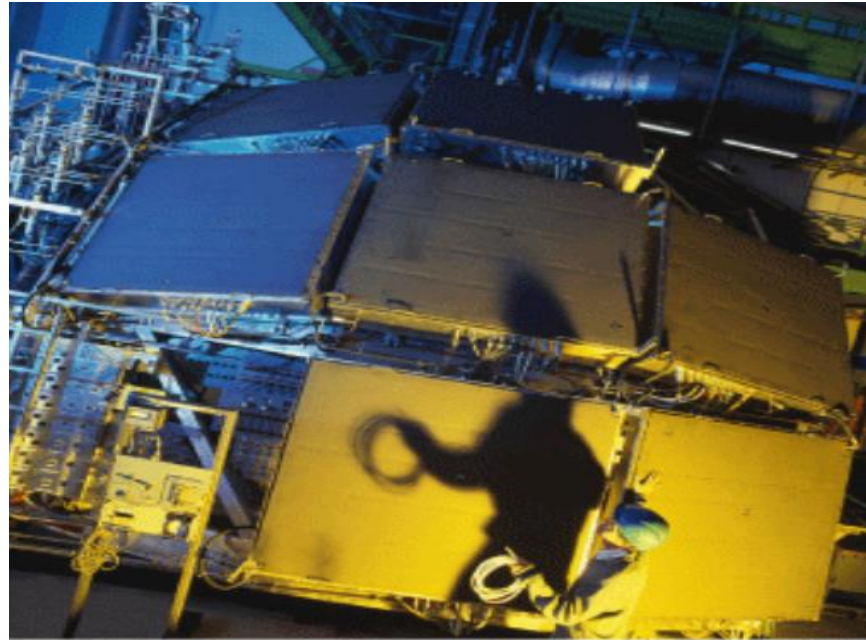


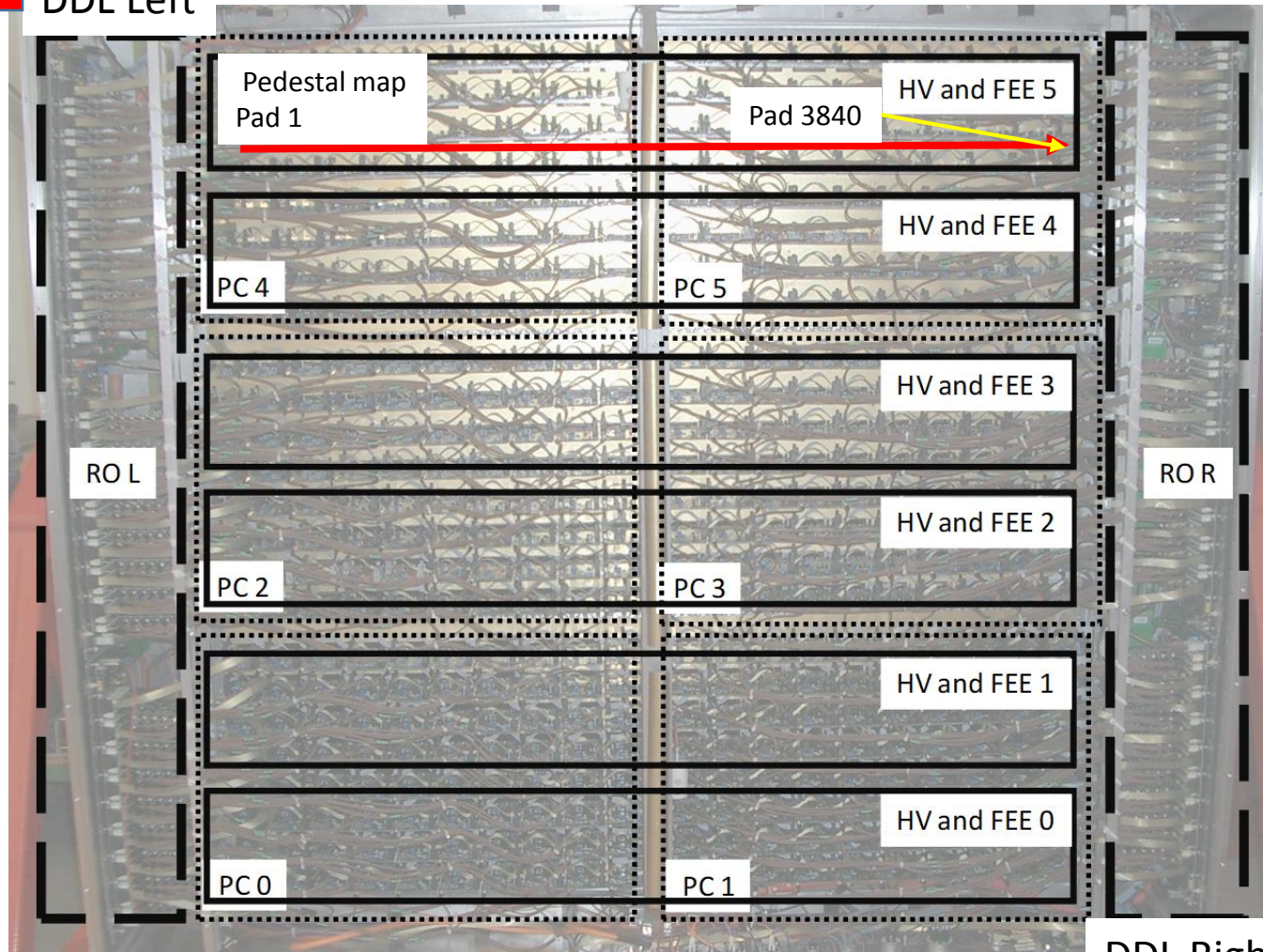
New Pedestal maps and Status of the FEE/RO electronics



A. Franco, GdC, J. L. Gauci, R. Arteché Diaz and G. Volpe

Correspondence DCS-RICH module

To FLP ← DDL Left



DDL Right → To FLP

HMPID commissioning activities

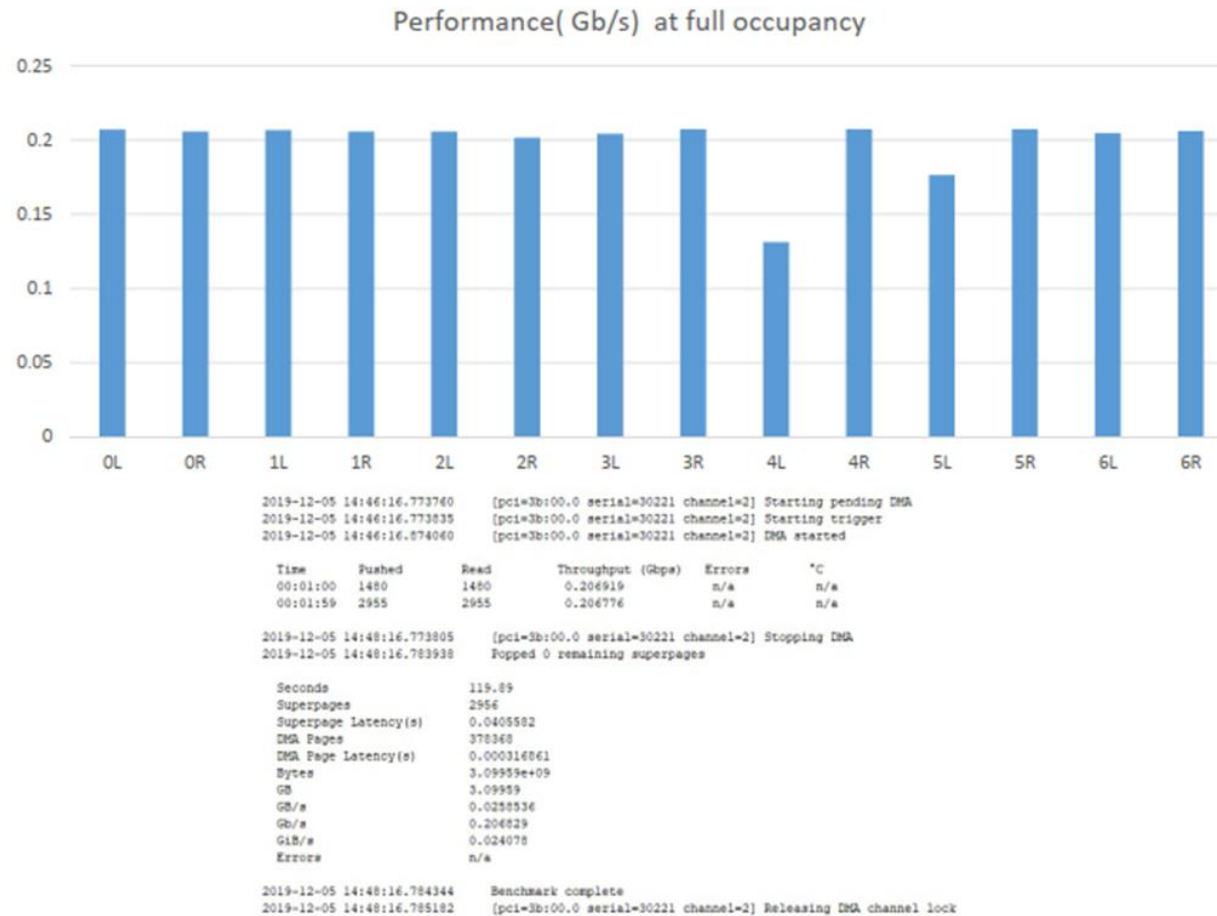
First read-out tests at P2 (18th-21st Nov.) by auto-triggering FW:

- Successfully read out of all the 14 HMPID equipment 😊
- Produced the first pad-map in O^2 of the seven HMP RICH modules.
- Useful functional tests of the HMP RO electronics,
- ...but not reliable for FEE ADC value!

As from Nov. 27th, Read out tests at P2 with LTU and Fan_IN/OUT modules (from CTP):

- 14 Equipment out of 14 are OK, only RICH4_L, Column 23 Missing!
- At RICH power ON FW uploaded from flash memory on board the RICHs modules (few seconds);
- Actual TTCrx FW without HBr and Time Frame trigger handling;
- New TTCrx FW version in preparation at bld 581 (see presentation of Jordan);

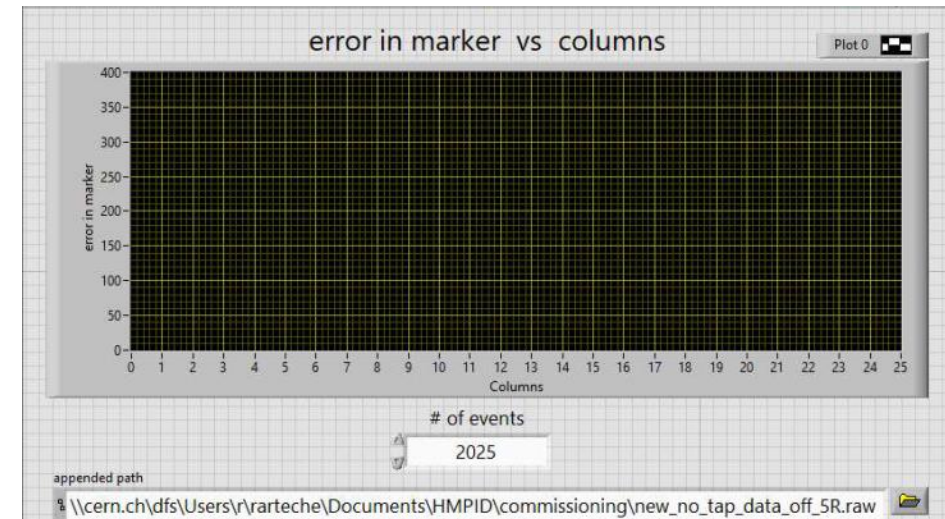
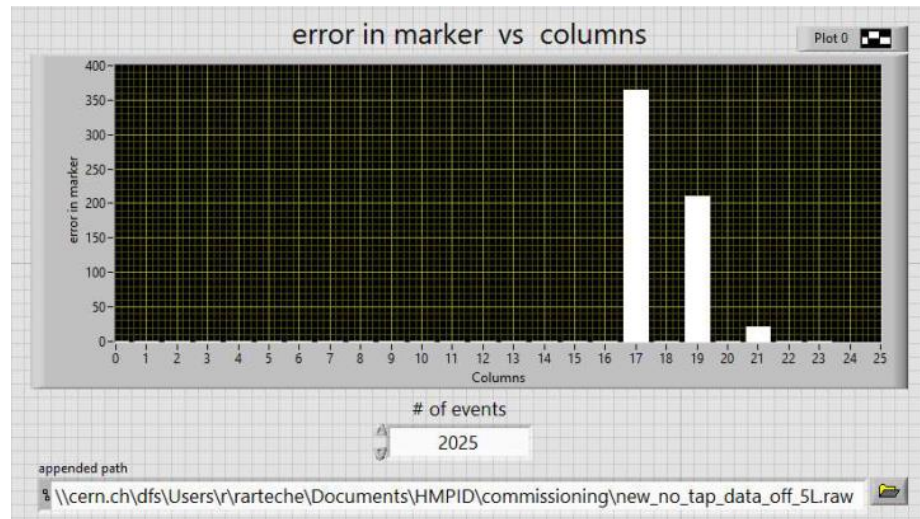
Data Throughputs per equipment



RICH4 with one missing columns (23rd);
 RICH5 with 17% of skipped events (see after).

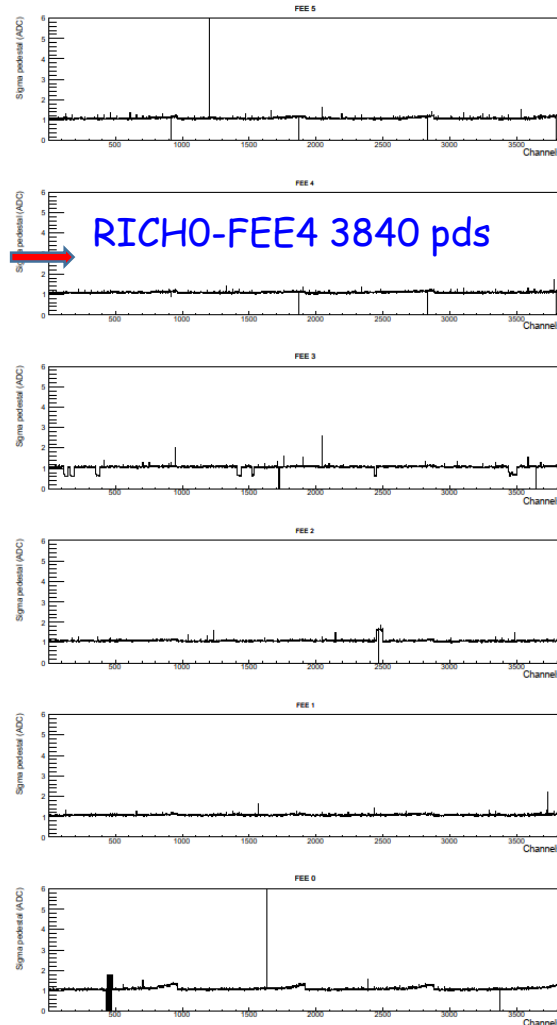
RO errors in columns

- On the average, the RO errors in the modules are of the order of $\sim 2\%$;
- In the RICH5-L errors at 17% of events ($\sim 380/2200$ tot). Checks under way. In the right equipment no errors;
- These events skipped for the calculation of the Pedestal Sigma (see after).

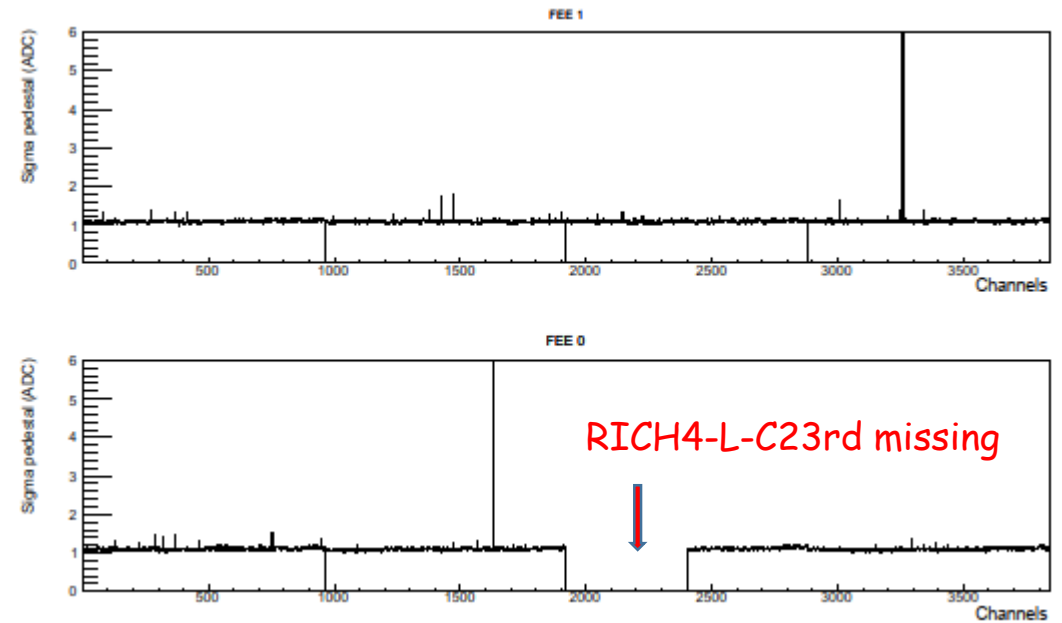


2019: pedestal maps

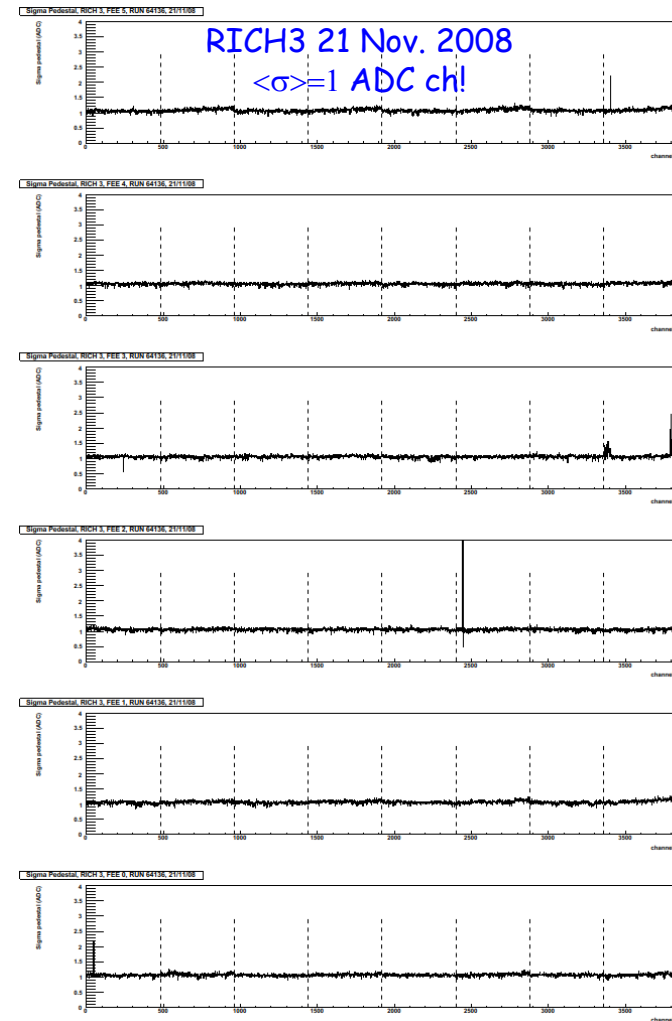
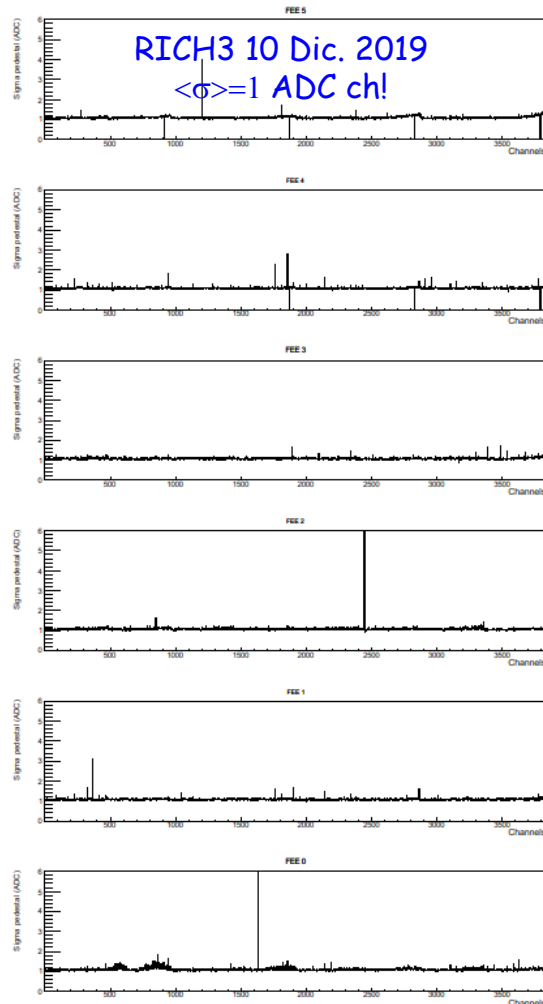
- $\langle \sigma \rangle = 1$ ADC ch!
- $\langle \text{SpEph} \rangle \sim 30$ ADC chs
- $\text{Th} = \text{ped} + 4 \langle \sigma \rangle$
- $\varepsilon_d = 88\%$



RICH4-FEE0-1
3840 pds
 $\sigma = 1$ ADC ch!



New (and old!) pedestal patterns!



Future commissioning plans

- Use the LTU at P2 to continue RO tests till end of this week 13th Dec. 2019. Continue with the HMP LTU as from February 2020 (delivery date);
- On the base of pedestals maps so far, we are going to request the TC the access on the beginning of 2020 the RICH4 to repair RO-L-C23rd. Scaffoldings should be installed;
- New TTCrx FW with HBr and Time Frame trigger handling by end of January 2020;
- As from summer 2020, HMP-CTP agreement for the usage of the Fan_IN/OUT modules ,VME crate, crate controller and relevant software (Run 2 device). HMP will use and maintain those device and the relevant software during all the Run 3.

(Anti)deuteron inelastic C.S. measurement

First comments of reviewers, received;
The new version of the document under preparation
(see later the presentation of A. Caliva).

Meeting with TC already planned before the end of
2019 to discuss the installation of two aluminum
Absorbers;

Preliminary scheme of installation available.

Measurement of the (anti-)deuteron inelastic cross section with the HMPID in Run 3

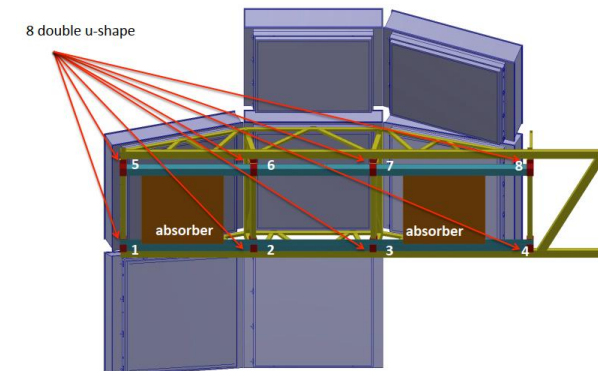
Alberto Caliva¹, Giacinto De Cataldo², Giacomo Volpe^{2,3}, Kai Schweda¹.

1. GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany
2. INFN, Sezione di Bari, Bari, Italy
3. Dipartimento Interateneo di Fisica 'M. Merlin', Bari, Italy

E-mail: alberto.caliva@cern.ch, Giacinto.de.Cataldo@cern.ch,
Giacomo.Volpe@cern.ch, kschweda@physi.uni-heidelberg.de

Abstract

We propose a precision measurement of the (anti-)deuteron inelastic cross section on an aluminum target in the momentum range $0.2 \lesssim p < 2.2$ GeV/c using the HMPID. Two absorbers of aluminum with a thickness of $\Delta x = 8$ cm, corresponding approximately to half of the hadronic interaction length λ_1 , will be installed parallel to the beam in front of 2 HMPID chambers. The (anti-)deuterons impinging on the two absorbers will be identified using the dE/dx measured in the TPC and the time-of-flight measured by TOF. The number of secondary particles produced in the hadronic interactions with the target nuclei and the number of (anti-)deuterons crossing the full material thickness will be measured using the Multi Wire Proportional Chambers (MWPC) of the HMPID. The expected statistical precision of this measurement is estimated for p-Pb and Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV in Run 3 and is expected to be in the range 1-3% in the momentum range $0.2 \lesssim p < 2$ GeV/c. The complementarity of this measurement with other existing approaches regarding the study of the mass number dependence of the (anti-)deuteron inelastic cross section is also discussed.



Summary

- 18th-21st Nov.: successful read out tests with auto-triggering FW at P2 of the 14 HMPID equipment!! 😊
 - Pad-map for all the 7 HMP RICH modules produced. Minor problems spotted;
 - Useful functional tests of the RO electronics,
 - **not reliable for FEE ADC value!**
- As from Nov 27th: Read out tests at P2 with LTU and Fan_IN/OUT modules (from CTP):
 - 14 Equipment out of 14 are OK, **only RICH4_L, Column 23 Missing!**
 - Actual TTCrx FW without HBr and Time Frame trigger handling;
- Future commissioning plans prepared:
 - C6F14 LCS: re-installation of the cold trap by end of February 2020;
 - RO tests till end 2019 and new tests beginning 2020;
 - New TTCrx FW in preparation at bld 581 (see presentation of Jordan). Expected by end of January 2020;
 - To be agreed with TC:
 - **Beginning of 2020: Opening of the RICH4 module to repair the C23rd. A scaffolding should be installed**
 - **After electronics reparation , installation of aluminum absorber for (anti)deuteron inelastic c.s. measurement.**
- **First Comments of reviewers on the Document for the anti-d inelastic c.s. measurement received.** Contacts with TC for the installation of the Aluminium absorbers, already under way.