

The 2nd workshop on signal processing and data acquisition infrastructure

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In the field of nuclear experiments, the increase in beam intensity and the number of detector channels, in conjunction with waveform data acquisition, have made faster data acquisition systems a necessity. On the other hand, the amount of data that can be stored is limited, and therefore, fast event discrimination techniques are also necessary to extract data on physical events from a large amount of data corresponding to background events. Whereas these requirements are important and are common matters to be dealt with by research facilities and experimental groups, it is becoming more difficult to continue to develop and maintain such large-scale data acquisition systems independently. Against such a background, the Signal Processing and Data acquisition Infrastructure (SPADI) Alliance¹⁾ was established in FY2023, and joint efforts for the commonization and standardization of data acquisition systems, streaming DAQ, and front-end electronics are being promoted.

The second SPADI Alliance workshop was held on March 8, 2024, in the large conference room of the RIKEN RIBF building with a hybrid format of on-site and Zoom.²⁾ The workshop is jointly organized by the RCNP Osaka University, RIKEN Nishina Center, and SPADI Alliance, and the following members are the organizers: S. Ota (RCNP), H. Baba (RIKEN Nishina Center), R. Honda (KEK), K. Shirotori (RCNP), N. Kobayashi (RCNP), T. Gunji (CNS, Univ. Tokyo), and M. Miyabe (ELPH, Tohoku Univ.). There were 18 talks, titled as follows:

- Performance evaluation status of a general-purpose readout circuit (RAYRAW) using an Japan-produced ASIC for MPPC,
- Development of ADCs that do not require delay cables,
- Development status of test board using ASIC SAMPA V4 for TPC readout,
- Development of general-purpose wire chamber readout circuit ASAGI ASD card,
- Status and Prospects of High-Resolution Waveform Digitizer FW Development,
- A study of a streaming readout waveform digitizer using a single slop ADC,
- Progress on data acquisition software that supports streaming readout 2023,
- Online Web-based Monitoring Tool Slow Dash + Mini Booking Tools,
- Clock sync module,
- Study on Fakernet's implementation,



Fig. 1. Group photograph of on-site participants.

- Development of Local Area Common Clock Protocol,
- Development of an integrated system for automation and advancement in online experiments,
- Collider Electronics Forum,
- ATLAS TRIGGER DAQ UPGRADE,
- Versal project in Collider Electronics Forum: Study of modern ACAP device for application in
- HEP experiments,
- SPADI-A DAQ Package Instructions,
- HLS4ML,
- WG4 + World Situation.

There were 68 participants in total. A group photograph of the on-site participants is shown in Fig. 1. The next workshop will be held at Tohoku University.

References

- 1) SPADI Alliance, <https://www.rcnp.osaka-u.ac.jp/~spadi/>.
- 2) The 2nd Workshop on Signal processing and data acquisition infrastructure, <https://indico.rcnp.osaka-u.ac.jp/event/2291/>.

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