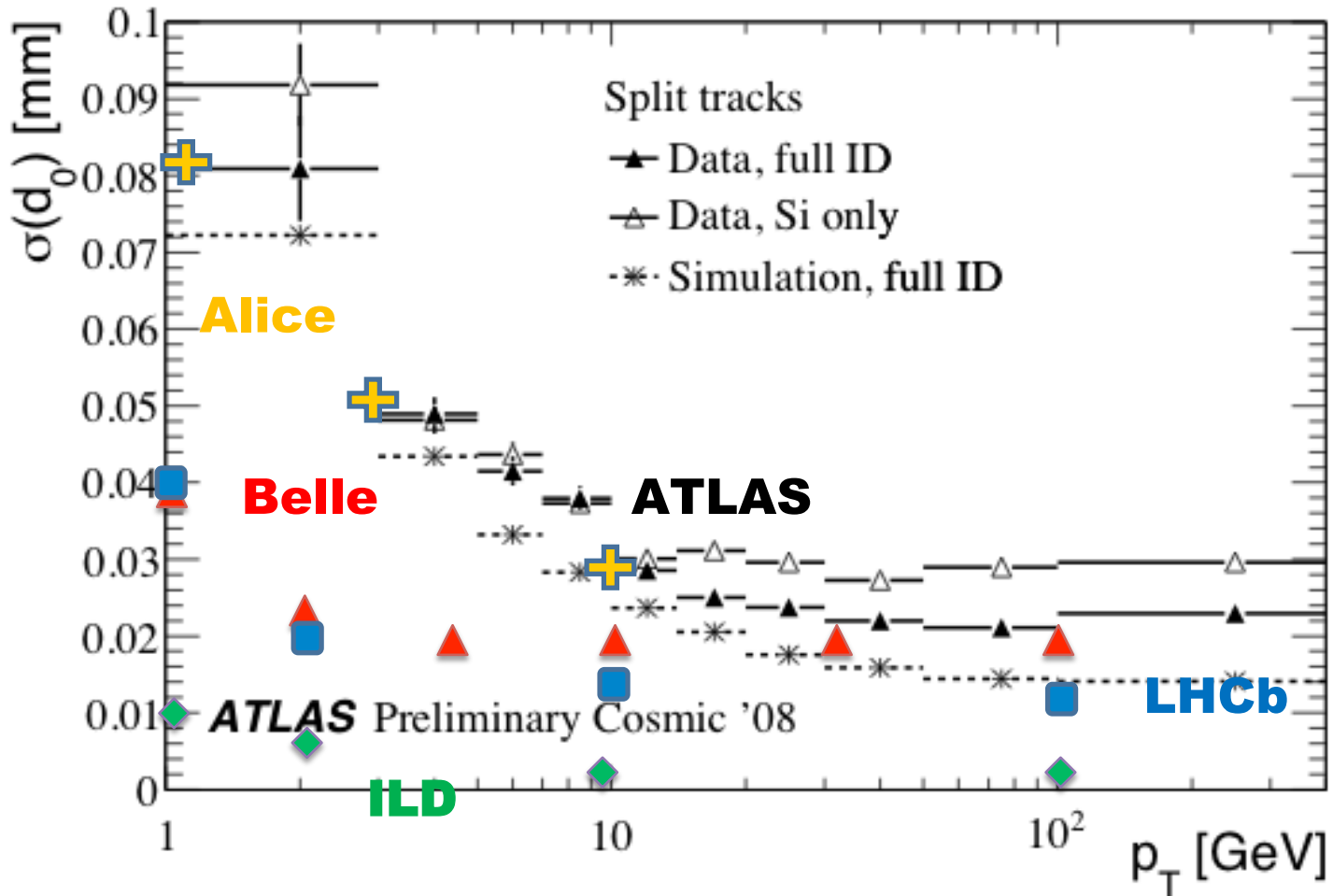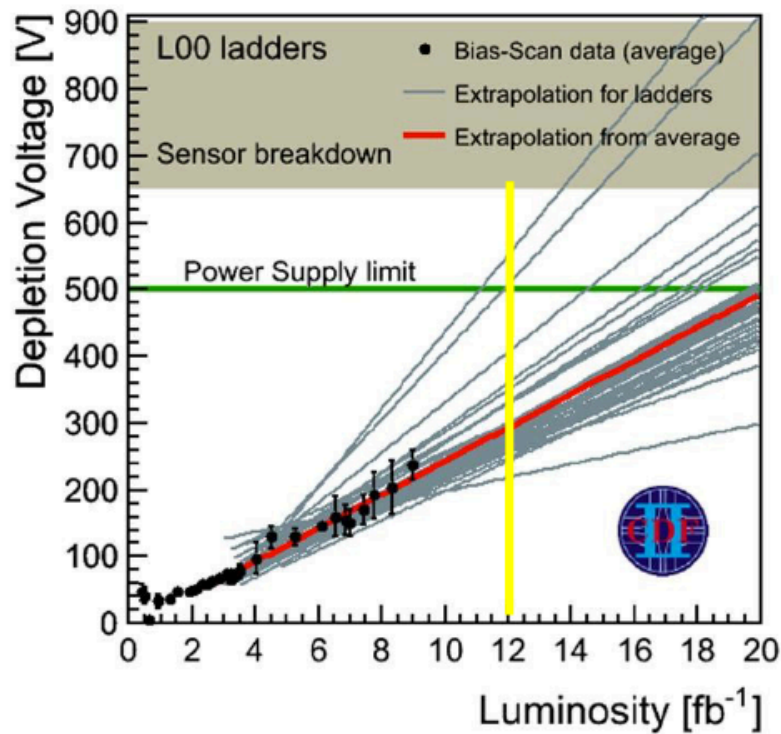# TIPP 2011

Lea Caminada

June 21, 2011

Impact parameter resolution
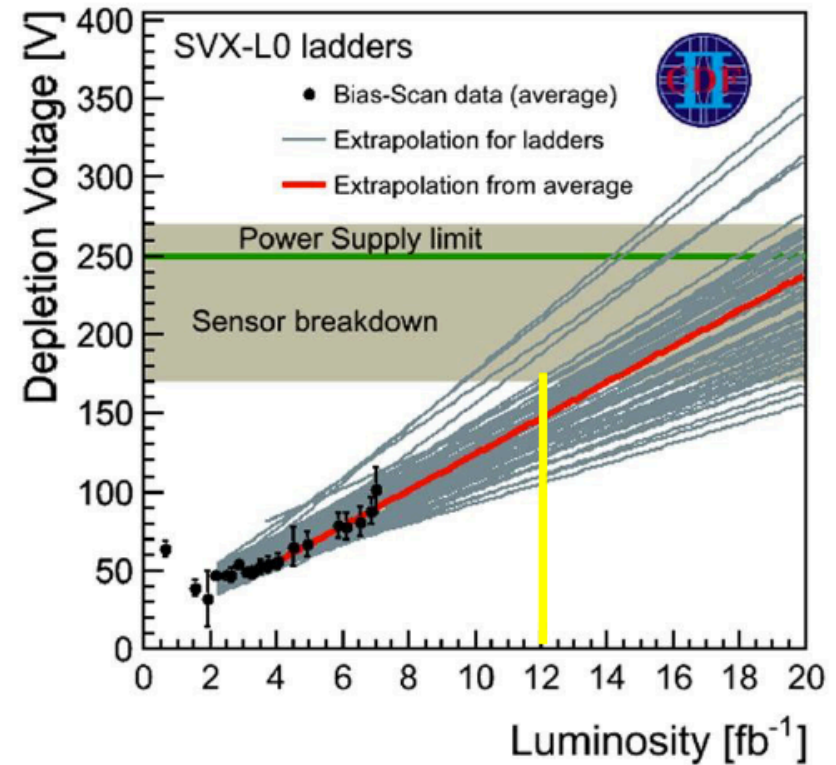
Depletion Voltage Projections L00-L0

Prediction for L00

Prediction for SVX-L0
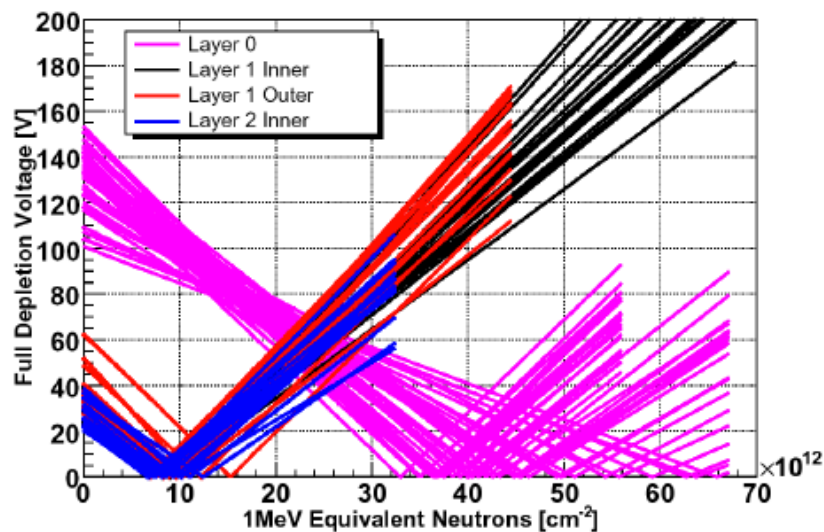

06/11/2011   TIPP 2011   Benedetto Di Ruzza

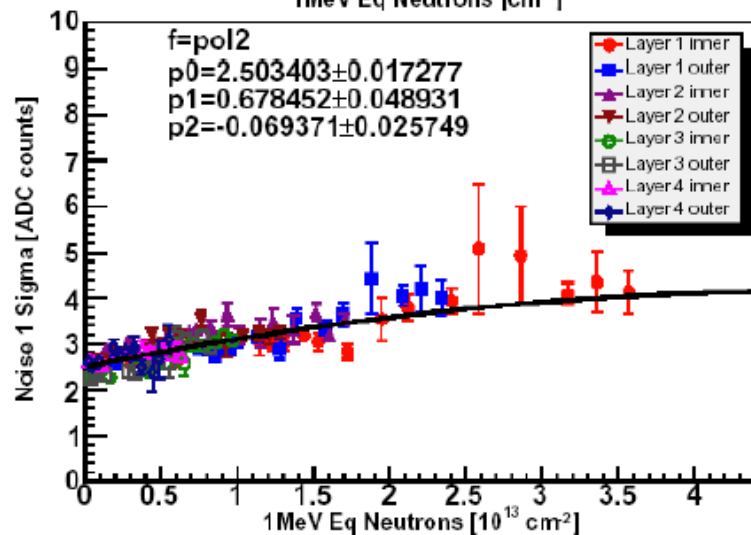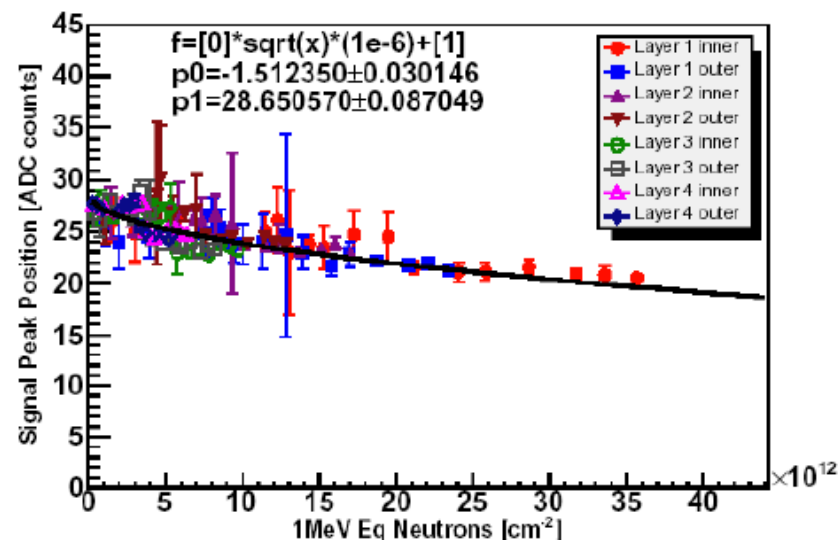# SMT Performance Evolutoin

$$\Phi = \beta \cdot L_{int} \cdot r^{p}$$

$\beta = 2.2 \times 10^{13}$ cm^{-2}/fb^{-1} at r=1 cm

Zhenyu Ye (Fermilab)

DESY April: FBK testbeam results
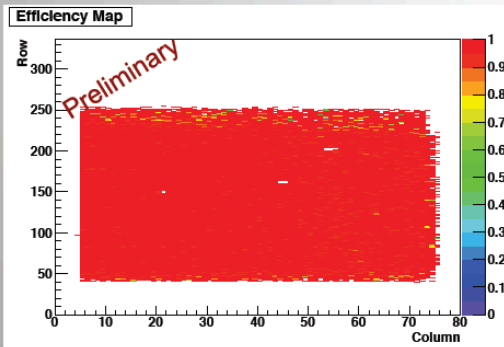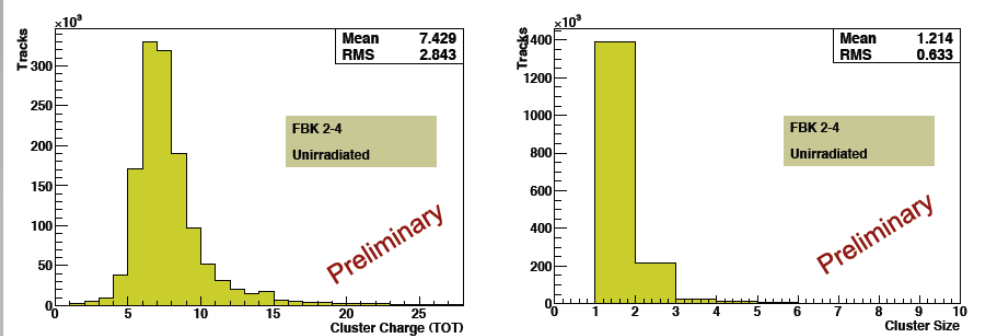
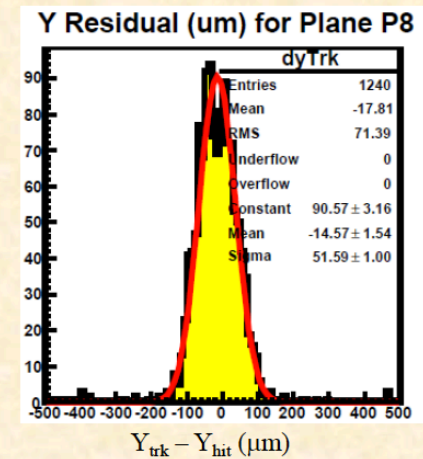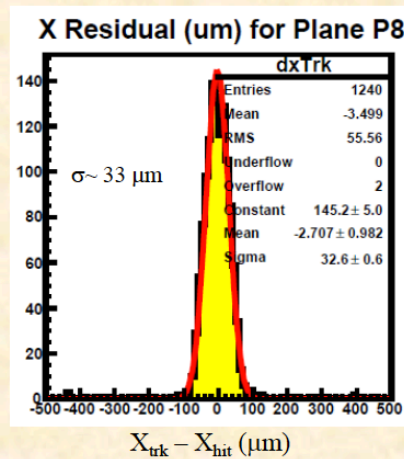**FBK un-irradiated, from early batch:**

Normal beam

TOT and clust

Overall trackir
efficiency for t
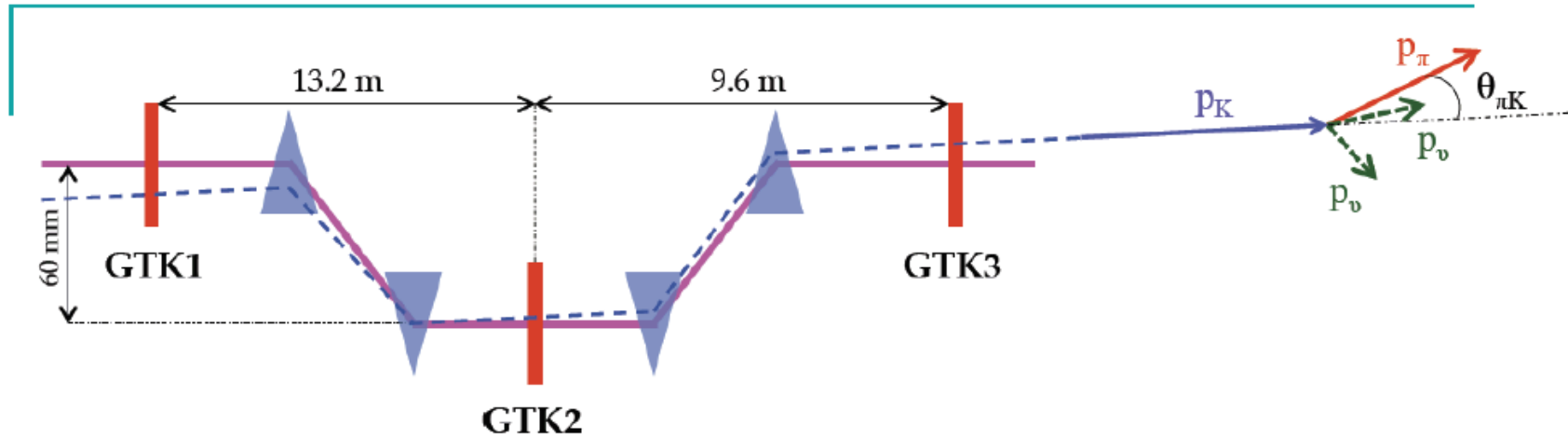(electrodes nc
tilted tracks.

Preliminary results Diamond

• Residuals are in agreement with the single hit resolution expected when the detector is facing the beam at 0°

Diamond detector residuals

$X_{trk} - X_{hit}$ (μm) $Y_{trk} - Y_{hit}$ (μm)

The GigaTracKer (GTK)

- ■ Beam spectrometer
  - ❑ provide precise momentum, time and angular measurements on all beam tracks
  - ❑ sustain high and non-uniform rate (~1.5 MHz/mm^2 in the center, 0.8-1.0 GHz total)
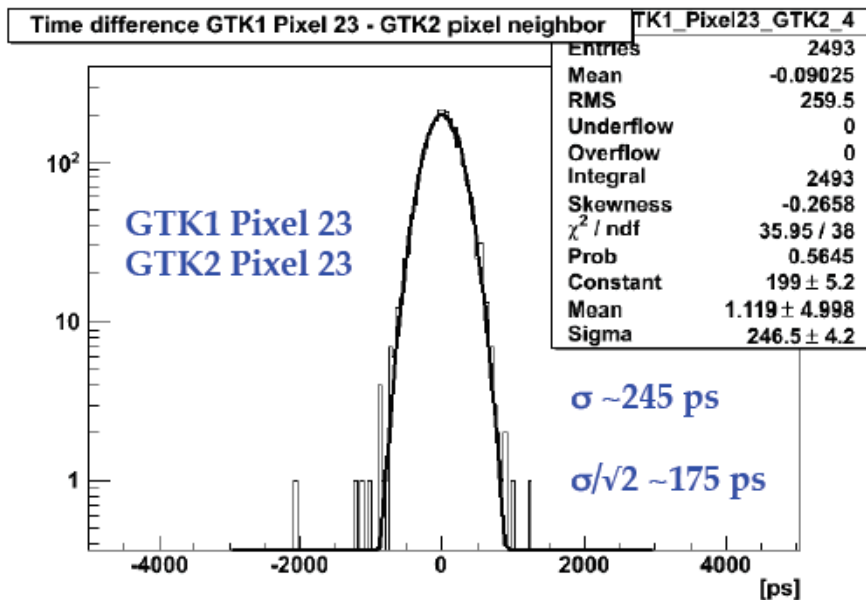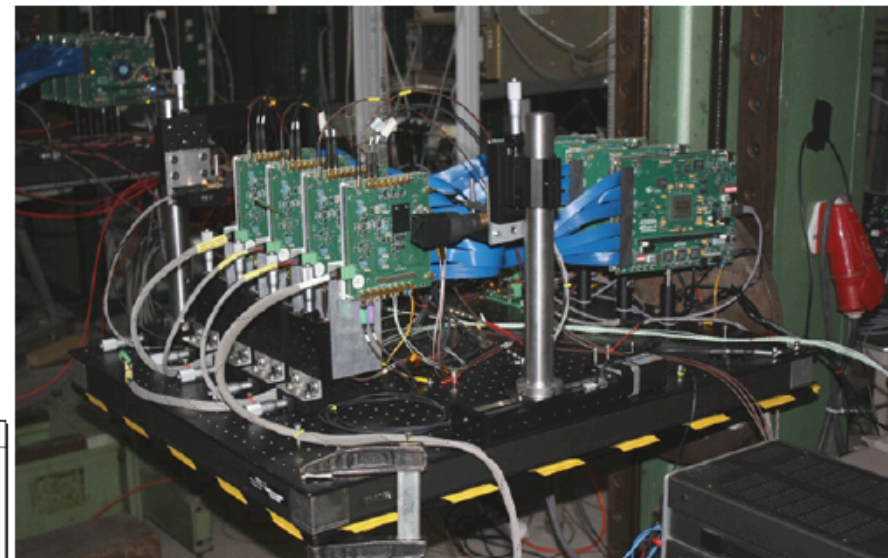 - ❑ reduce multiple scattering and beam hadronic interactions

- ■ $X/X_0 < 0.5\%$ per station
- ■ $\sigma(p_K)/p_K \sim 0.2\%$
- ■ $\sigma(\theta_K) \sim 16~\mu rad$
- ■ pixel size $300~\mu m \times 300~\mu m$
- ■ $\sigma(t) \sim 150$ ps on single track

Test-beam at CERN PS

- test-beam at CERN T9 (10 GeV/c π^+ and p)
- 4 consecutive GTK planes
- fast scintillators used for timing reference

Time difference GTK1 Pixel 23 - GTK2 pixel neighbor TK1_Pixel23_GTK2_4

Entries	2493
Mean	-0.09025
RMS	259.5
Underflow	0
Overflow	0
Integral	2493
Skewness	-0.2658
χ^2 / ndf	35.95 / 38
Prob	0.5645
Constant	199 ± 5.2
Mean	1.119 ± 4.998
Sigma	246.5 ± 4.2

GTK1 Pixel 23
GTK2 Pixel 23

$\sigma \sim 245$ ps

$\sigma/\sqrt{2} \sim 175$ ps

- applied Time-over-Threshold correction (pixel-by-pixel) using scintillator information
  - procedure validated for NA62
- measured **time resolution of ~175 ps** at 300 V sensor bias
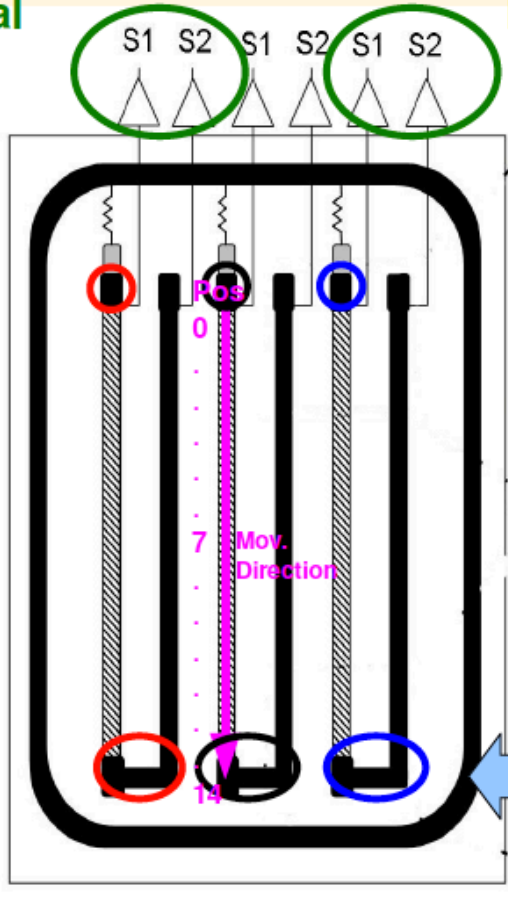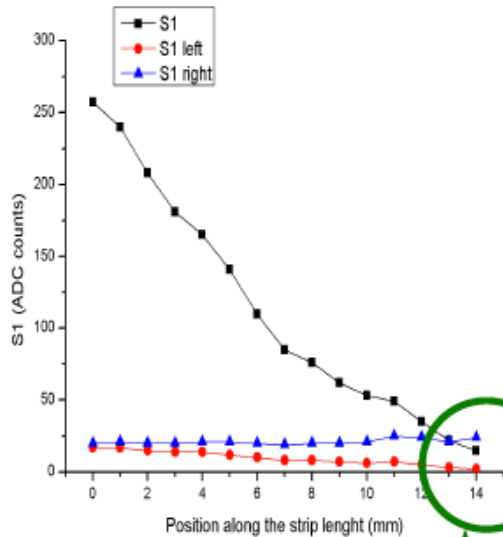
Charge division principle

- Charge division in wire chambers is used to determine the coordinate along the sensing wire

- Electrodes with slightly resistive material produce same effect in microstrips silicon detectors

F. J. Muñoz, **Technology and Instrumentation in Particle Physics 2011, Chicago, June 11**[th]
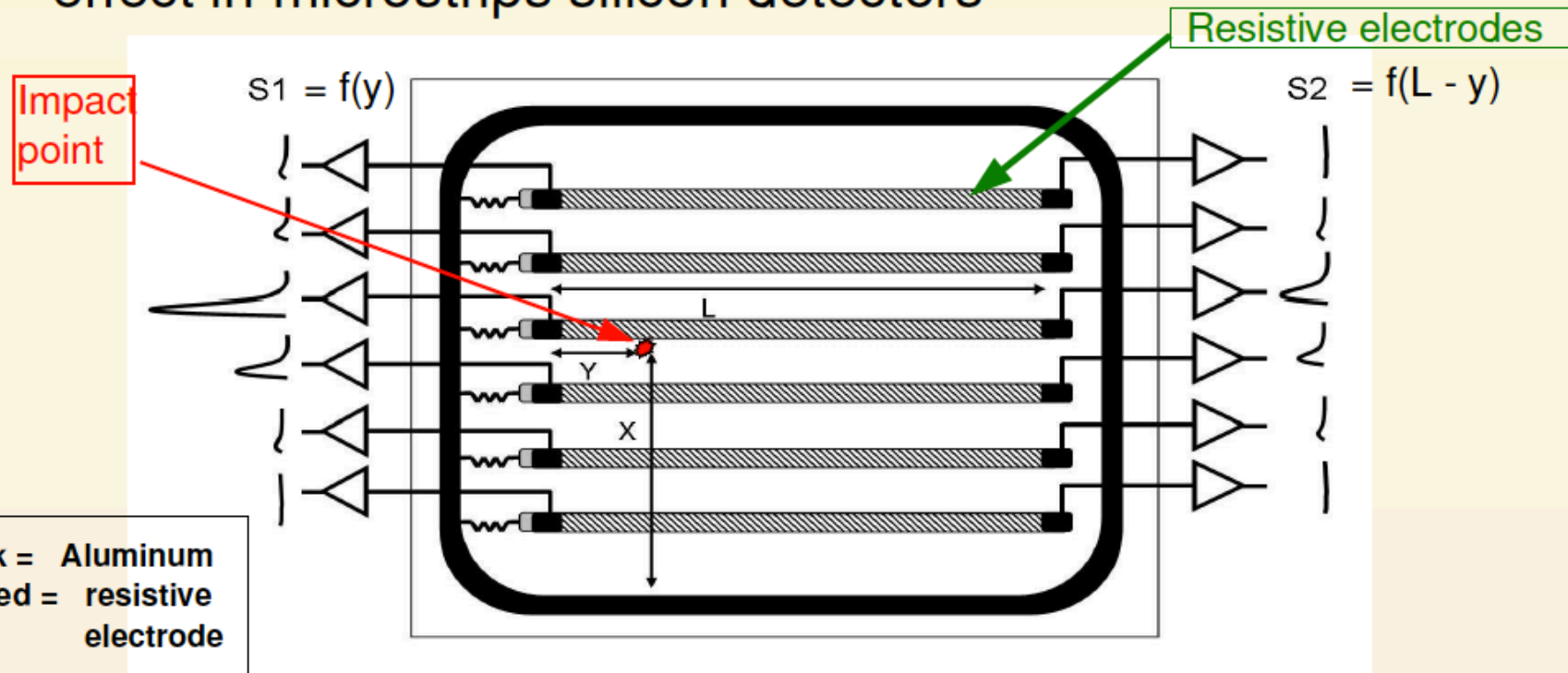
Laser longitudinal scan

Left signal   **Right signal**

Are not perfectly antisymmetric!

Coupling effect?

At position 0: S2≠0