



AGH UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Raport from the Hardware Working Group

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31th FCAL Collaboration Workshop 3-4 September 2017 Belgrade



Main Objectives of Hardware Group

- Presently the main Hardware Goal is to build a prototype of Compact Multilayer FCAL Detector
 - Within the AIDA-2020 project it is also our deliverable with the deadline in first part of 2019
- Proceeding with hardware R&Ds: on sensors, ASICs, mechanics, alignment, DAQ, back-end electronics, ...
- Test-beam preparation and data analyses – topic shared with Software&Analyses group

Summary of meetings held

Technical info

- Frequency: recently less than one per month
- 3 meetings from the last (March 2017) FCAL Workshop at CERN – in total 31 meetings
- Duration: ~1 hour
- Participation: > 5 people

Recent topics and presentations:

- Report from AIDA-2020 Annual Meeting, Marek Idzik
- BeamCal study, Yan Benhammou
- Various discussions

Recently there was not much hardware activity...
(at least looking at the HWG meeting presentations)

AIDA-2020 Annual Meeting

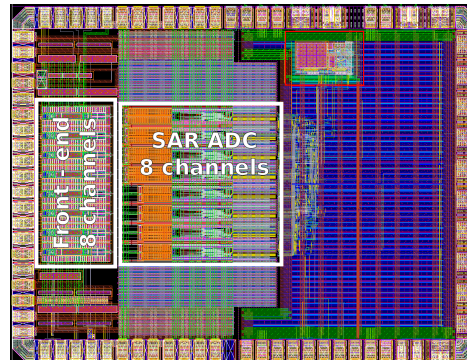
FCAL Task, Milestone, Deliverable

Task 14.3.2: Infrastructure for very compact tungsten based calorimetry

Milestone:

Month24: MS14.5 (57) - Design and test of ASICs and readout board prototype for the test infrastructure

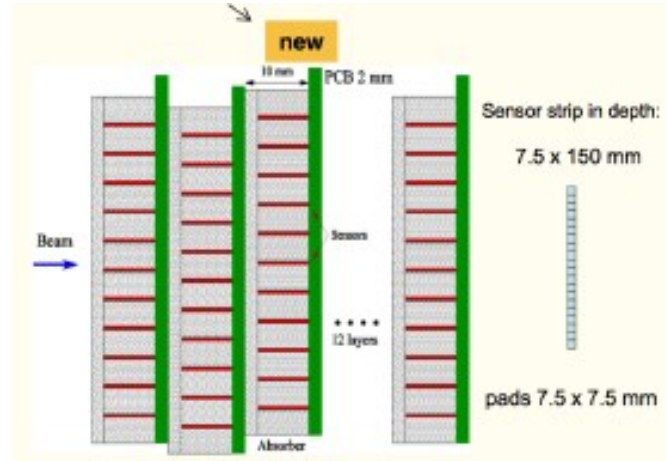
- milestone completed with 8-channel FLAMEv0 chip

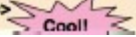


Deliverable:

- Month48: D14.4 - Very compact calorimeter
- to be done...

New BeamCal study with Sapphire



- The main idea of the new design is to increase response of sensors to the MIPs, shifting calibration signal up in the "physical" working range, thus additional calibration mode is not needed anymore
- Longitudinal and transverse sizes for both designs are kept the same
Number of readout channels is 12000 for baseline design and 8880 for new one
- Note: new design leaves much more space for electronics between layers ~10mm compare to 4mm at baseline design and fanout PCB could be made using standard multilayer technology
- In connection with new design new sapphire sensors are investigated. They are very cheap! very radiation resistant! and "small signal" down point is solved by turning sensors => 

Any further progress reported during the workshop ?



Progress&Status with HWG objectives

- Development of Compact Multilayer FCAL Detector prototype
 - Within the AIDA-2020 project, in 2017 we have completed the **milestone regarding readout ASICs**, the main goal now is our deliverable prototype of compact calorimeter in 2019
 - Sensors: first thin sensor modules produced by TAU/CERN, and already used at test-beams. Present status – Sasha talk...
 - ASICs: prototype ASICs for new LumiCal readout designed at AGH-UST. Present status – my talk...
 - Back-end electronics: works ongoing at IFJPAN, first works at JINR...
 - Tungsten plates, ~10 available, 25 ordered at JINR – status ?
 - Mechanical frame: in principle ready
- New BeamCal study with sapphire progressing...

Thank You for Attention



Expressed interests

Reminder – any change/update ?

- PUC (Angel); ASICs for BeamCal; ~1 FTE
- SLAC (Bruce); Sensors, radiation damage; ~1 FTE
- ISS (Titi); Testbeams&Analyses, Sensors; ~1 FTE
- CERN (Konrad); Mechanical structure; ~1 FTE
- IFJPAN (Leszek); LumiCal sensors, Laser alignment; ~2 FTE
- JINR (Georgy); Tungsten, BeamCal sensors; ~2 FTE
- TelAviv (Itamar); LumiCal sensors, Testbeam&Analyses, DAQ; ~2 FTE
- DESY (Wolfgang); BemCal sensors, Testbeam&Analyses, conn., ~2 FTE
- AGH-UST (Marek); ASICs for LumiCal, testbeam&analyses, ~3 FTE