Introduction to the poster:

The ALICE Silicon Strip Detector performance during the first LHC data taking

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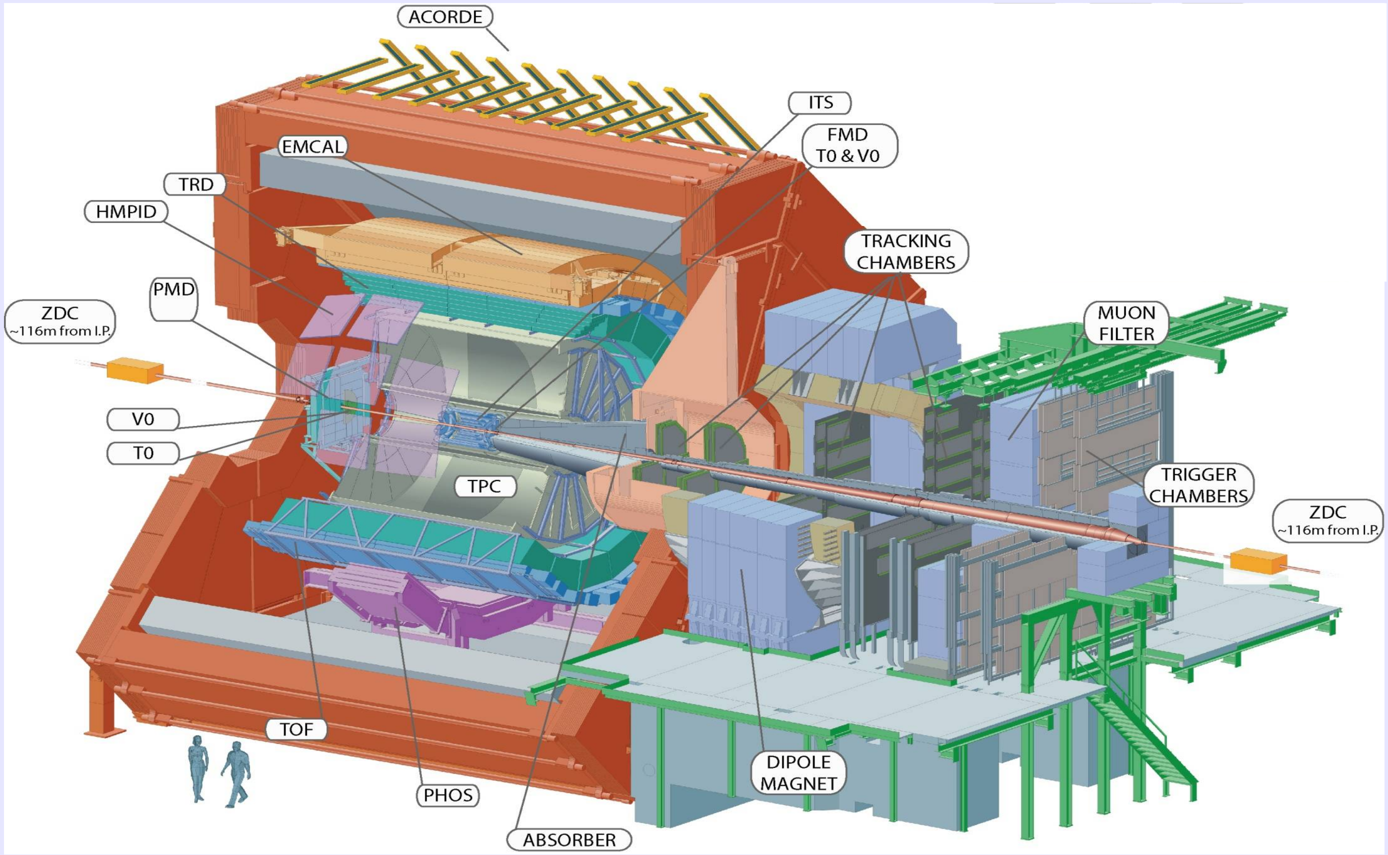
ALICE @ LHC: *A Large Ion Collider Experiment*

A multi-purpose experiment to study Heavy-Ion collisions at ultra-relativistic energies.

• *PbPb run:* to study the properties of the Quark Gluon Plasma, a high energy density and color-deconfined state of strongly interacting matter *(expected: fall 2010)*

• *pp run* @ $\sqrt{s_{NN}}$ = 0.9 TeV: ~10 million collisions to collect benchmark data *(December 2009-May 2010)*

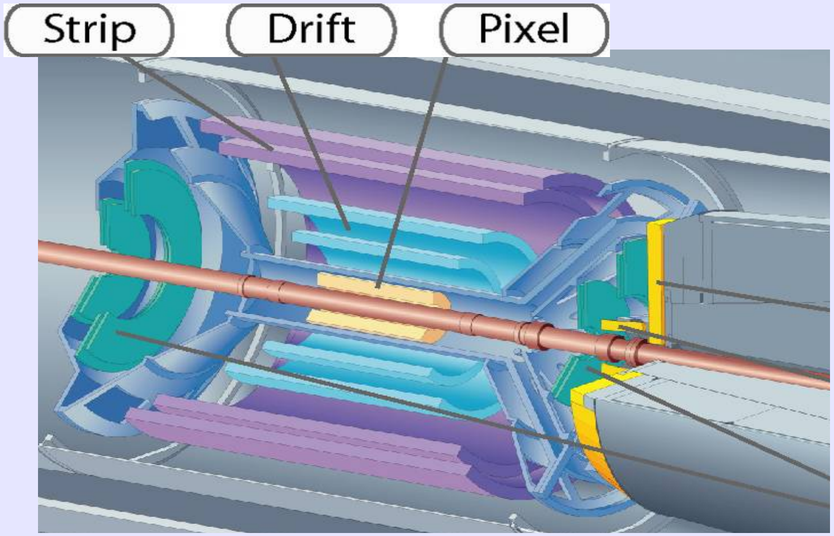
• *pp run* @ $\sqrt{s_{NN}}$ = 7 TeV: ~ 600 million *minimum bias* collisions up to now, used for calibration and alignment and to a explore new energy range *(March-August 2010)*



The ALICE detector

• 17 sub-systems
• tracking detectors *(ITS, TPC)*
• PID for specific particles
• muon arm

Tasks of the Silicon Strip Detector (SSD)



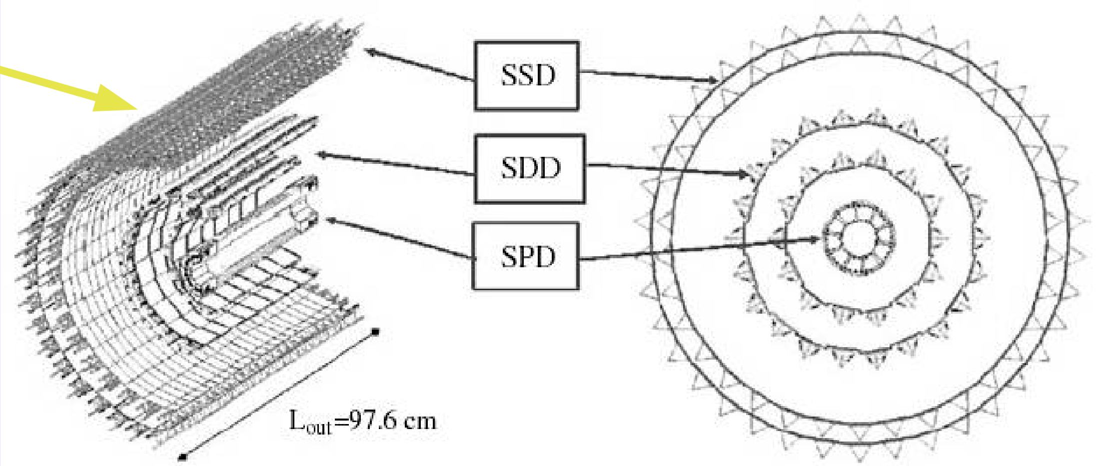
The Inner Tracking System (ITS)

Composed of 6 cylindrical layers of silicon pixel, drift and **strip** detectors, placed close to the interaction point

- Main tasks of the ITS:
  - localize the primary and secondary vertices
  - track the charged particles even at low momenta
  - measure the energy loss for PID

The Silicon Strip Detector (SSD) forms the outermost layers of the ITS

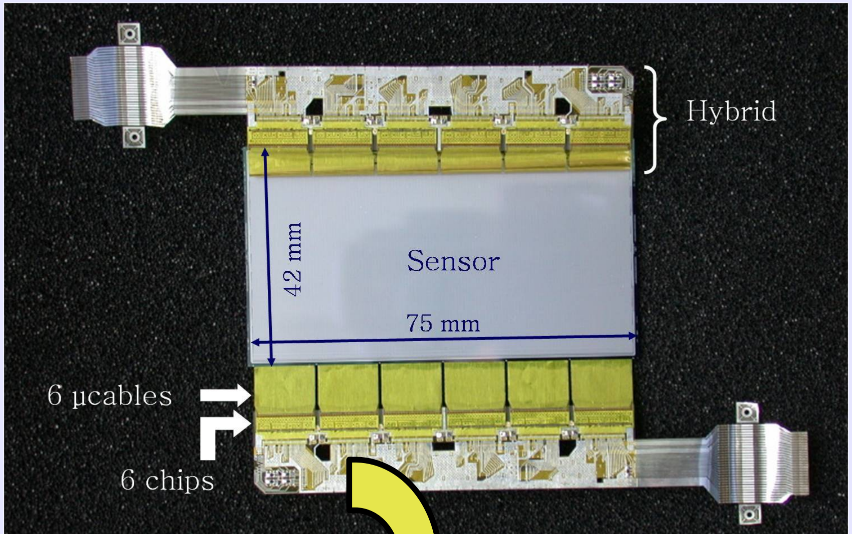
- Crucial to **connect the tracks** from the TPC to the ITS thanks to its:
  - position
  - point resolution
  - acceptance



the ITS layers

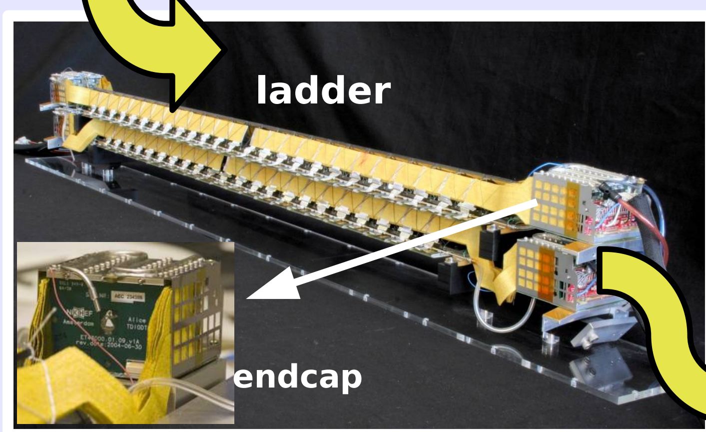
The SSD layout and features

the SSD module



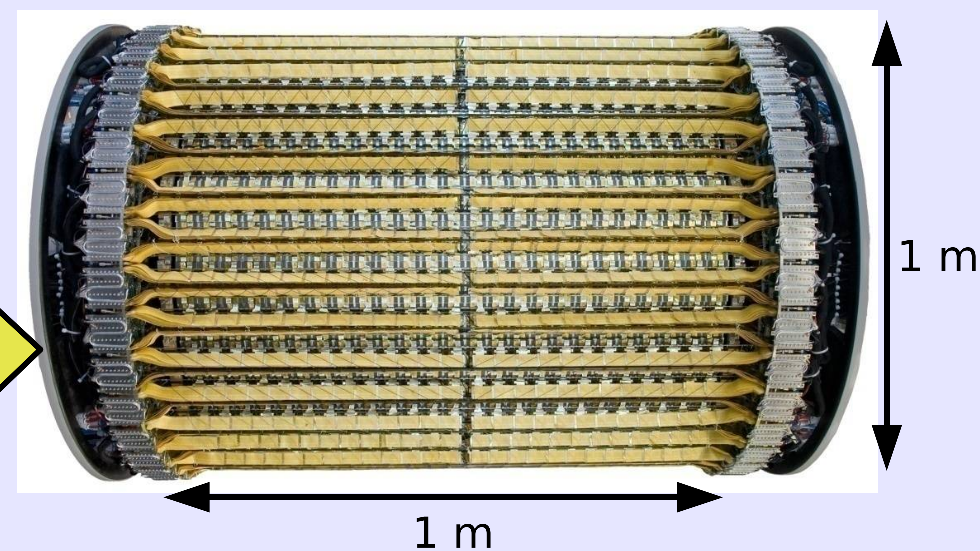
SSD features

- double-sided microstrip sensor
- point resolution in $r\phi$: 20 μm
- 2.6 million channels read-out
- *signal-to-noise* ratio ~ 40
- ±14 MIPs dynamic range
- low material budget



the SSD ladders

the SSD barrel

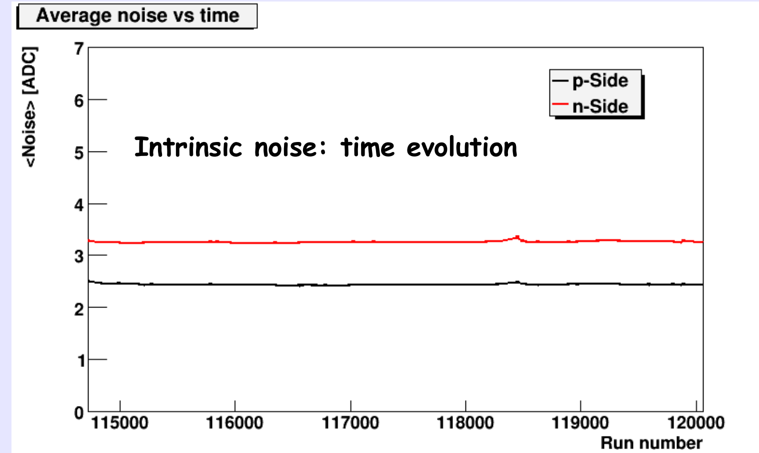


The SSD during the 2009/2010 *pp* data taking

1) Calibration parameter monitoring

SSD stability monitored through the time evolution of the calibration parameters:

- The *intrinsic noise* of the 2.6 million SSD channels is used to assess the detector efficiency



The SSD Calibration

Calibration procedure

- *Pedestal run* at each LHC fill
- Unsuppressed data processing
- Calibration parameters uploaded in the read-out electronics and stored in the Offline Conditions Database

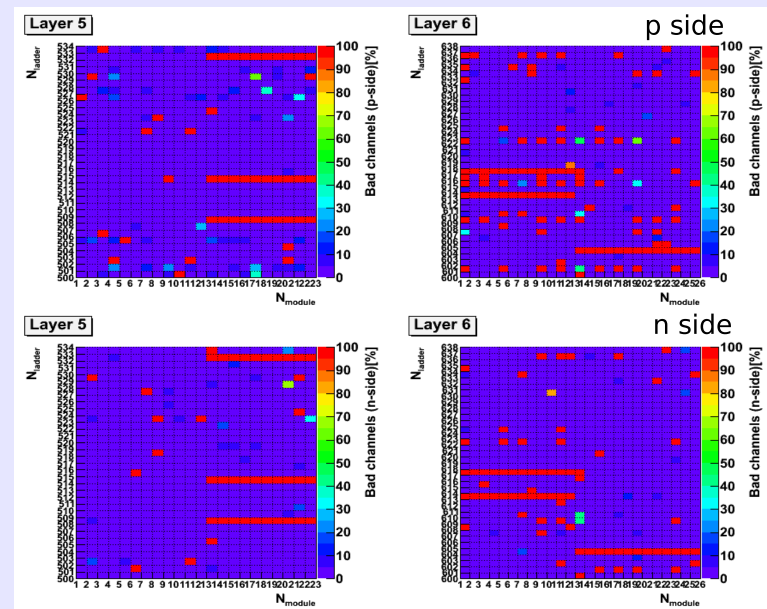
Computed parameters for each channel

- pedestal *(baseline)*
- total noise
- *common mode* corrected noise

→ tag as ***bad channel*** and mask it if:

- noise > 20 ADC ch. *(noisy)*
- noise < 1 ADC ch. *(dead)*
- pedestal > 512 ADC ch. *(overflow)*

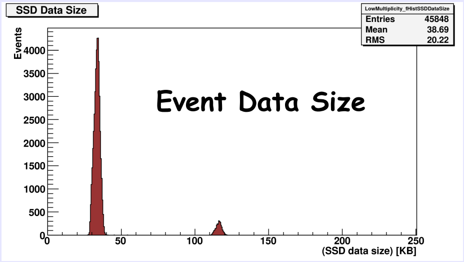
Bad Channel Map



The SSD during the 2009/2010 *pp* data taking

2) Online Monitoring of the raw data to check:

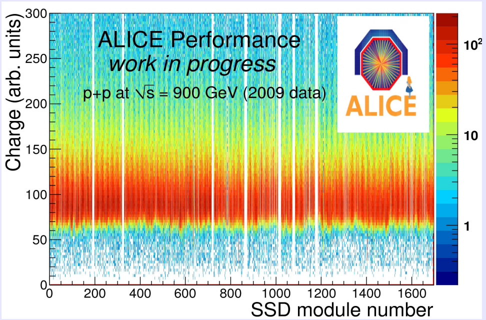
- Event Data Size
- *Average Module Occupancy*



3) Correlation with **environmental conditions**

- humidity dependence of intrinsic noise

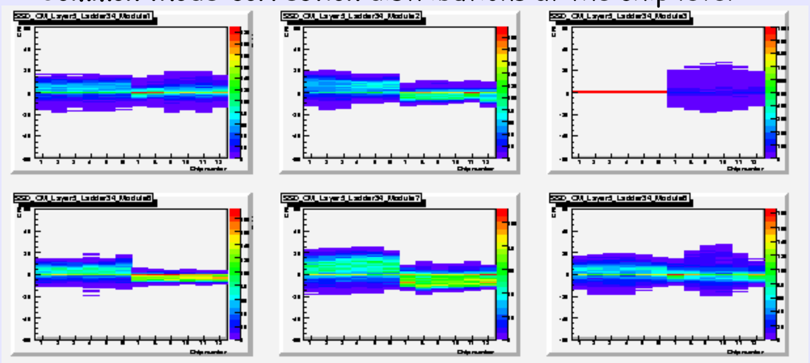
Cluster charge distribution measured from collision data with all the SSD modules



4) Offline Data Monitoring

- Point reconstruction efficiency
- *Gain calibration*
- *Common Mode* noise correction

Common Mode correction distributions at the chip level



The SSD performances

The SSD is included in the data acquisition since the first pp collisions, playing a crucial role in the:

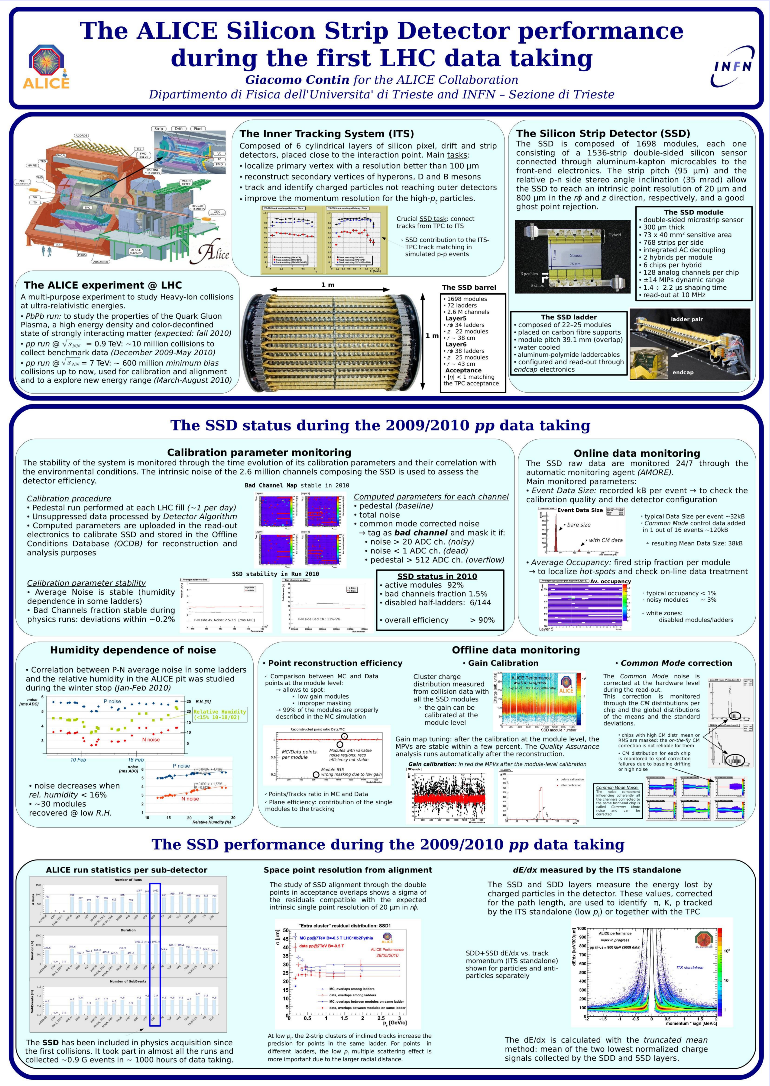
- ITS-standalone tracking
- global TPC+ITS tracking
- ITS charged particle identification through *dE/dx* measurement

Results and Conclusions

In the poster you will find all the details about...

- **The SSD status during the *pp* data-taking:**
  - **active fraction**
  - **overall efficiency**
  - **time stability** of calibration parameters
  - typical data size and occupancy
  - noise improvements at low humidity
  - point reconstruction efficiency
  - gain calibration stability
  - typical *Common Mode* distributions

- **The SSD performance during the *pp* data-taking:**
  - presence in Physics acquisition
  - space point resolution from alignment
  - SSD contribution to the *dE/dx* measurements



Thank you for the attention and...

... see you at the poster session!