

## Forward RPC working Meeting02 CERN 12.2.04

*Present: Peter Levtchenko, Austin Ball, Ian Crotty, Walter Vandonicnk, Leandar Litov, Serguei Akimenko, Archana Sharma*

### Agenda

- **Local infrastructure issues (Peter / Austin)**  
**Discussion of unloading and storage issues; suggest keep item in meeting agenda each 15 days due to crowding of deliveries**
- **RE Schedule (Walter)**  
**Gaps arrive mid March**
- **Status from China (Sijin)**  
**See page 2**
- **GIF RE1/2**  
**See page 2**
- **Cable preparation in Millerin's facility (Ian)**  
**Machines available to us when needed**
- **Information of Bakelite, gaps, FEBS, Adaptor boards (Walter)**  
**At next phone meeting**
- **Gas Leak QC, preparation of gas lines,**  
Gas QC documentation and communication to Korea  
(Ian is working on this)
- **HV QC preparation (gas, boxes, modules)**  
**Start HV QC definition**  
16 HV boxes for QC started; **See photo page**
- **DAQ:**  
Labview s/w and h/w delivered 11.02.03  
Installation work starting 25.02.04  
HV module rented from E-Pool
- **Chamber Assembly Procedure**  
Bending gas pipes in chamber  
HV Cables inside chamber  
Cutouts in honeycomb panels for HV  
**To be investigated in test chamber work starting 25.03.04**  
**See page 4**
- **Scintillators, mechanics, tooling, misc**  
**See attached file rpc-trig.pdf**
- **Scissor Table for manipulating gaps and chambers (Jean Paul)**  
**See page 3**
- **Plan Beam test with CSCs - Not discussed**
- **Production Data Base started**  
(Full report will be given in CMS week).

## News From China

(Sijin by e-mail)

- **Chinese Prof. (Jun) to arrive 1st week March** [Should be ok.](#)
- **Strips production for Pakistan:** contract signed production started, expected to finish by 20/4; air-ship to Pakistan. [Noted](#)
- **Ferrule production:** 1/2 of total 100K pieces delivered to Peking Univ., another 1/2 in a couple of weeks; air-mail to Pakistan. [Noted](#)
- Chinese colleagues need following materials to be procured at CERN
  - (a) **Gas and water unions**
  - (b) **40 pin connectors on patch panel**
- Order negotiation with Mr. Leone
  - [Ian said that this is 'rolling', the order has gone through.](#)

## RE1/2 GIF Chamber:

Sits between barrel chambers and MDTs in the GIF, with absorption filter 1

**Since Feb 11 11:00 hrs on HV after two days of flushing with gas:**

Status @ 12:10 hrs 12.02.04

Main	Utility	Setup	Groups	View	User	Group
Channel Name	V0Set	I0Set	VMon	IMon	Pw	Status
endcap_1	_ 9000 V	700.0 uA	9000 V	92.7 uA		On
endcap_2	_ 9000 V	700.0 uA	9000 V	27.4 uA		On
endcap_3	_ 9000 V	700.0 uA	8998 V	18.0 uA		On

### **Current Still Going up:**

101.7; 30.2, 20.3 respectively @ 5.07 pm 12/2/04

Need from Chinese and Korean Colleagues – history of this chamber; origin and treatment of bakelite, resistivity, processing etc.

**Photographs of the scissor table, lab:**

Minimum horizontal position



Maximum Horizontal Position



Mechanism for blocking vertical position



In vertical handling position



Cosmic Stand

The three gas racks: Gap QC, HV QC and Cosmic tests



# Muon trigger

Serguei, Archana, Leandar

12.02.04

# Introduction

## ❖ Test of scintillators

- Noise

- Efficiency

- Time stability

## ❖ Trigger rates

## ❖ Some pictures

# Scintillators

Dimension – 165X20X1 cm

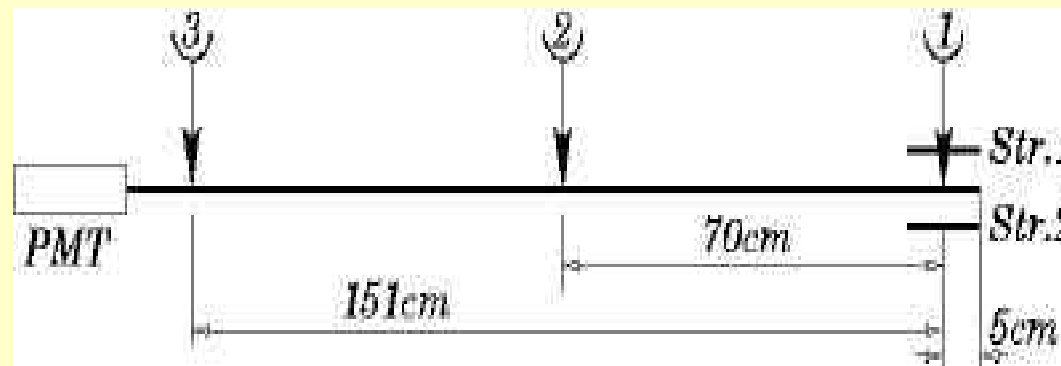
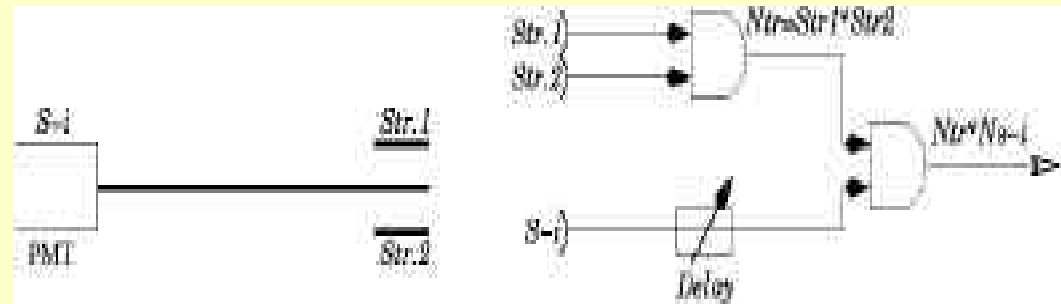
Can work up to 180 cm

32 scintillators

32 scintillators – 350x20x1 cm – spare

For the trigger we need 16 -18 scintillators

(2 layers – 8 scint. Each + 2 additional scint.)



# Efficiency

Requirement – at position 1

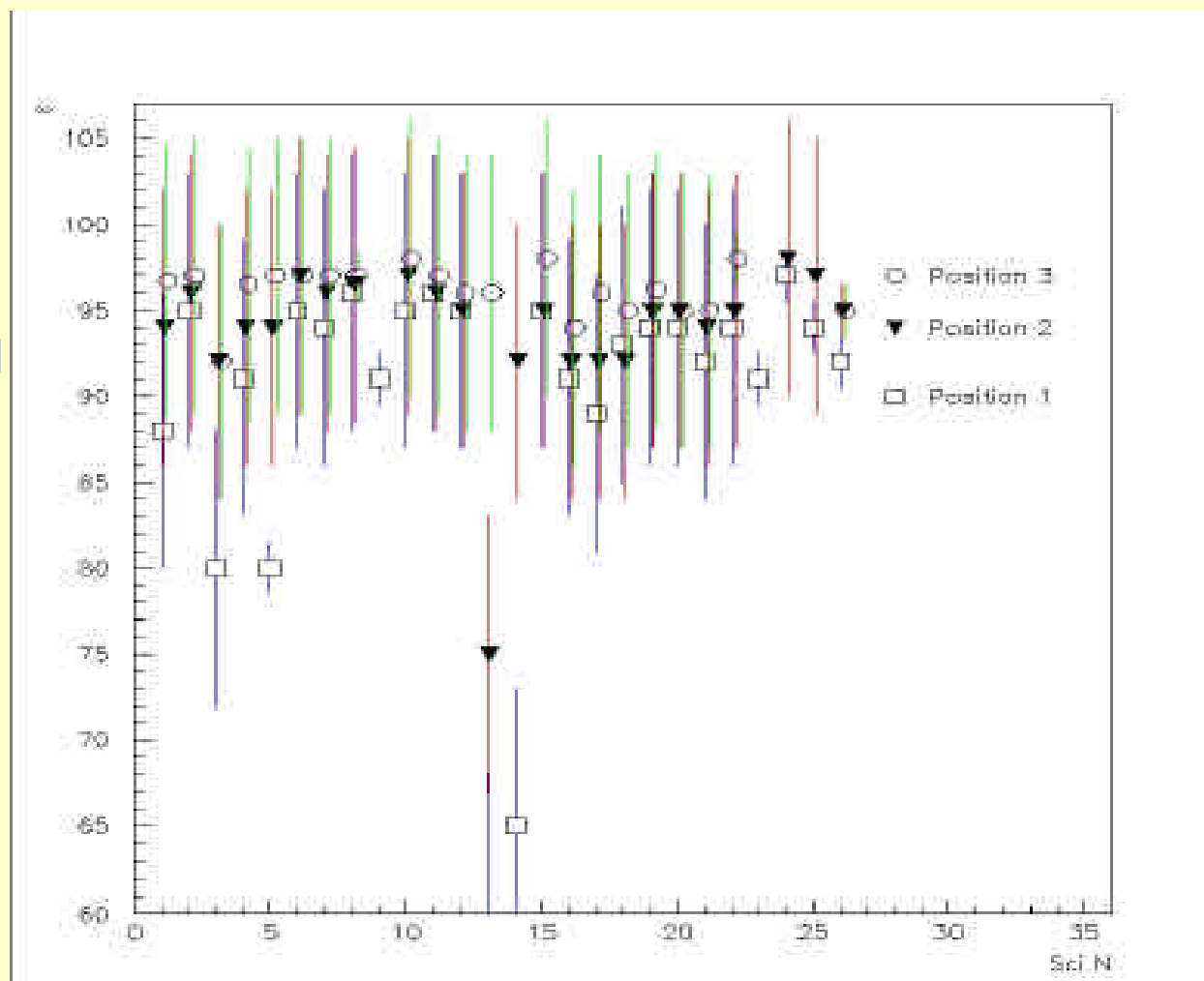
$$\varepsilon_{eff} \gtrsim 90 \%$$

20 scintillators - good enough

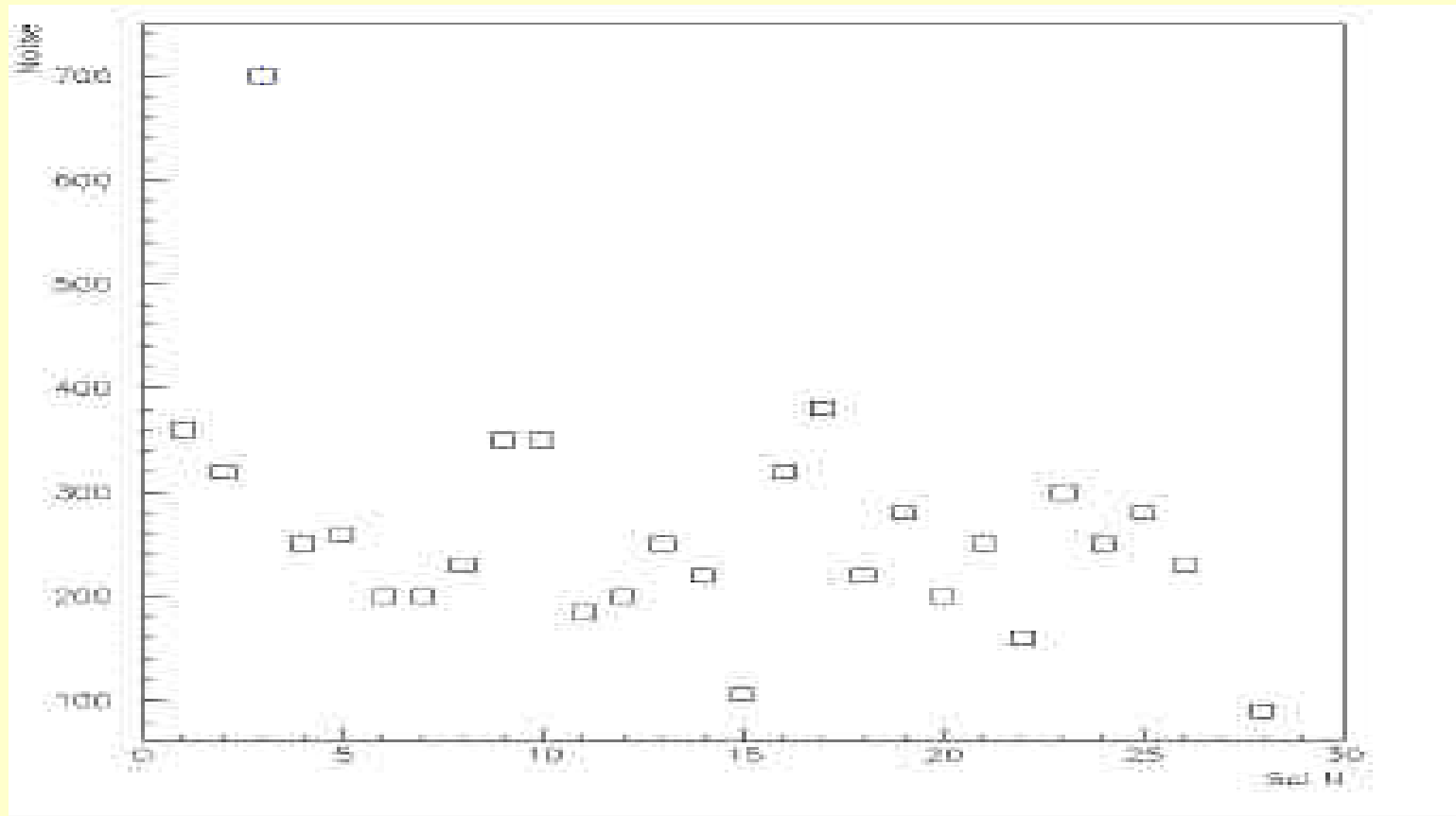
12 scintillators – need additional work

Change of the HV distributors

Change of the PMT



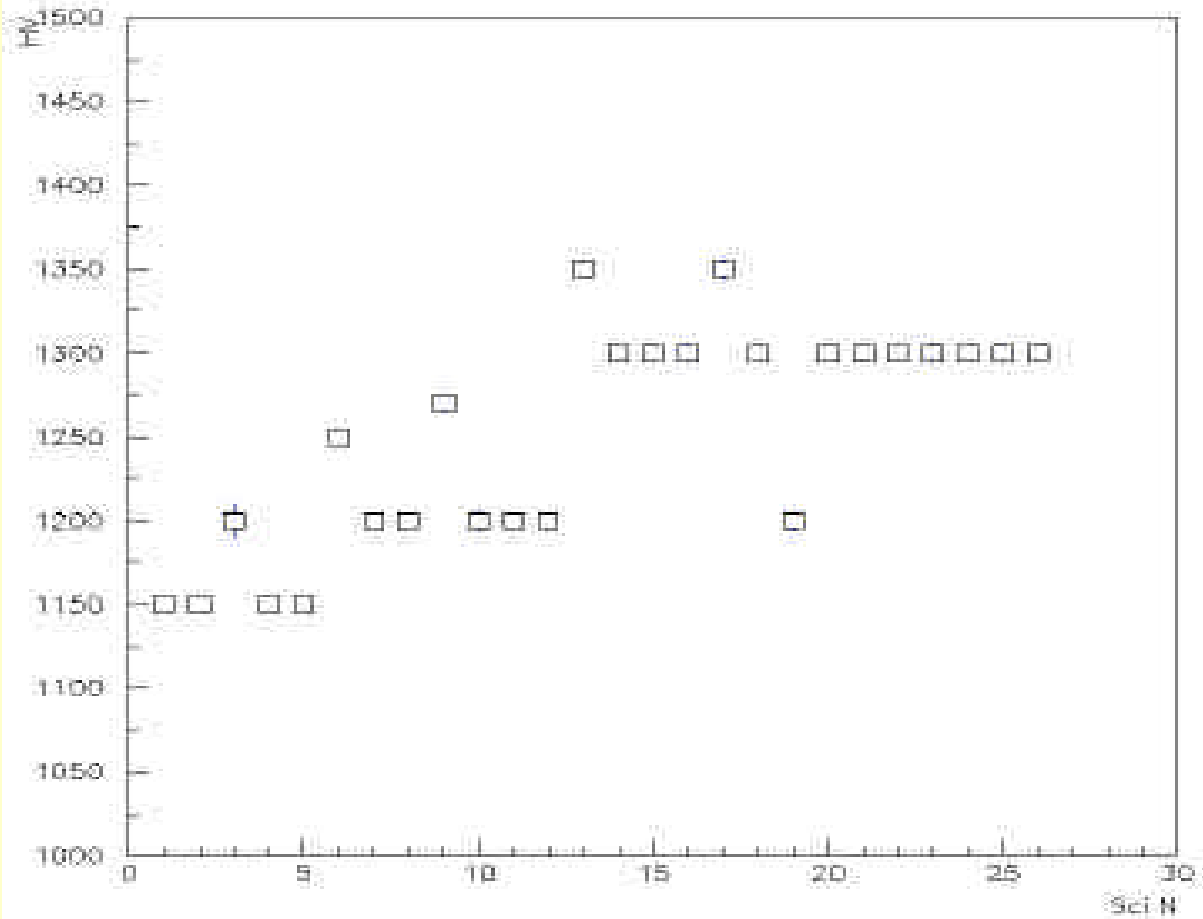
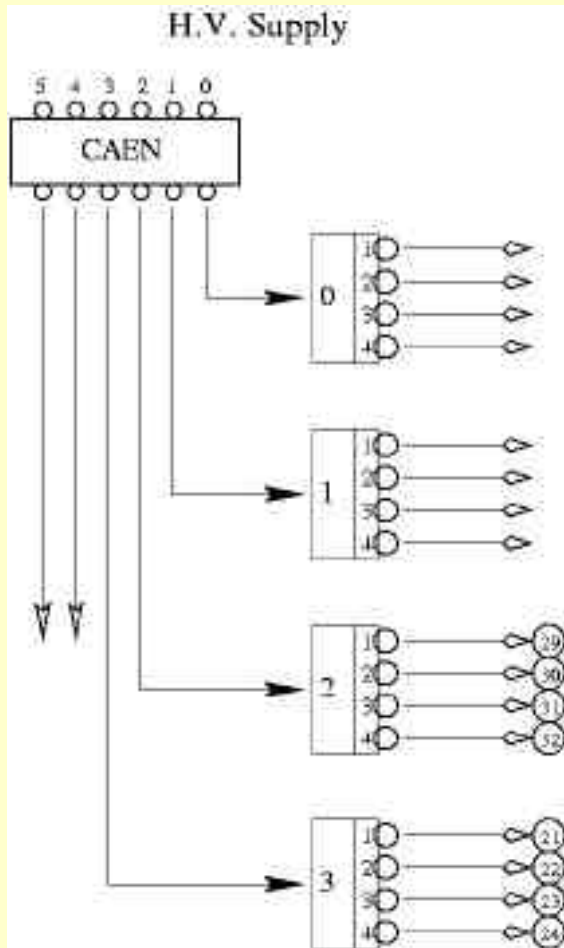
# Noise



For good scintillators the noise is in the limits  $(200 - 350)/s$

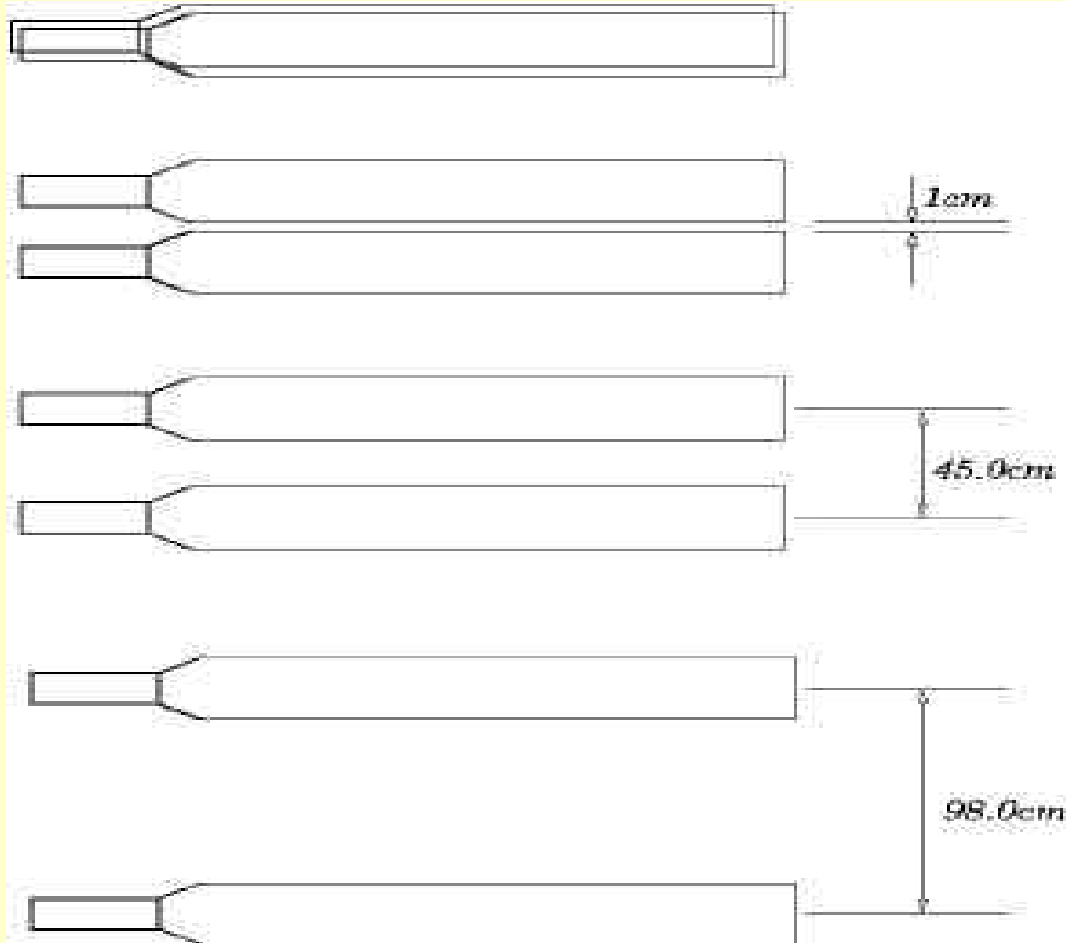


# High Voltage



# Trigger rates and accidental coincidence

$N = 18.2/s$

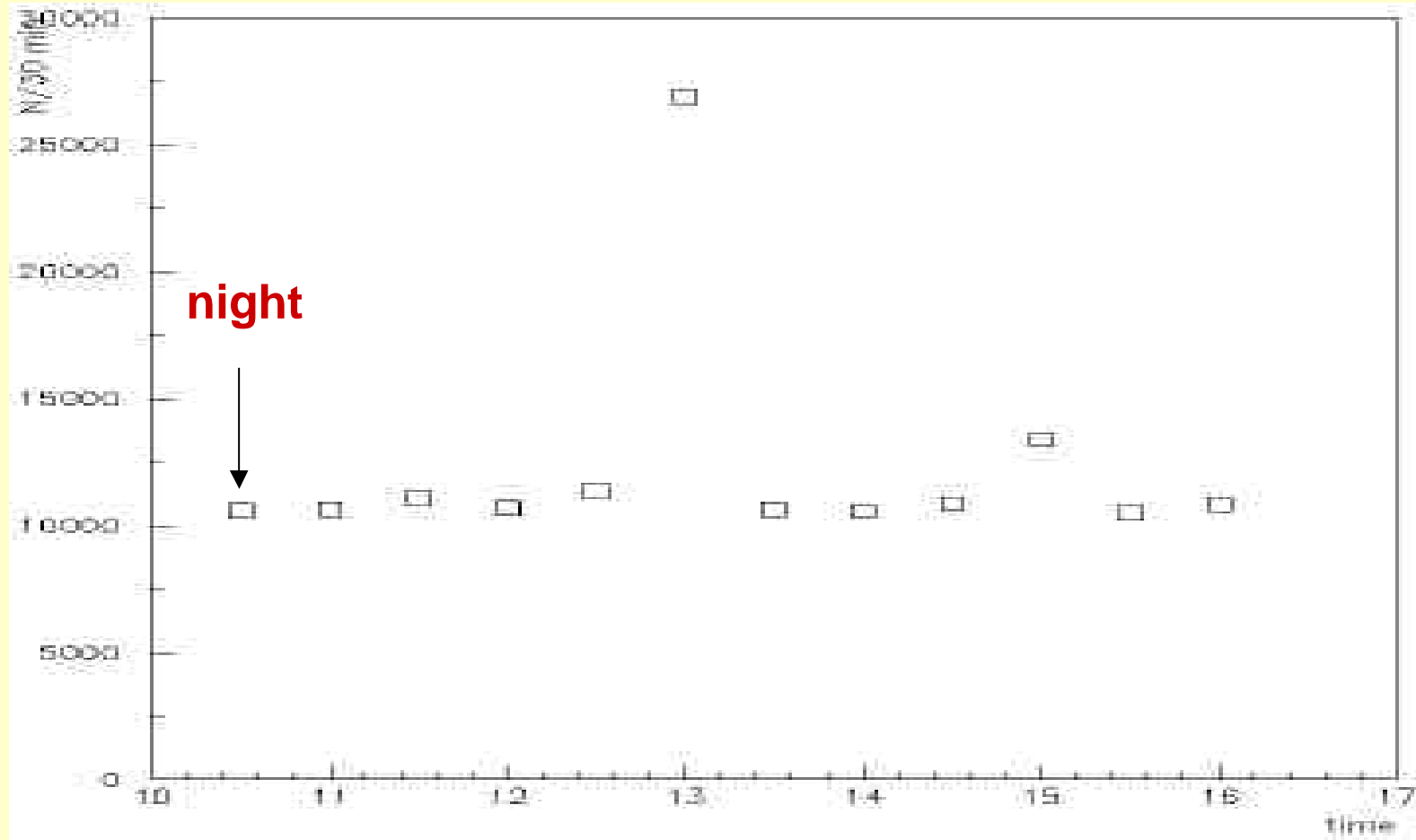


$N = 0.8/s$

$N = 0.17/s$

$N = 0.12/sec$

## Time stability



We see the sun ?!

## Trigger Rates

Trigger telescope – 2 scint. x 2 scint.

$H \sim 1.80 \text{ m}$

5 days measurement

$N / \text{day} = 5.94 \cdot 10^5$

Full surface  $N / \text{day} = 2.376 \cdot 10^6$

Number of the strips  $3 \times 32 = 96$

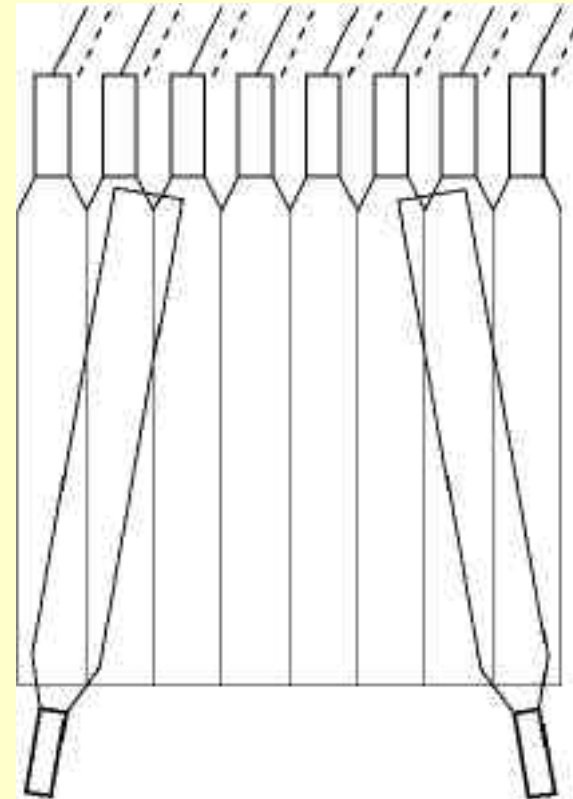
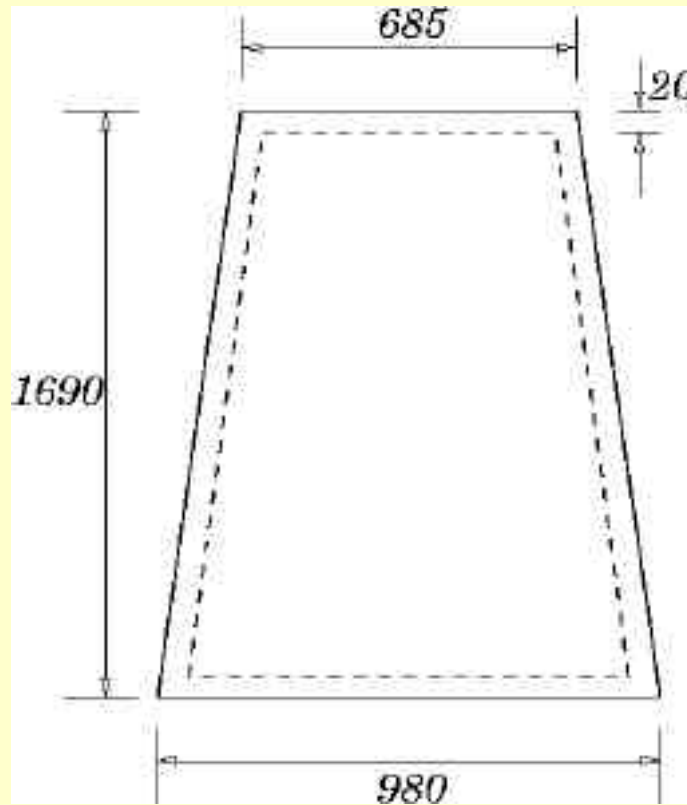
If we want to have 10000/strip

$N / \text{chamber} \sim 10^6 \text{ muons}$

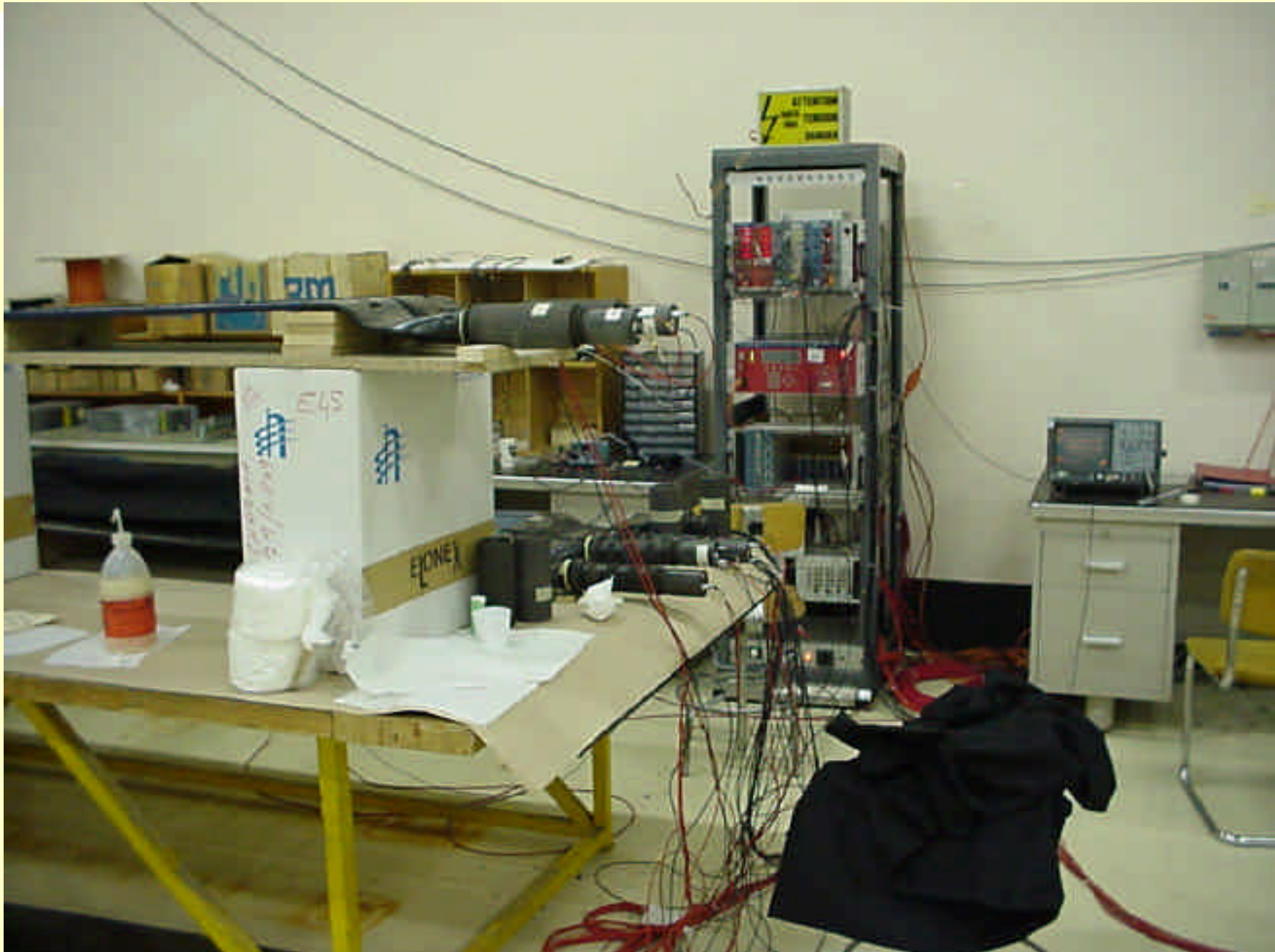
$S_{\text{ch}} \sim 0.5 S_{\text{trigger}}$

Full measurement of the chamber -1 day

## Trigger set-up



Two movable scintillators to match the chamber's dimension



Serguei, Archana, Leandar

Muon trigger

12.02.2004

## Conclusions

- ❖ We have 20 good scintillators
  - ❖ Efficiency > 90%
  - ❖ Noise ~ (200 – 350)/s
  - ❖ HV 1250 +/- 100
- ❖ Expected trigger rate 27.5 /s
- ❖ Expected random coincidence < 1.5 Hz
- ❖ Trigger is stable in time
- ❖ To be done
  - ❖ Efficiency can be improved
  - ❖ The random coincidence can be reduced – gate 50 ns