

Report of the PARIS Electronics and DAQ integration Working Group on-line meeting, 20th November 2020

On Friday 20th November 2020, the PARIS Electronics and DAQ integration Working Group meeting took place on-line from 14:00 to 16:00.

Since the PARIS collaboration is currently at the stage of completing detectors and related equipment, the purpose of this meeting was to make a choice of the front end electronics and the related DAQ system.

The meeting was opened to the people of our collaboration that gave a contribution in the electronics working group in recent years and extended to interested people. We also invited to the meeting a representative of LNL and GANIL as future laboratories where PARIS detectors are supposed to work in a next future to benefit of their experience and suggestions.

After a first introduction of the current state of the PARIS project, perspectives for future experiments in different laboratories and a summary of different electronics solutions and tests carried out by various groups and members of the collaboration, we took into consideration the choice of the VME V1730 digitizer of CAEN company as front end board for PARIS.

However, as already stated in previous meetings, other solutions preferred and supported by PARIS host laboratories can be also accepted as it was for the experimental campaign already performed in Orsay making use of the laboratories Faster electronics.

During the meeting we evaluated the characteristics of the V1730 board that make it suitable for processing the signals coming from our detectors, here is a list of the main points:

- 500MHz 14 bits digitizers are good enough for PARIS detectors, they allow good energy and time resolution and to easily disentangle the interaction position of the γ rays between the two crystals, LaBr₃/CeBr₃ and NaI, of the PARIS phoswich
- can work in triggerless/coincidence mode
- digital algorithms allow charge integration, time estimation and PSD
- synchronization through clock propagation (internal/external)
- high acquisition rate

We also took into account for our choice these important motivations:

- 1) we already have at this moment six of these 16 channels boards in our collaboration that can be used in the next experimental campaigns, they represent nearly half of the front end needed channels
- 2) several integration tests with this board have been already performed in collaboration with LNL in the GALILEO data acquisition environment that is based on XDAQ software platform

- 3) XDAQ is the chosen environment for integration of AGATA ancillary detectors in the LNL experimental phase and then any development in this direction is already a development that goes towards a safe integration with AGATA
- 4) integration of commercial V1730 CAEN digitizer is already planned at LNL for other detectors so we can take advantage adopting this solution
- 5) great part of the integration work done for DAQ integration at LNL can be reused in the future for the experimental campaign in GANIL

Some possible critical points were also highlighted in the discussion, such as the possibility of having access to the PSD algorithms integrated within the FPGAs of the V1730 boards for a possible customization and the long term availability of these boards on the market for the future.

At the moment the algorithms already present fully satisfy the experimental needs and the possibility of development of new algorithms appears in this sense to be really unlikely.

The same argument is for the future availability of the V1730 cards if we think to buy the remaining boards in the medium term.

In any case it is possible to establish close contacts with the CAEN company to have a more detailed view of the situation and to be able to prevent this possible occurrence.

No other solution has been taken into account during the meeting, so we will proceed in this direction and recommend the CAEN V1730 digitizer as front-end board for the PARIS detectors.

Sergio Brambilla

(on behalf of the PARIS Electronics and DAQ integration Working Group)