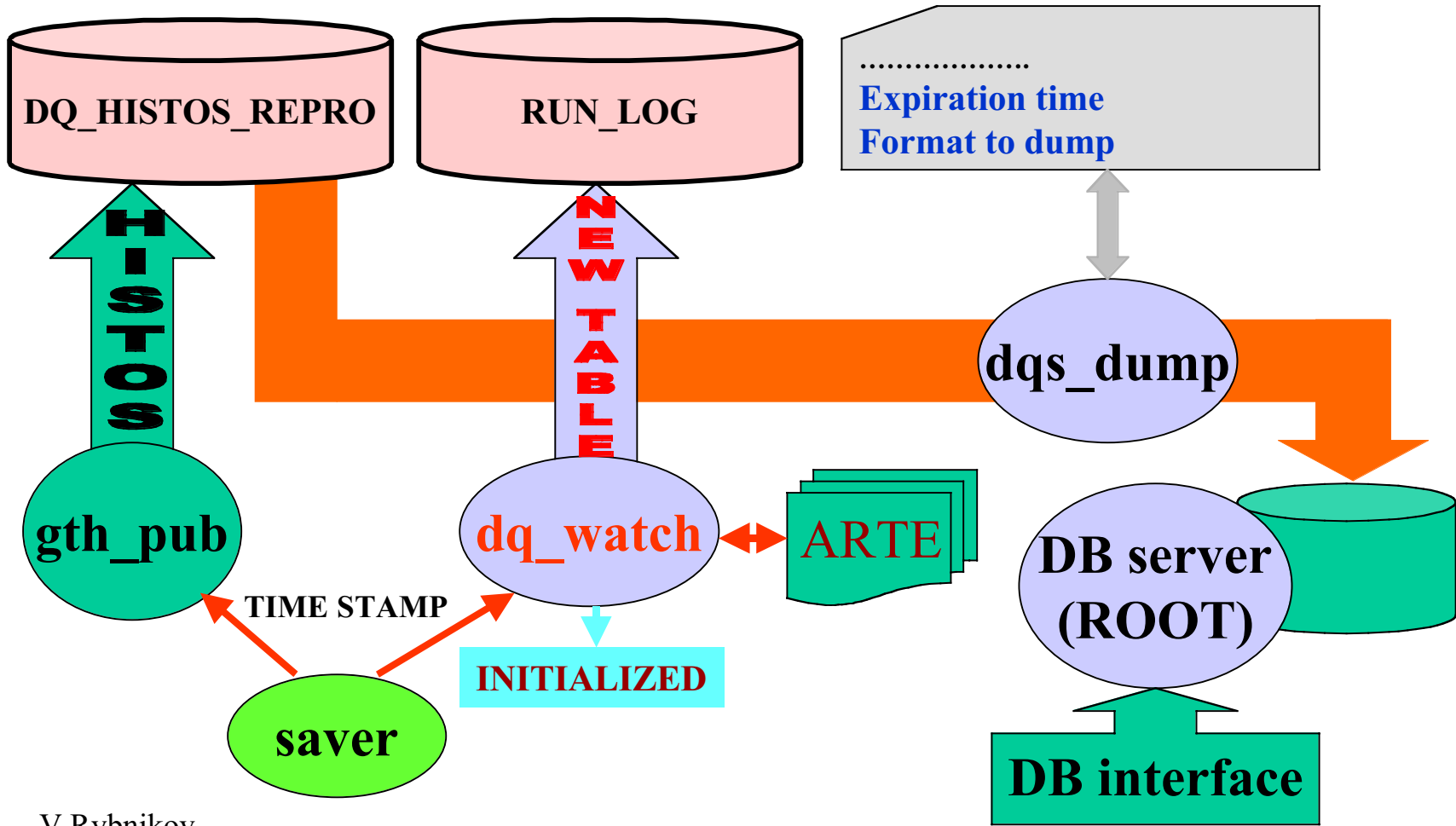
- ◆ Detailed evaluation of SLT efficiencies on 2002 MC, in various seeding modes
- ◆ Evaluate effect of track-multiplicities and soft-tracks on SLT performance (summer student ?)
- ◆ Cycle new SLT code online during "dry-run"
- ◆ Test new ITR sparsification code
- ◆ Test pre-trigger and FLT seeding modes
- ◆ Acquire enriched MUON and single-lepton samples to evaluate SLT efficiencies on data
- ◆ Evaluate trigger reduction and timing using 2002 PRE/FLT data

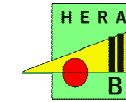
# L4 Farm Status

- Farm being used for reprocessing tests
- Archiving data next year:
  - 2000 logging rate: 5 MB/sec
  - Last reprocessing tape robot throughput: 10 MB/sec
  - So far high priority for us in write queue
  - Next year improvements
    - Double number of tape drives (currently 3 write, 10 read)
    - DESY dcache project
    - More clever HERA-B logging/archiving
  - With all the improvements we'll be able to log data next year at a rate above 10 MB/sec
  - Current peak logging rate in reprocessing (without archiving): 12 MB/sec (60 Hz, 180 ARTes, 3 secs, 200 KB/event)



# DQ histogram path





# DQ histogram visualization

