ALICE Pixel Operational Experience

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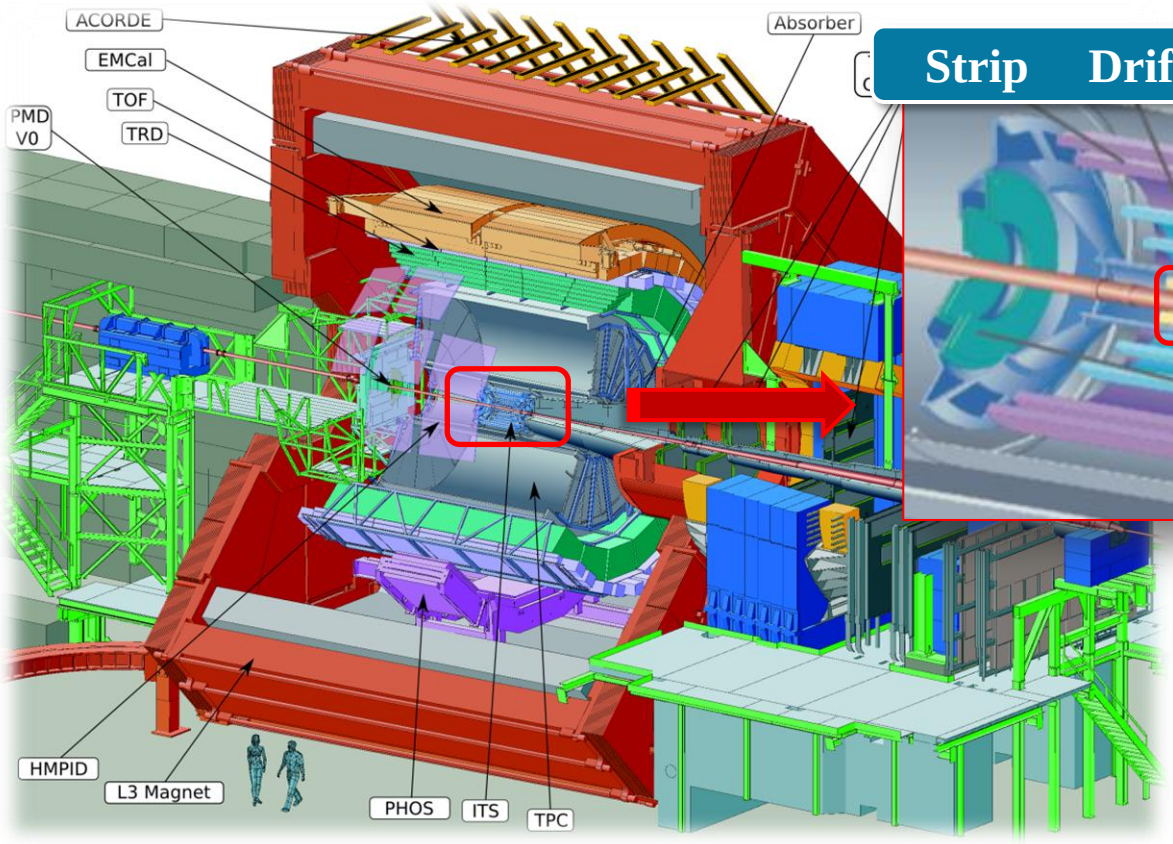
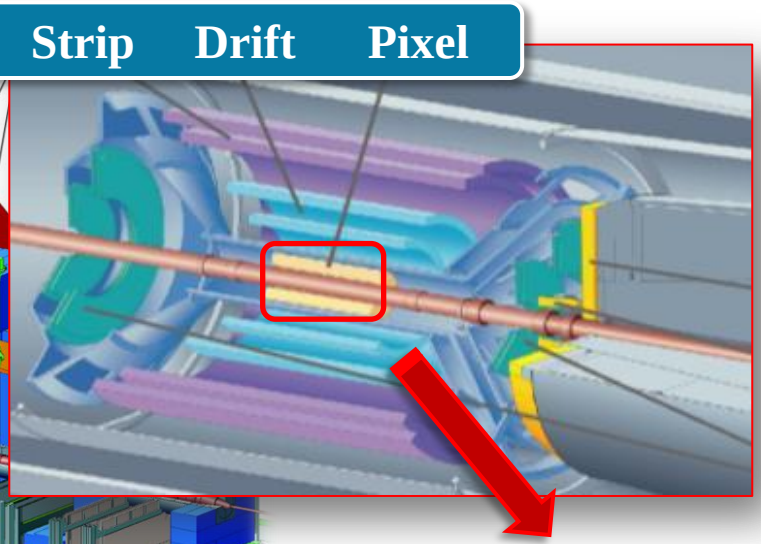
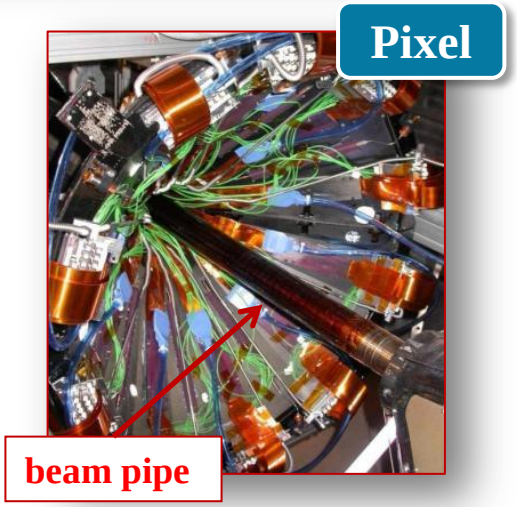
Outlook

- SPD calibration
- Detector operation and organization
- Data Quality Monitoring (DQM)
- Quality Assurance (QA)
- Run stability

Silicon tracker in the ALICE experiment



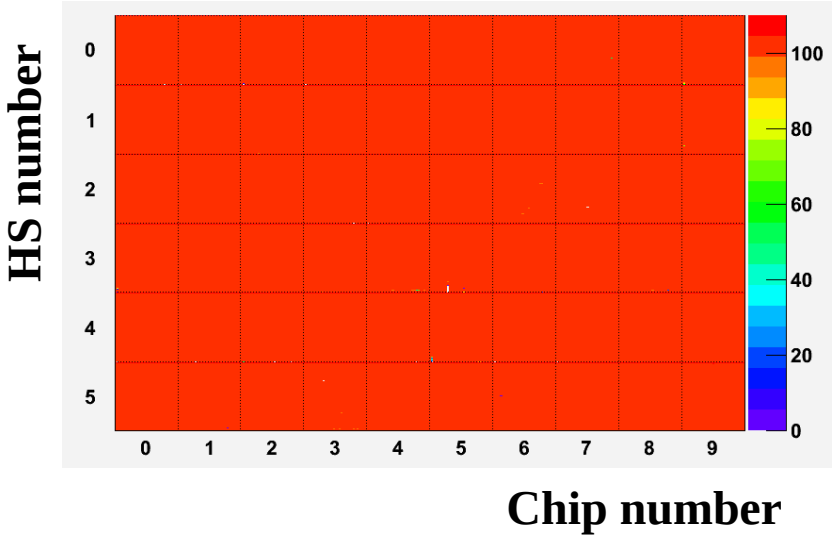




ITS (Inner Tracking System) consists of 2 layers of silicon pixel (SPD), 2 layers of silicon drift (SDD) and 2 layers of silicon strip detectors (SSD)

SPD calibration

- The detector has stable performance
  - There is no need of frequent calibration, the configuration is verified at each technical stop
  - The noisy pixels are detected via software during the run and the identified pixels are masked in the hardware before the start of the new run
- The typical calibration steps to verify and optimize the detector response are:
  - Tuning of the chip settings (DACs) to optimize the matrix response to the internal signal
  - Tuning of 4 additional DACs to optimize the Fast-OR response circuitry



The typical response of one Half-sector to 100 internal signals after the tuning

Detector operation and organization

- At the beginning (2008 – 2010) the SPD was assisted by
  - 1 System Run Coordinator (SRC)
  - 1 On-call
    - SPD expert or a well-trained user selected from a short list of SPD collaborators
  - 1 shifter
    - Trained persons of the SPD collaboration to monitor the DCS panels and the DQM plots
  - 1 Quality Assurance Expert

- At present the SPD is much better integrated in ALICE and the system is assisted by
  - 1 ITS SRC: a person in common with the ITS which is in charge for 3 months and which is assisted by the 3 subdetector on-calls
  - 1 SPD On-call
    - well-trained user selected from a short list of SPD collaborators
  - 1 DCS + 1 DQM shifter in common with ALICE
  - 1 Quality Assurance small team in common with the rest of the ITS

ITS System Run Coordinator (SRC)

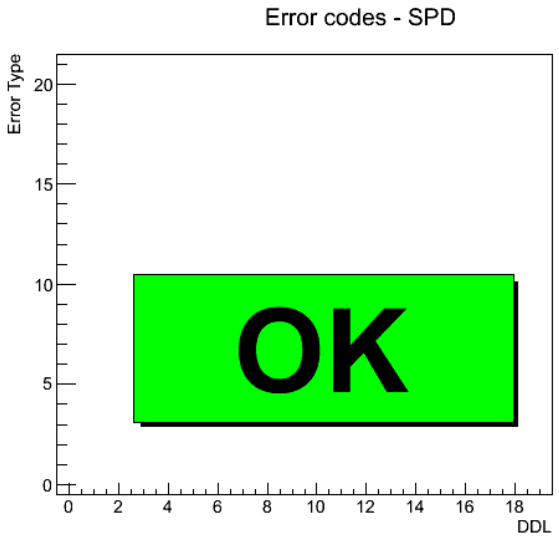
- The SRC is common to the other ITS subdetectors
- The SRC is in charge for 3 months and he is assisted by the 3 subdetector on-calls

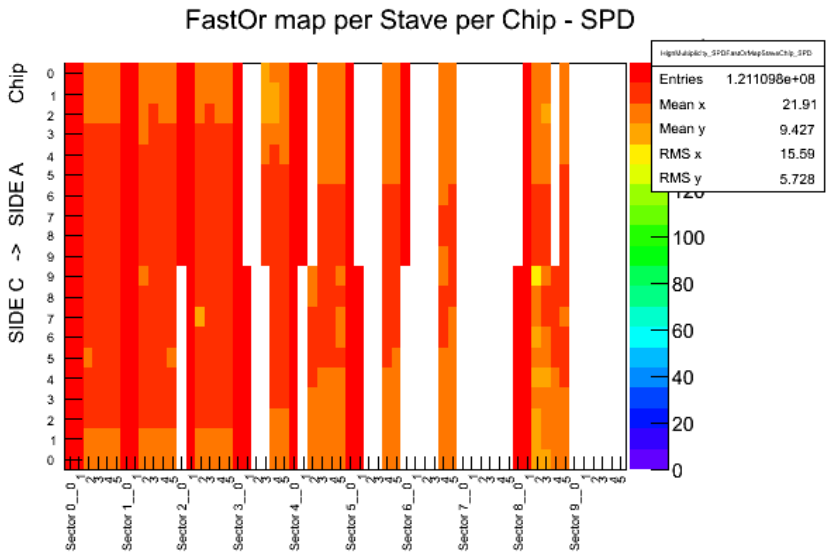
- The main SRC duties are:
  - Be present during the most relevant activities at P2 and follow the detector actions / fix / improvements
  - Active participation to the ALICE Run Coordination meetings to be informed on the experiment activities
  - Chair a short ITS daily meeting with the subdetector on-calls
  - Chair the ITS weekly operation meeting
  - Chair the meeting to prepare the subsystem activities to be performed during the technical stop

Data Quality Monitoring (DQM)

- The DQM shifter is an ALICE shifter who monitors few plots / subdetector.
- Each plot has automatic checks or “reference” plot to identify malfunctioning
- The plots are available on-line during the data taking and are stored in the ALICE electronic logbook associated to the specific run
- A web page collects all the information needed to act for each specific error/warning

Example of plots extracted from a Pb-Pb run



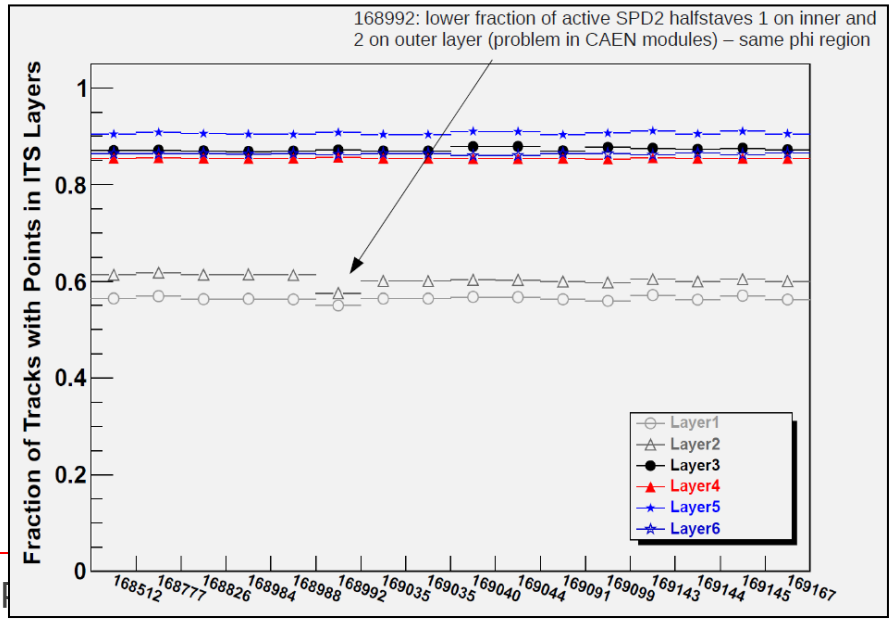


Quality Assurance (QA) Task Force

Strategy used during the Pb-Pb data taking

- 1 ITS QA responsible assisted by the 3 subdetector QA experts
  - To chair the daily ITS QA meeting
  - To attend the daily ALICE QA meeting
- 1 QA shifter to monitor on daily basis the plots which are automatically produced after the first step of data reconstruction. There are two types of plots:
  - ITS plots: tracking related plots
  - Subdetector plots: calibrations related plots

Example of an ITS trending plot extracted from a Pb-Pb run



Run stability

- Only 5 runs over 220 were stopped by an SPD failure during the last Pb-Pb data-taking. There is no evidence of system instability
  - 2 runs were stopped due to the high temperature measured on one module
    - This problem should be fixed thanks to the recent cooling improvements (see Rosario's talk)
  - 1 operator request
  - 1 data format error
  - 1 CAEN mainframe failure (first time since the detector installation)

- The detector stability is quite important to record data efficiently. ALICE has 18 subdetectors
- To improve the overall data taking efficiency, ALICE is implementing the strategy to pause/resume the run. This will allow the detector to recover from errors without stopping the run. This will reduce the time lost to restart a new run

Conclusion

- After the first years of experience, the SPD is efficiently operated with the rest of ITS to reduce the manpower effort
- Reliable tools have been optimized to monitor the quality of the data collected
- The system shows a very stable behavior in terms of configuration and data taking

Thanks for your attention