AGATA AMB Phone conference 27th April 2022

Sujet : April AMB
Heure : 27 avr. 2022 01:00 PM Paris
Participer à la réunion Zoom

https://cnrs.zoom.us/j/98240817296?pwd=WmlId0txbFQ4bkFyWU54WFoxcmc0Zz09

ID de réunion : 982 4081 7296
Code secret : 2A4wD5

Apologize: A.B, J.N, A.G,

ASC Report / ASC Matters

A. Bracco is the new chair of the ASC. Ch. Theisen is elected as new deputy chair. Regarding the MoU, all countries have signed. The document is pending at the Bmbf after signature of GSI for the Germany. The next ASC meeting is scheduled on the 12th and 13th of October 2022.

ACC Report / ACC Matters

Next ACC meeting scheduled after the AGATA week in LNL. Work on-going for the EPJA topical issue. It is proposed to add a contribution on the detectors developpments by Herbert and CTT.
The next Pre-PAC meeting is scheduled on the 5th-7th of October. The forthcoming LNL PAC meeting is scheduled for December 5-7th, 2022, and will evaluate experiments to be performed in the first half of 2023

LNL Status (J.J. Valiente-Dobon)

Minutes status AGATA@LNL 27/4/2022

- Today starting with the commissioning of AGATA.
- We have 9 detectors in the structure but soon we will include a new one if the test that will be done on the 2/5 after the commissioning
- Issues on the bayonets to be solved as soon as possible and place isolation on the exhaust part of the bayonet. Problems of supply of the coating due to the international situation.
- Limit of 30 mA in the power is giving issues and PRISMA switch of because there was a dispersion with the motor during the rotation.
- Coming pre-PAC dates 5-7 of October.

GSI Status (K. Wimmer)

No special report. Mechanics discussion to be consolidated but started. On the To-do list : start the FEBEE – DAQ discussion.

REPORTS FROM THE WORKING GROUPS

Detector Module (H. Hess)

2 detectors delivered from MIRION after repair
1 detector (A003) needs a second reprocessing at MIRION
Still observing oscillations on ATC12 and ATC09.

Infrastructure (B . Million)

Major fix on the system done by Saclay on time and as scheduled. Data base updated.

Front End Electronics (A. Gadea)

Coordination:
Last meeting Tuesday 12th of April Next meeting Thurday 12th of May 2022 at 15:30 (CET).
Last AGATA Digital preamplifier Infra-Tech IMATRA bid: 11th of April 2022 (submission of grant application on 20th of April.

Status of the Phase 1 Electronics at LNL:
All GTS mezzanines from Phase 0 now flashed and placed in the tree.
By the end of the week 39 GGPs will be fully installed (some cables need a change of connector)
GGP still to be connected to GTS.

Phase 2 electronics status and production:
PACE: "Hardware" components and re-design status (J.Collado)
Visit to GANIL and IJCLab very successful. Error rate in the Transmission between CAP and PACE solved now.
"Hardware" Status

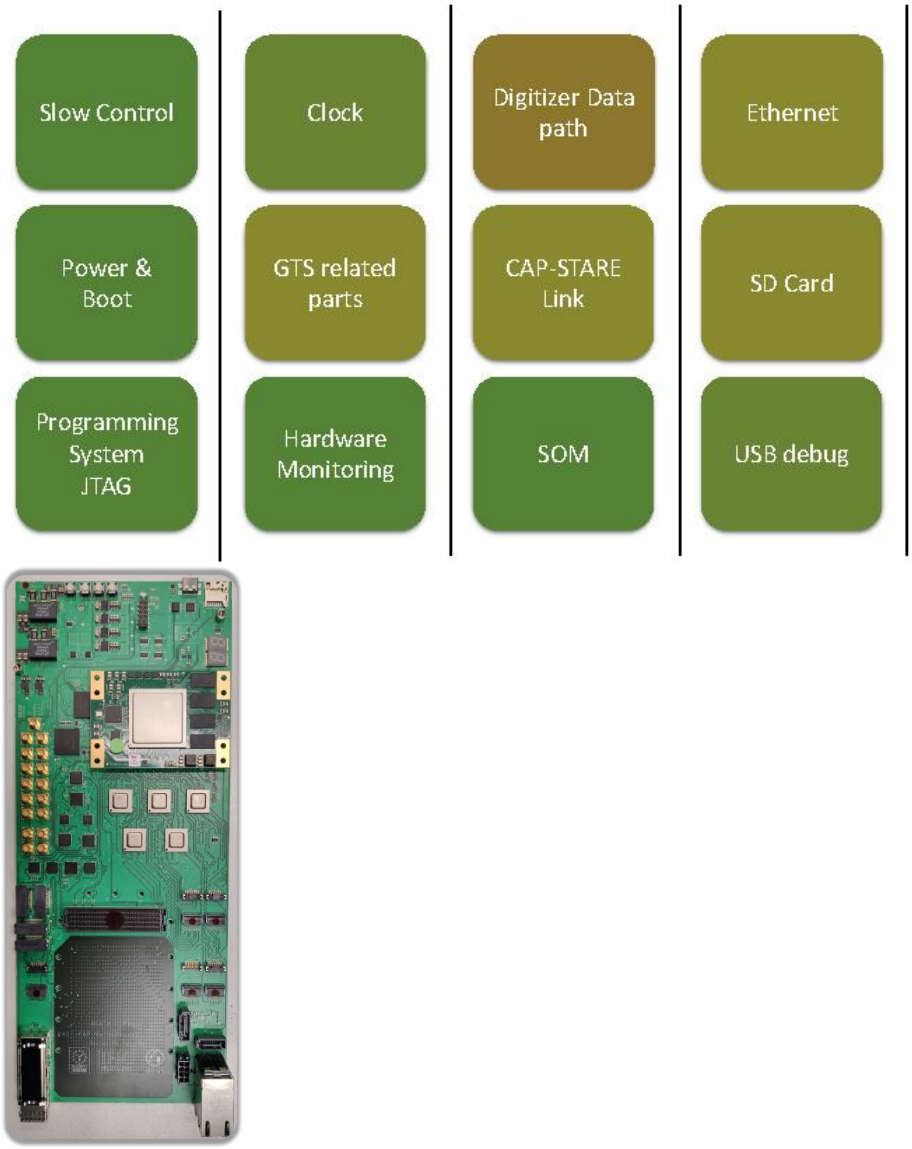


Figure: PACE hardware components and existing prototype board. Green means fully functional and brownish test or upgrade to be done

Slow Control: I2C bus ready**,** MDIO bus ready**,** SPI bus ready**,** Uwire bus ready, IO ready, Memory Map ready, Digi-Opt control and Update start up procedures to be ready in the new revision.
Power & Boot: Power Up ready**,** Reset System ready**,** Power control ready**,** UART debug ready**,** PSU power control to be ready in the new revision.
JTAG System: Programing SOM ready**,** Program SC/Boot ready**,** Program STARE ready**,** Remote Program STARE&SOM to be ready in the new revision.
Clock System: GTS PLL ready**,** TLK fanout ready**,** Crospoint Switchs ready**,** ADC fanout and clock delivery ready**,** ADC clock in Digiopt12 to be tested with HF oscilloscope.
GTS related parts: Transceiver and Switches tested, SFP+ to be tested with tree, GTS Delay to be tested with HF oscilloscope.
Hardware monitoring: Current, Voltage, Temperature, Power, all working ok.
Digitizer Datapath: TLK programing and datapath ready, Digi-TLK lines and TLK-SOM lines o be tested with HF oscilloscope.

CAP-STARE link: Data reception (Pattern, JESD Sim, ADC data) all working, Initial LNL BER<10^{-7} at IJCLab Orsay BER<10^{-11} after upgrade firmware at LNL BER<10^{-14}. The CAP-STARE link now considered fully functional (note: at 5 Gbps - no-PSA or writing-, UDP packet losses about 1/10000)
SOM: Programing, Power, Bank IO, Transceiver, PLL, Prog. Memory all fully functional.
Ethernet: Link reconized on switch, required functional Test
SD Card and USB connection: to be tested.

Summary: most, if not all parts working, few still to be checked with HF oscilloscope or have to wait for the new version pre-production board (only minor changes)

PACE Hardware modifications & pre-production

Preliminary design V53 sent to the producing company, for revision. Modification requested for some resistor pads and side panelling. Electronic and functional test being defined.

Expecting to be ready for pre-production before mid May, checking part inventory,

PACE firmware Status

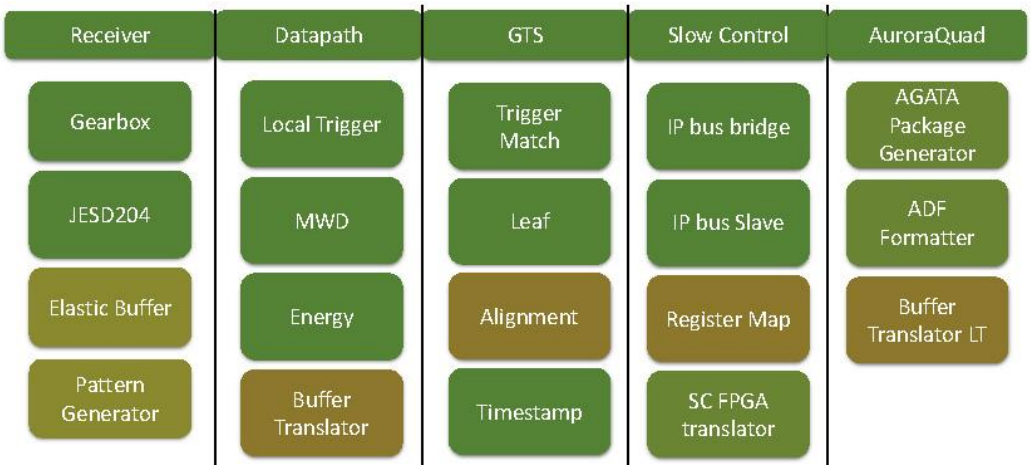


Figure 1 PACE Firmware components. Green means fully functional and brownish to be tested or completed

Receiver: Gearbox [running], JESD204 [running], Test pattern generator [running], Xilinx IP (~1400s) [running], Custom IP (~500s) [running], Elastic Buffer [compiled], Pattern Generator [compiled]

Datapath (thanks C. Houarner, GANIL): Local Trigger [Tested to be integrated], Linear interpolation [Code existing], MWD [Tested to be integrated], Energy extraction [Tested to be integrated], GTS coupling Buffer translator [only designed], Buffer to AuroraQuad [only designed]

GTS (thanks C. Belkhiria, A. Bourjrad, GANIL): Trigger Match[Tested to be integrated], Leaf [Tested to be integrated], Timestamp [Tested to be integrated], Alignment -> Software

Slow Control (thanks to X.Lafay, C.Esnault.,N.Karkour,M.Taurigna,… IJCLab): IP bus Bridge [Running on system], IP bus Slave [Running on system], Register Map [only designed], SC FPGA translator [only designed].

Aurora Quad (thanks to IJCLab colleagues): AGATA Package Generator [Running on system], ADF formatter [verified, no compiled], Buffer Translator LT[only designed]

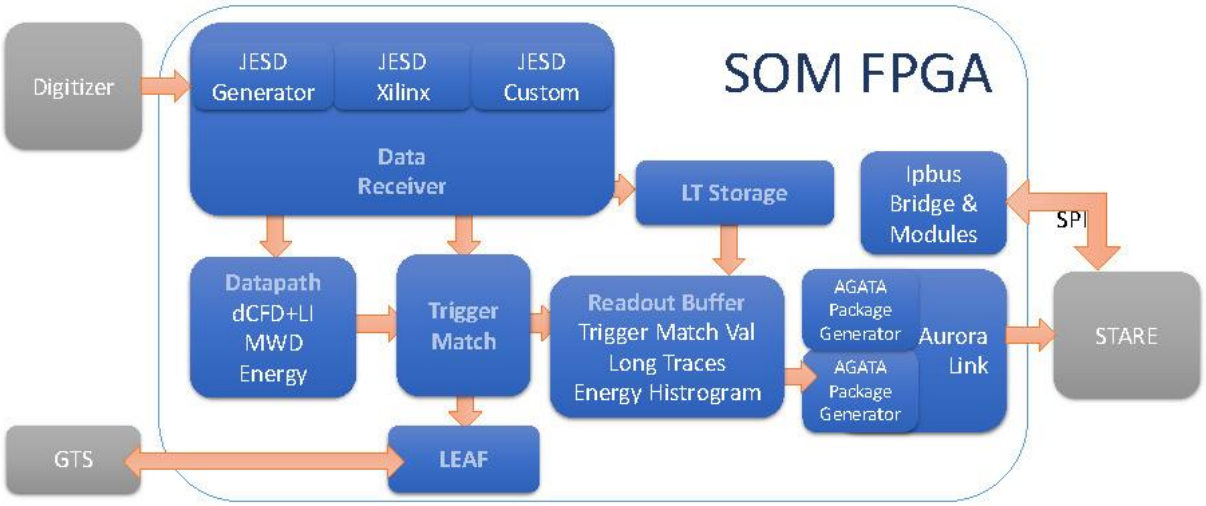


Figure: Updated Schematic Firmware Design and parts

Short term actions:

- Test with pulser/detector – Now is possible, better to complete datapath and ADF formatting (1 week)
- Add datapath MWD and dCFD to extract proper energy and trigger(1 week)
- Digitizer datapath transceiver test (1 week at Valencia)
- Update top and add IP Bus (1-2 Weeks)
- Continue GTS tests (1-2 Weeks)
- Install linux + EPICS + Alignment (>2 Weeks)

Mechanics and PSU (V.Gonzalez)

The 3D printing front panel we produced needs further fine adjustments in two or three places to fit perfectly, it will be done.
Regarding the ETSE PACE card for testing, finally we have another one which Javier brought to Valencia for small repairing. I will now continue the work to make thermal test with the complete system. The DigitOpt12 cooling plate production is being studied in order to optimize the procedure.

STARE Status (N.Karkour)

In the last weeks working with J.Collado and learning about integration PACE-STARE
The idea now is to have similar test-benches in LNL, Valencia and Orsay.
STARE board working ok at IJCLab with lower Error rate. The one at LNL will be sent back for checking.
Upgrades of the firmware took place and are to be implemented in the LNL board.
Upgrades in UDP, Code, IPbus, slow control…
Now required to align versions and check if there are differences between the two boards. May require further check and delay production.

STARE - PACE integration (X.Lafay)

With J.Collado tested the functionality of STARE connected to test.
The condition for the test was that the data generator was still in STARE but power – up done via PACE. Reached about the same transmission rate. Thus if BER remains it is more likely in the PACE-STARE link.

Firmware policy:

Received the IPHC contribution to the firmware, nevertheless, the priority is to have the complete end-to-end test, possibly with ADF formatted data and MWD.
The IPHC firmware will be considered as a possible improvement to the pr4esent MWD and else if compatible.
UK project to upgrade the firmware MWD improving the transfer function of the pre-amplifier also is on-going.
Thus the plan presently is:

1) Use of NUMEXO 2 migrated IP
2) Check IPHC firmware as improvement
3) New UK transfer function for the MWD
4) Anything more to be integrated as SMART or else…

Important to check if the firmware is ok and compliant with the present GTS and ADF readout formatting.
Before integration in the AGATA setup: Stability of the system, power-up and start, local check of AGATA events.

Software: (N. Dosme)
Crystal producer existing.
STARE-DCOD with all on-line analysis.
Simulated data validation with some problems on the header, few thinks to check.

INFRATECH Grant IMATRA:
AGATA developments integrated in WP2. Of interest for the electronics the three subtasks of the Digital pre-amplifier.

- Subtask 2.2.1 Cryogenic ASIC developments, Participants: UNIMI, CNRS, CEA, GANIL
- Subtask 2.2.2 Interconnection of cryogenic pre-amplifier to warm digitizer, Participants: CNRS, UOC Subcontractor: CTT (now including part of the cryostat production)
- Subtask 2.2.3 Low-Power, Low-Noise ADC System for cryogenic ASIC preamplifier readout Participants: UVEG, UNIMI

Submitted on 20th of April.

Data Processing (O. Stézowski)

Coordination:

Re Installation of the DAQ box : 28/03/2022 to 01/04/2022
+ debriefing the week after
Last VC meeting April 11th 2022, meeting dedicated only to phase2 actions
+ dedicated meetings with Orsay electronic team 06/04/22, 15/04/22
+ doodle for a second FEEBE an DAQ meeting (before the AGATA week)

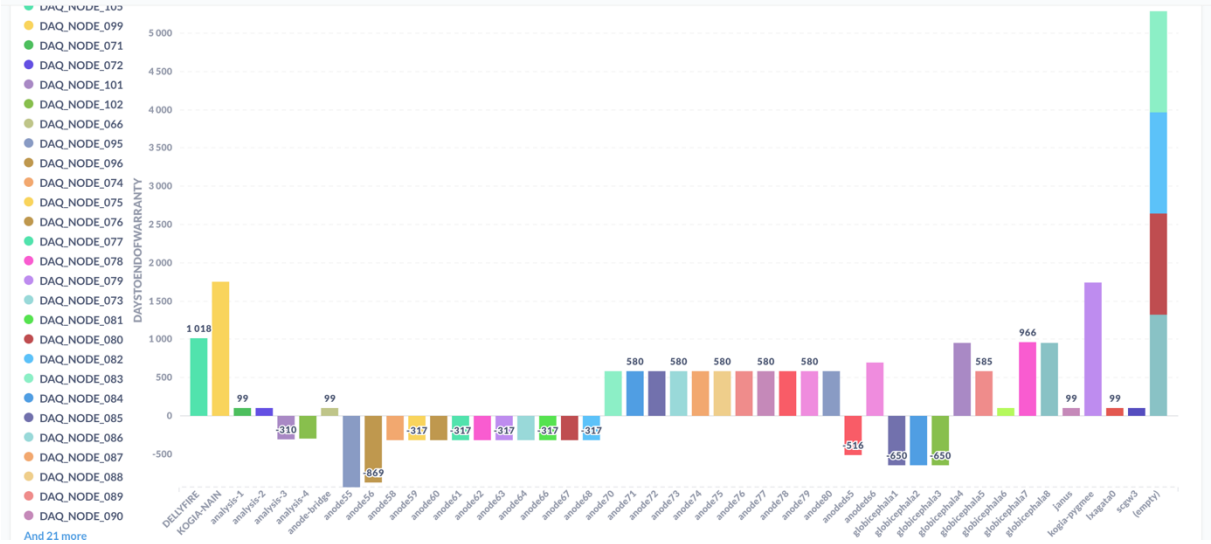
Phase 1 :

- The DAQ box has been re installed almost completely after 01/04/2022
    - Pb to re start the CEPH disk array
        - Memory upgrade not straightforward
        - Upgrade of the OS (debian11) (+CEPH version) neither … but ok now
        - many pb to configure the network cards driver
        - almost ok now **but**
        - Globicephala1 still down … out of warranty
            - New machines to be ordered
            - <u>BUT very long delays foreseen</u> …
        - We have 138 To available on CEPH

        - Anodeds6 (backup system of the CEPH)
            - Not yet operational …
        - **One should take care to NOT store too much data !**
- Other systems up to replay seems to be operational
    - Topology, dcod, run control coupling, replay and analysis facilities …
- Much more after the first commissioning !

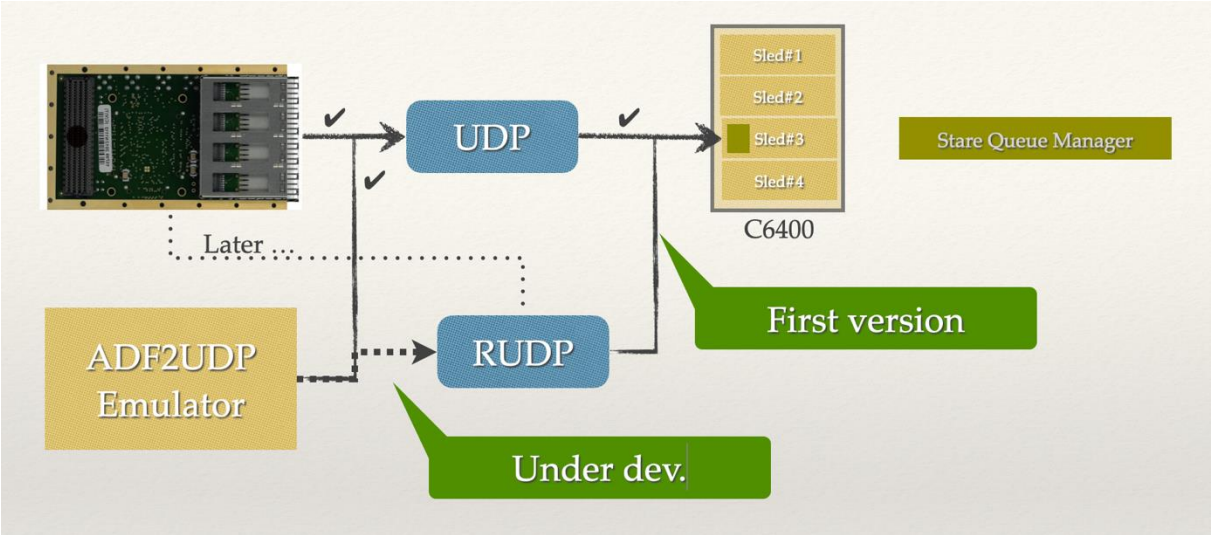
- A lot of information have been added in the AGATA Array Database

    - Here warranties of all the actives machines … to anticipate updates



Phase 2 developments :

- First version of a ‘roadmap’ document, on phase 2 electronic mainly so far, released
    - https://atrium.in2p3.fr/408d2ccc-db15-4cf0-b4a2-52563e6cbbf5
- Electronic Phase 2 integration



    - test of rate transfers – UDP - with jumbo frame (all signals in one UDP packet !)
        - With emulator as input 151 kHz reached … almost 10Gbits/s
        - data transfer through complex network (100Gbits/s switch) to be done

        - data transfer to two machines to be done
    - About the RUDP protocol implementation
        - Because of the jumbo frames might be less critical
        - A first version RUDP compatible of SQM exits
        - In the coming weeks re-writing of the Emulator
            - At STARE level, priority is to get 'real' data from CAP
        - Once over, test of the system … backpressure issues dur to RUDP
    - various points discussed
        - Slow control : Eric to write a REST interface to IPBUS
        - Implementation of an 'idle' frame, long traces frames on going
            - Discussion with Javier Collado yesterday !
            - A small summary document to be produced
        - Back pressure management (should be one point of the next FEEBE-DAQ meeting)
            - With the current emulators, UDP & RUDP to be extensively stressed

- Others
    - Simplification and modification (reduction of the numerical precision) of the PSA code on going
    - New script to download data from the grid
        - https://atrium.in2p3.fr/f6ec4aaa-e918-4cdf-904a-8ca22d58b42b

PSA and Tracking R&D (A. Boston)

Characterisation

Last Team meeting 7th March 2022.

Liverpool update:

- A009 scans data under analysis by Chris Everett and Jack Hackett.
- A009 capsule CT scanned at Clatterbridge Cancer Centre on 26/04/22
- A009 to leave Liverpool to return to IKP 27/04/22
- C017 operational and under measurement – coincidence scan to commence soon. Work led by Adem Kus.

The new laboratory commissioning continues to be delayed due to issues with the security door and asbestos removal above the door. The new x-y positioning table and detector holding structure are entering final commissioning.

Salamanca Update: An extensive set of measurements is in progress on the A005 detector. The energy resolution results (see figure 1) below indicate the capsule is performing well. Issues with the digital electronics reported last month have been resolved. The analogue energy resolution measurements were recording using an ORTEC 575A spectroscopy amplifier with 3 µs shaping. Acquisition of the scan data is in progress.

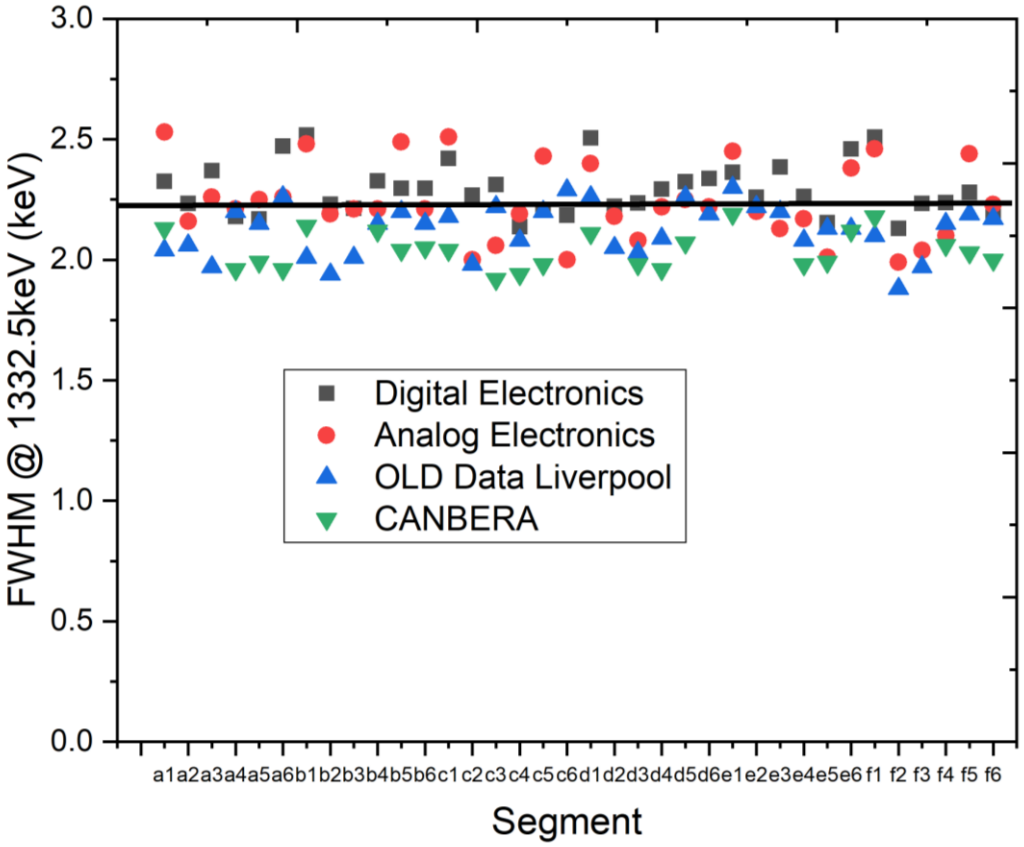


Figure 2: Comparison of Resolutions for present measurement with the Liverpool and CANBERRA data

IPHC Update: Available to receive A005.
GSI update: Available to receive A005 from August onwards.

Next Team meeting due mid-May.

PSA

Last Team meeting 18th March 2022. Update received from Fraser.

Fraser provided an update on his most recent results at the UK IOP Nuclear Physics conference. In Liverpool the ML based High-Fold PSA development is progressing well, a graph-accelerated method to link Fold-1 solutions to higher-fold combinations shows promise however will likely need a significant re-write once a refined methodology is determined, preliminary results will hopefully be presented at the UK IOP NP conference in April with a second presentation at AGATA week detailing the complete methodology.

The work on self-calibration from York (has been observed to converge on noiseless test data (simulated), tests on simulated data with experimental noise were performed producing a reasonable observed deviation.

Orsay is continuing with machine learning developments to accelerate PSCS. The experimental campaign at LNL is taking a lot of their focus at the moment, things should calm down at the end of April.

Next Team meeting due mid-May.

Tracking

No significant items to report at this time.

ORTEC detector status update

The following update was received from ORTEC on 15th April 2022.

The final details are being managed this week and next to make the detector ready to fabricate. We have had to push our fabrication to the final week of April, the week of 25th April 2022. The manufacture of the AGATA detector and the load of the system is scheduled in two weeks, the final week of April 2022. This pushes the leakage, segmentation, and resolution testing to the first week of May 2022. The plan with ORTEC is as follows prior to the FAT:

- Manufacture and demonstrate that the detector operates as a diode with a leakage current as expected when mounted in the capsule at the recommended operating voltage.
- Check the spectroscopic performance of the core with Co-60 (1332 keV) and measure the energy resolution – this verifies the bulk charge collection profile from the detector is okay
- Verify a response is observed from all of the segments
- Make a set of measurements of the low energy with Am-241 (60 keV) resolution of the segments to check performance

This means the earliest date for the FAT would be late May 2022.

Performance and Simulation (M. Labiche)

First steps toward the GSI simulations framework starting
From LNL, not yet reference data to be compared. Action on Rosa, report at the AGATA week.

Financial Reports (B. Million)

ATOMKI OC transfer on-going to GANIL
Several capsules orders placed
The LN2 cost from LNL to be re-evaluated.
Replacement of one CEPH node (Globalicephal1) by IPHC to be done.

Dissemination (J. Nyberg)
No report.

AGATA Week : - Discussion on the Program