

HPTD Beam Test (L0 and MIP)

Aug. 2011. at PS T10 Preliminary Results

Gergő Hamar on behalf of the
REGARD Group and the
VHMPID Budapest Group

Beam test group:

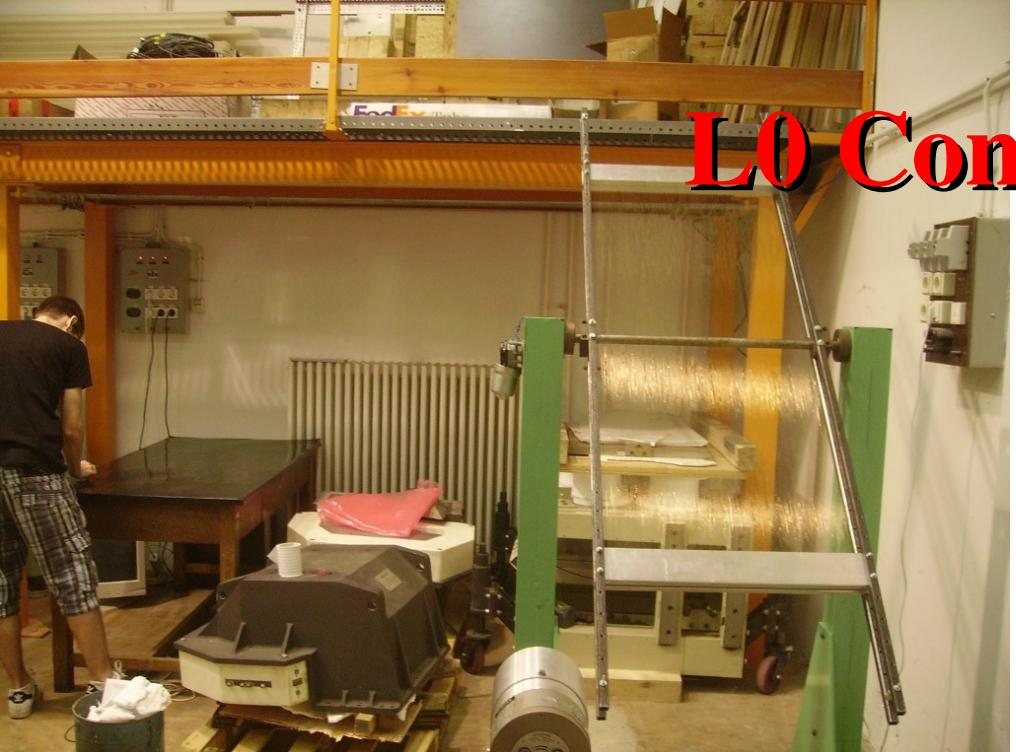
G.Bencze, G.Bencédi, G.Hamar,
G.Kiss, M.Mátyás, L.Oláh, D.Varga

28.09.2011. VHMPID Meeting

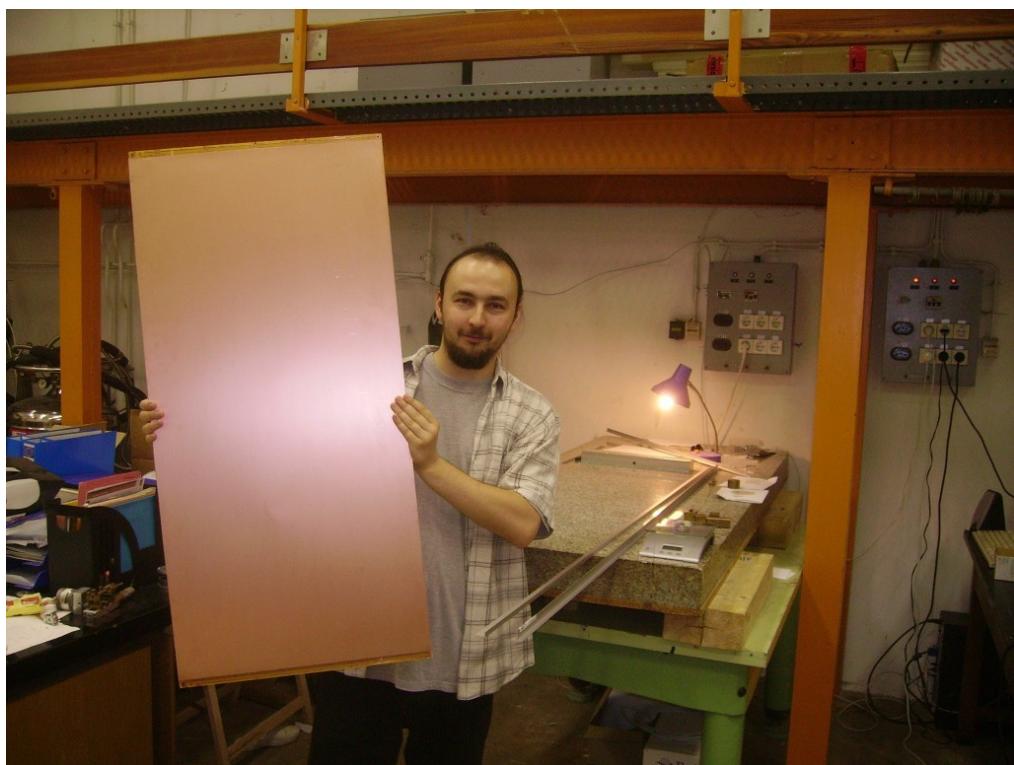
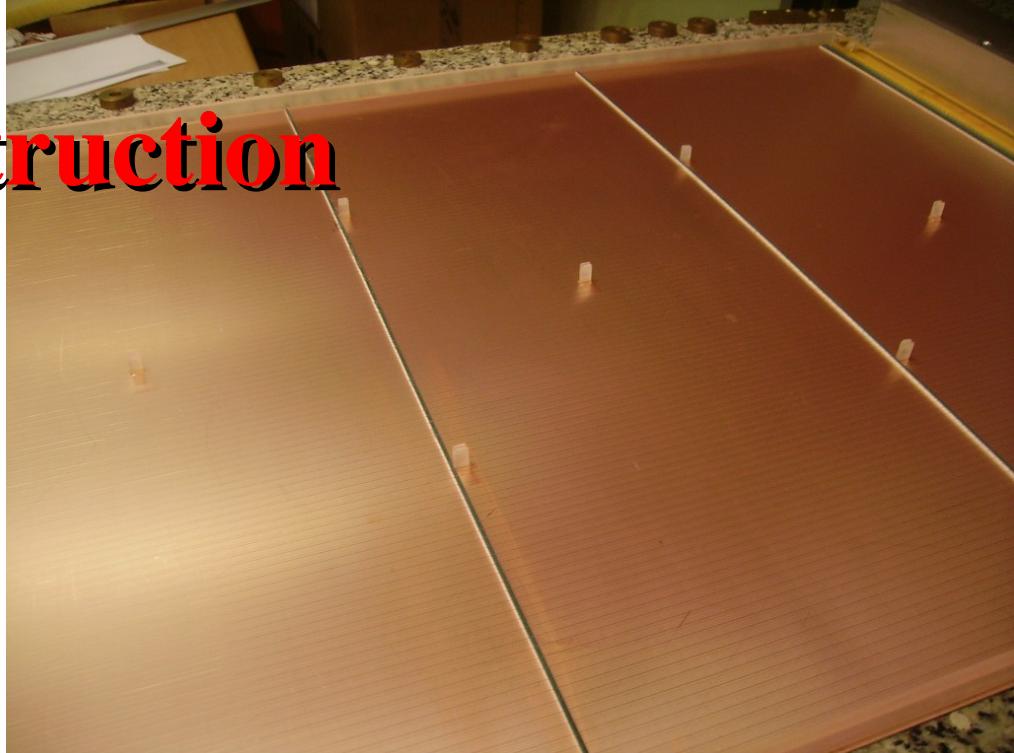
Chambers at the Test Beam

- 50cm x 50cm CCC prototype from last year
- New 32cm x 32cm MIP Chambers
 - CCC technology
 - Projective geometry
 - 4 mm pads; 4 mm wire spacing
 - Used electronics : same as for the L1 chambers :
amplifier+discriminator → 1 bit / pad → shift register → DAQ
- New 50cm x 100cm L0 Chambers
 - CCC technology
 - 4 mm wire spacing
 - No pad structure
 - SuperPad structure via wire groups
(20mm and 48mm)
 - Used electronics : fast amplifier + discriminator → 1 bit / SuperPad

L0 Construction



L0 Construction



HPTD - Test Beam Setup

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...50cm
prototype

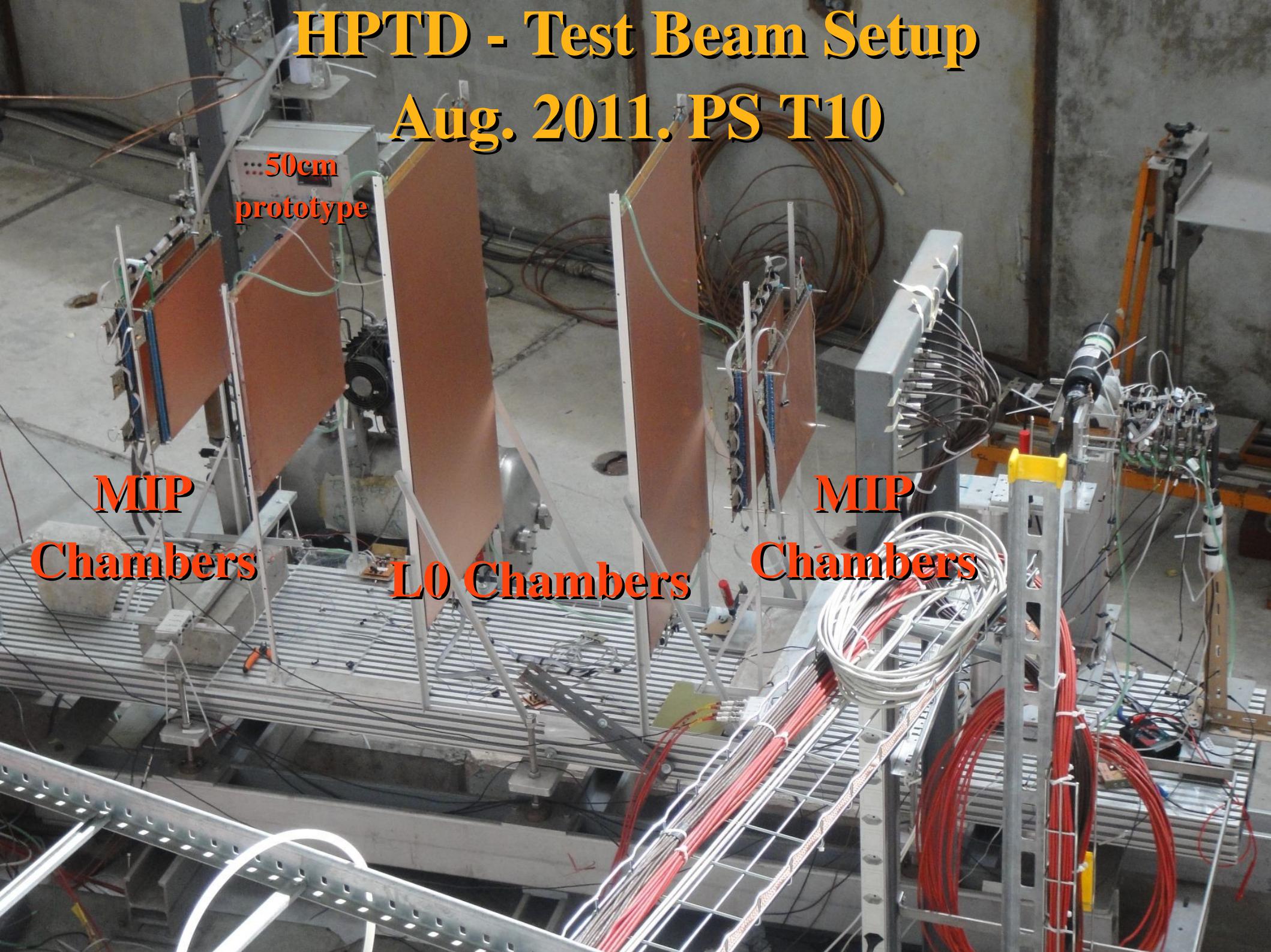
MIP

Chambers

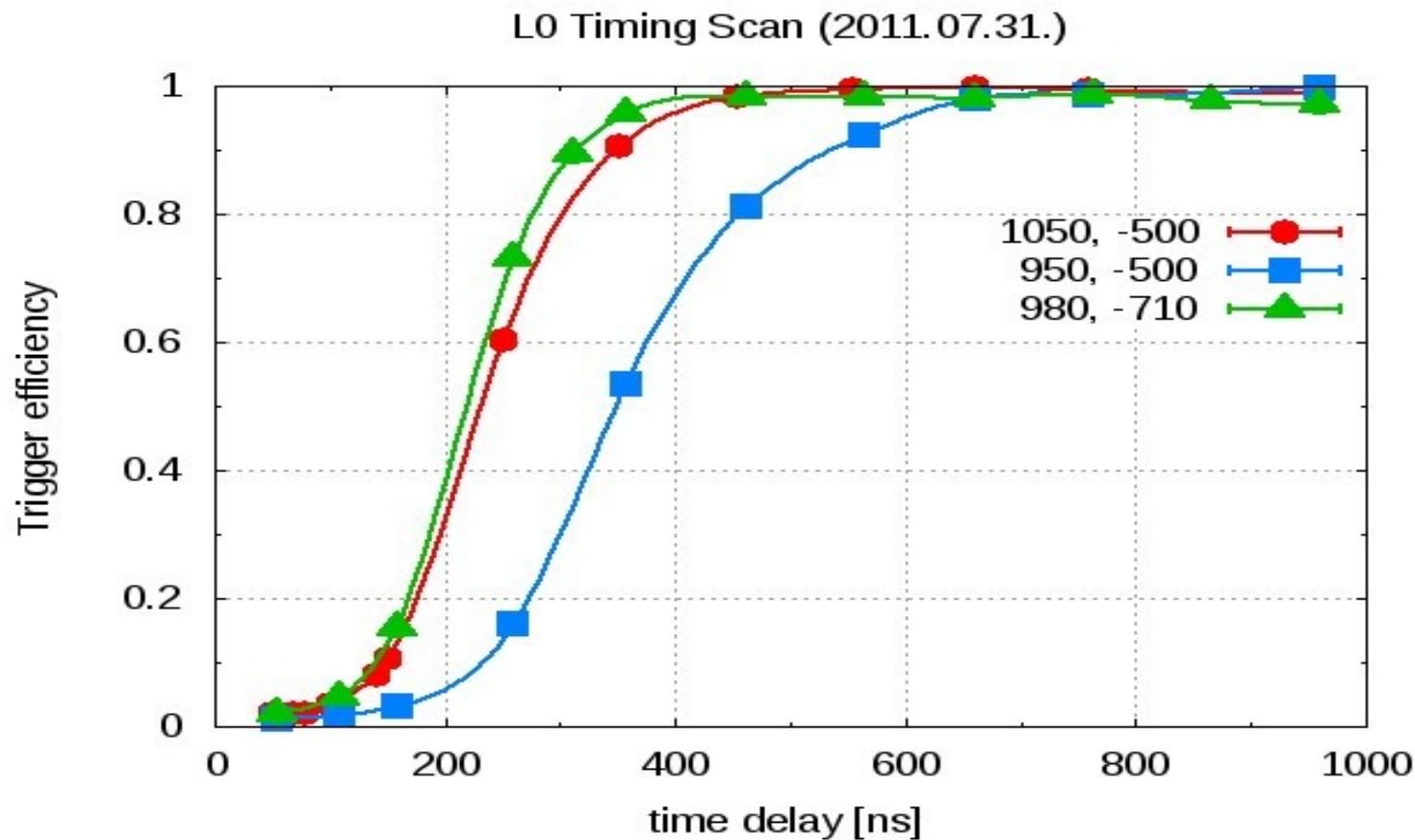
L0 Chambers

MIP

Chambers

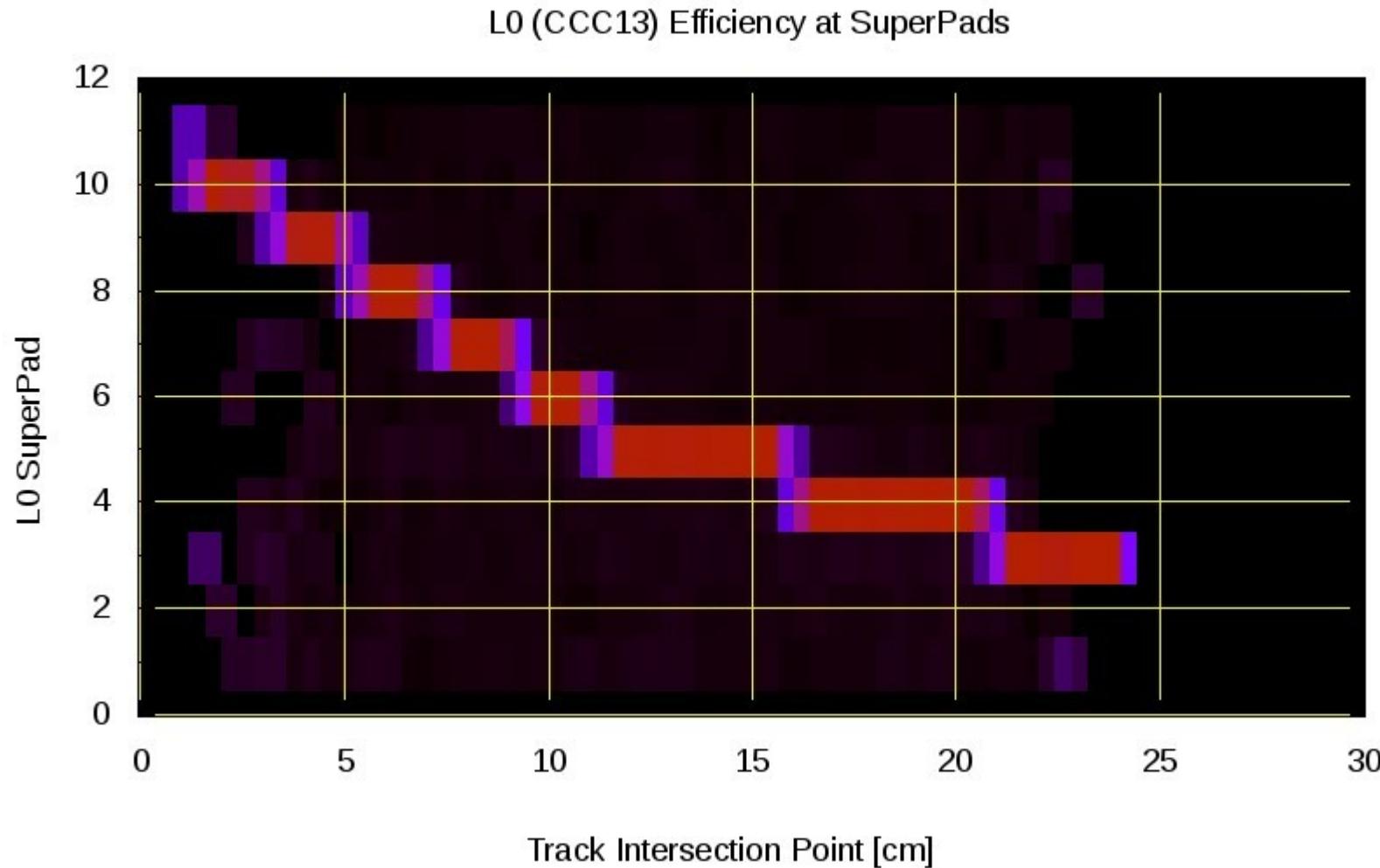


L0 Timing



- L0 timing have been studied with different voltage settings (**Standard**, **Low gain**, **High cathode voltage** with standard gain)
- Relative 95% efficiency at 400 ns

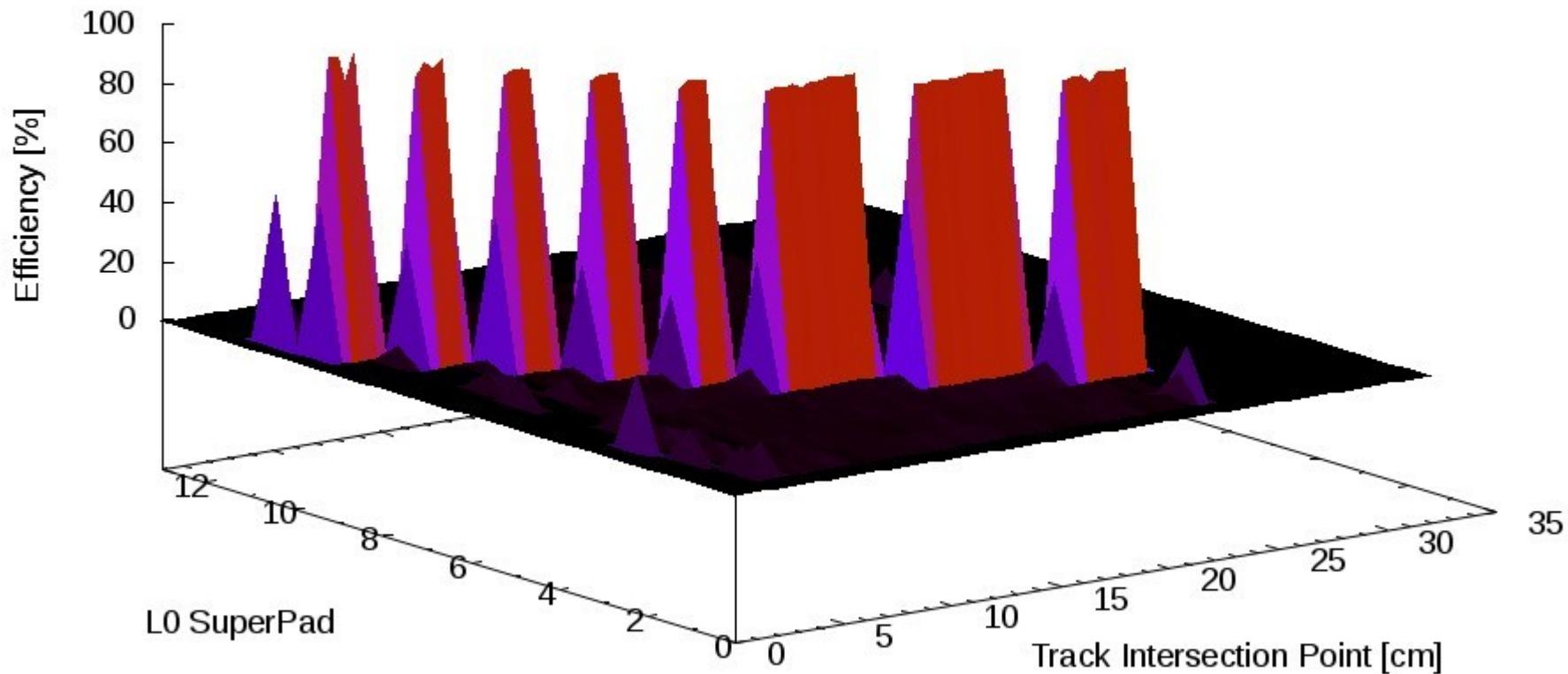
L0 : SuperPads



- “SuperPad” segmentation via wire groups
- SuperPad size : 20mm and 48mm
- SuperPad readout : fast amplifier, discriminator → one bit information

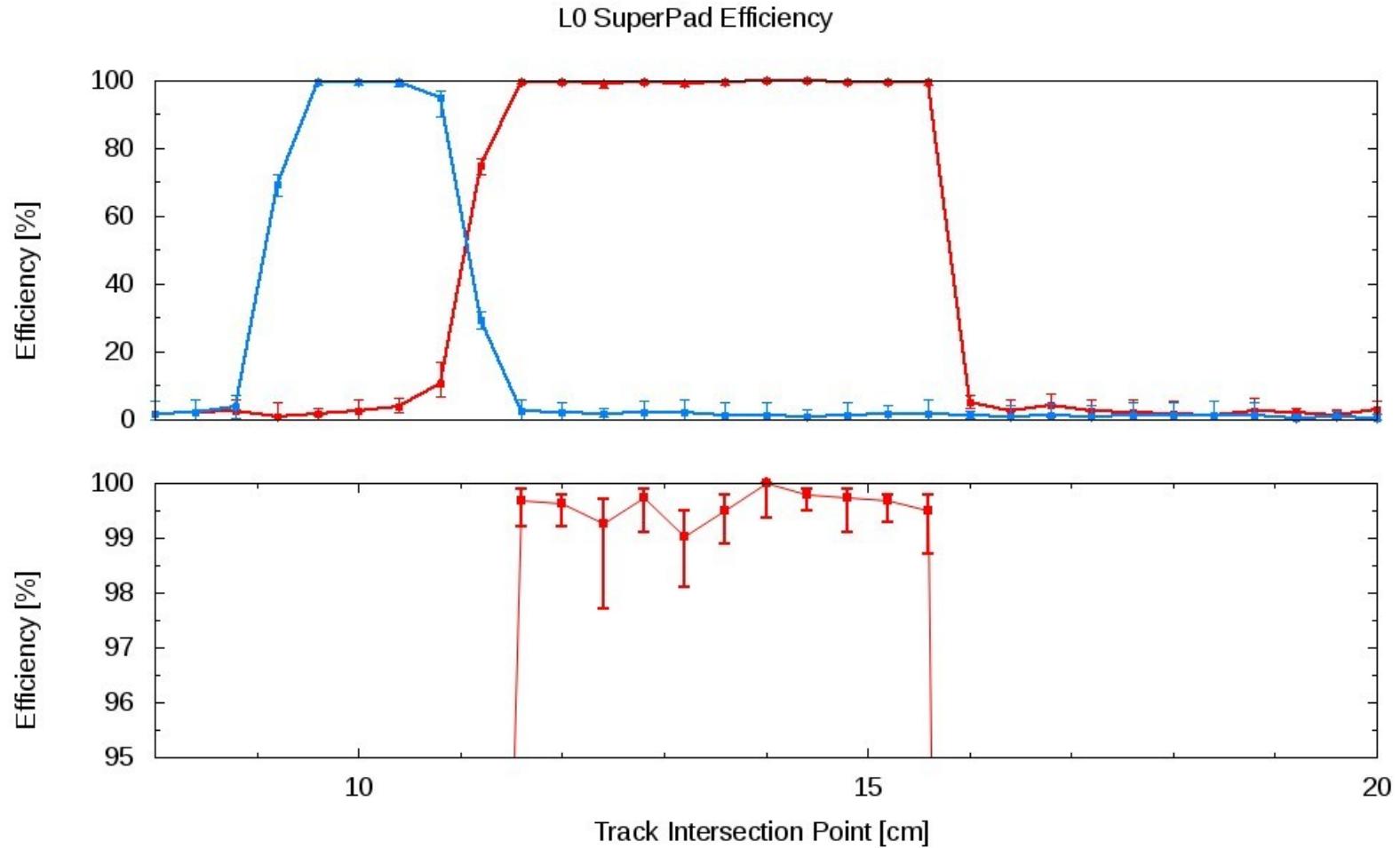
L0 Efficiency

L0 (CCC13) Efficiency at SuperPads



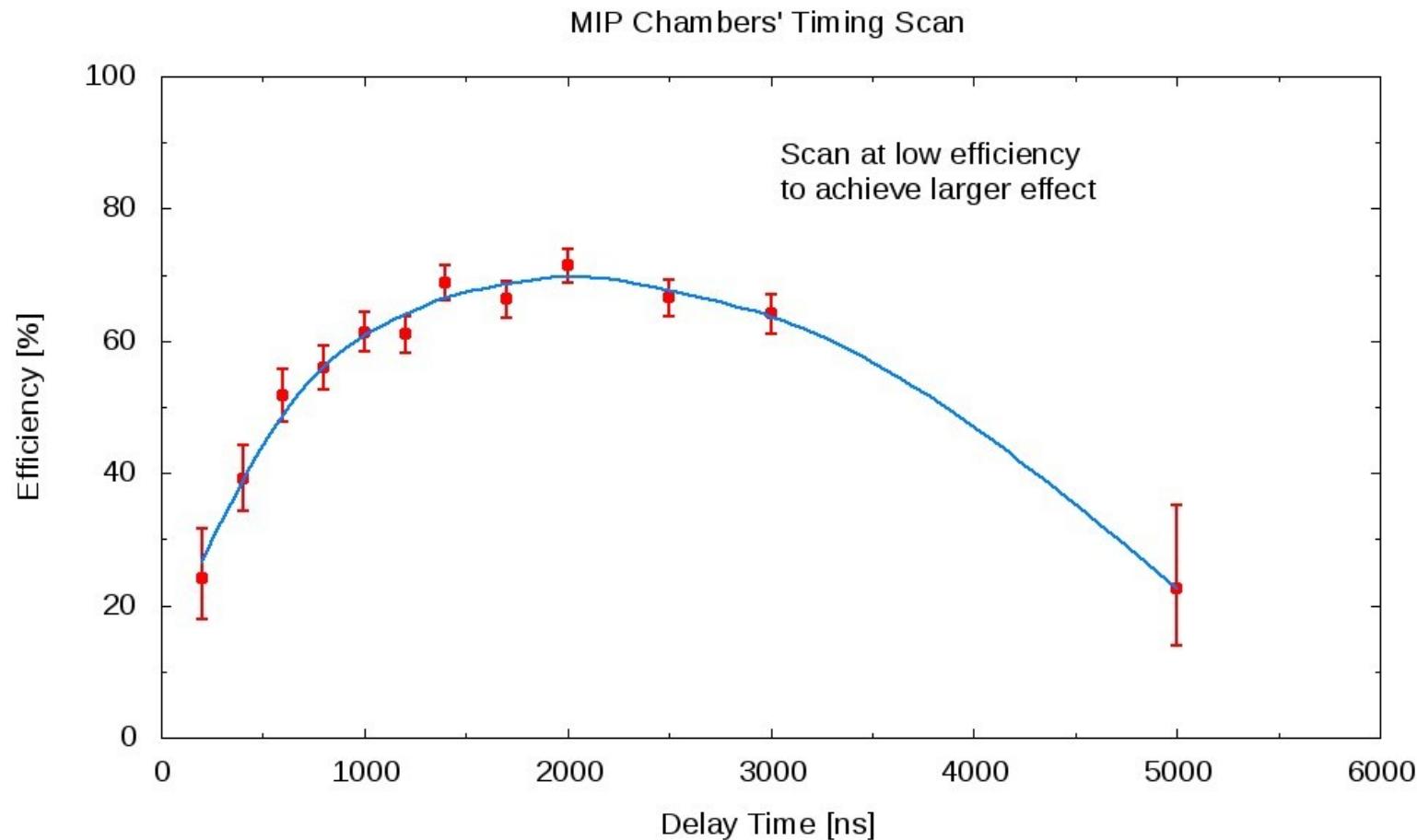
- High efficiency for all SuperPads

L0 Efficiency



- Each “SuperPad” reach 99% efficiency
- SuperPad borders are sensitive as well, no loss in efficiency
(clusters with 2 neighboring SuperPads)

MIP Chamber : Timing Scan

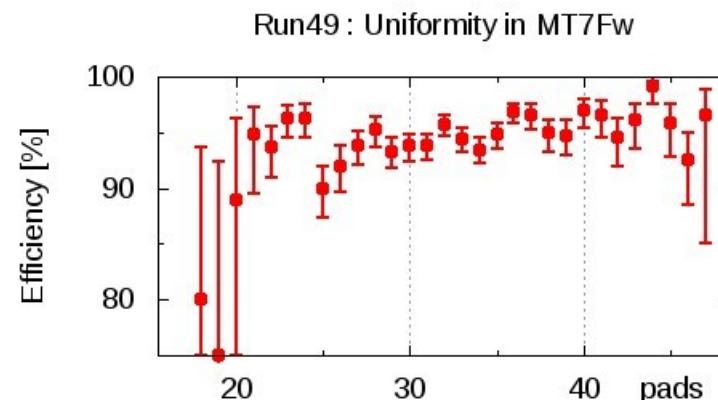
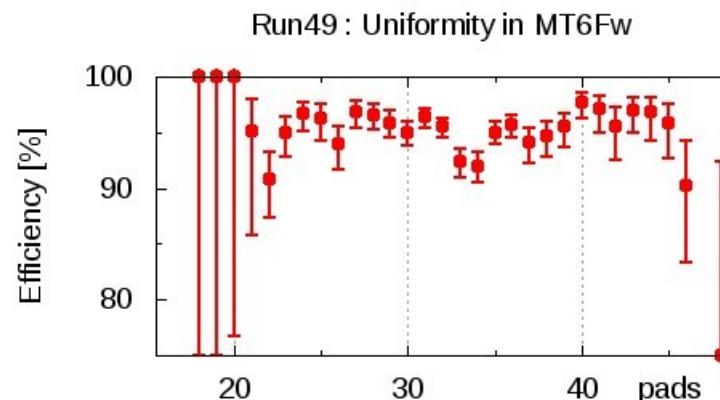
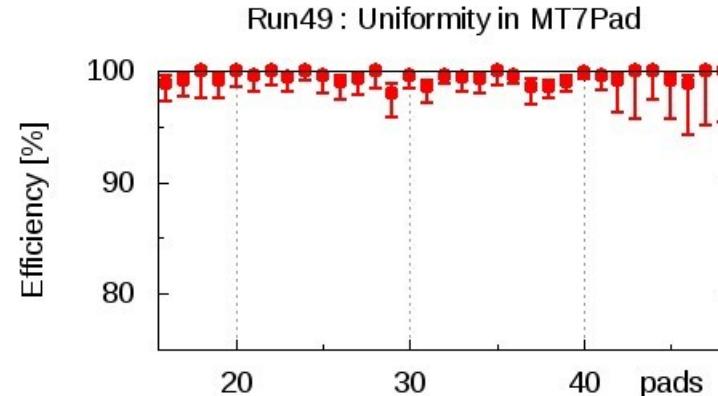
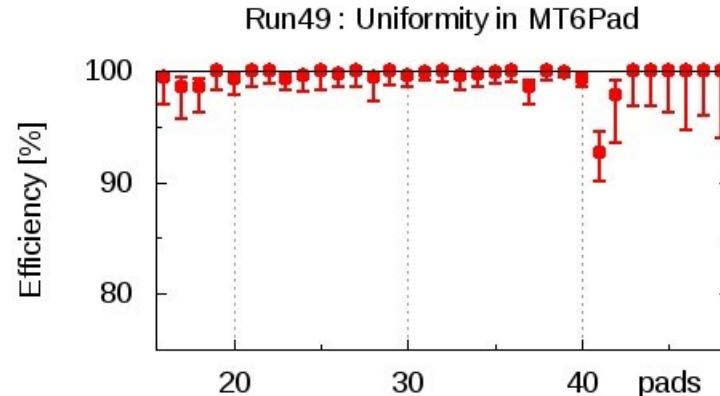


- MIP signal delay measured with at gain
- Signal Peak at ~ 2000 ns
 - ~ as desired for HPTD in ALICE

MIP Chamber

Efficiency and Uniformity

Efficiency Uniformity at 1050V



- Efficiency $> 99\%$ on the pads
- Uniformity : ok
some deviations due to electronics

Other Studies (ongoing)

- Rate study : PS Intensity Scan : $1 - 3000 \text{ Hz/cm}^2$

Expected particle intensity in ALICE:

LoI : $60 / 10\text{m}^2/\text{event}$ (central collisions)

8000 collisions/seconds

Particle rate $< 8000 \times 60 / 10 \text{ m}^2 / \text{sec} = \sim 5 \text{ Hz/cm}^2$

- HV / Threshold / Efficiency studies
- MIP and L0 resolution studies
- L0s SuperPad coincidence studies
- L0s coincidence triggered MIP chamber readout
- Absorber study, material budget study
- CCC type BPD (Beam Position Detector) tests

HPTD - Test Beam Setup

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