

FAUST Electronics Summary of WP3

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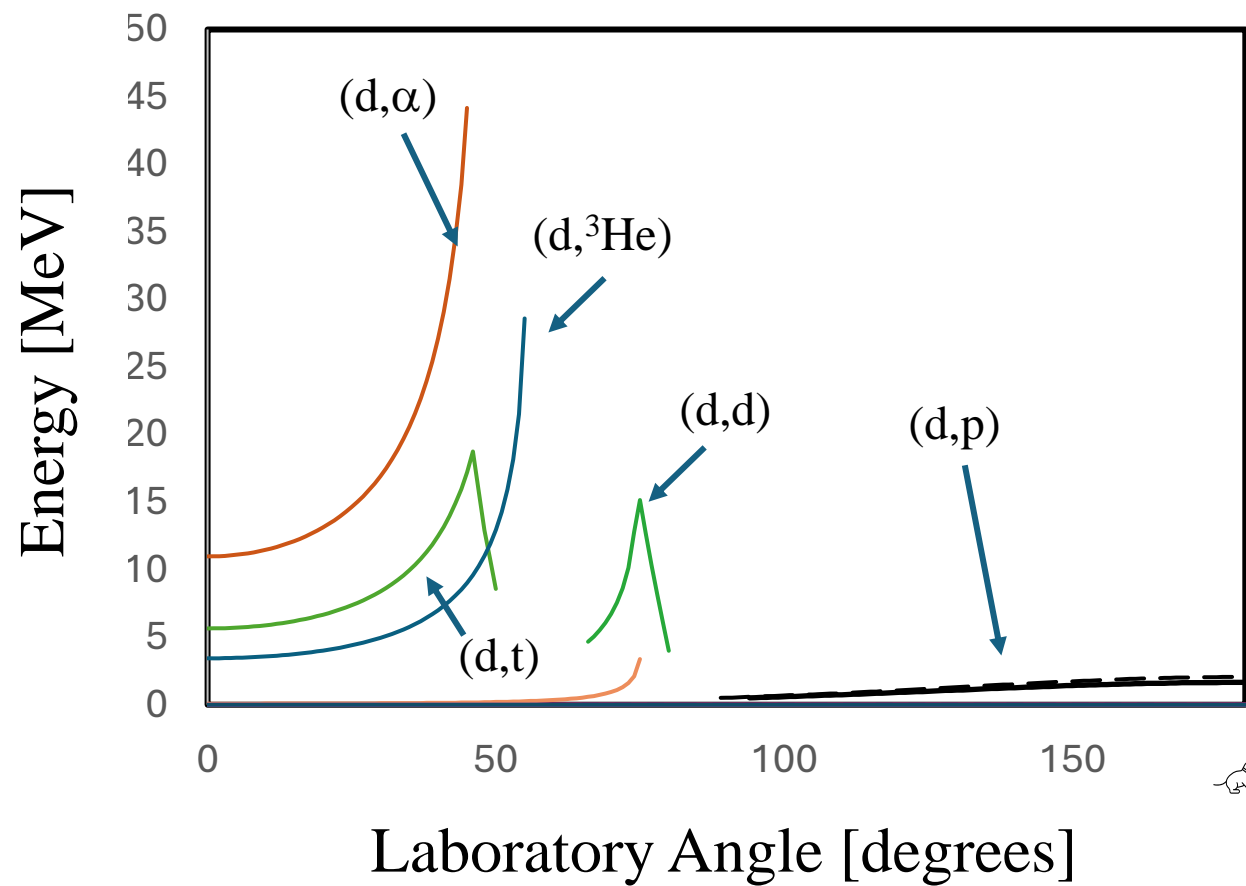
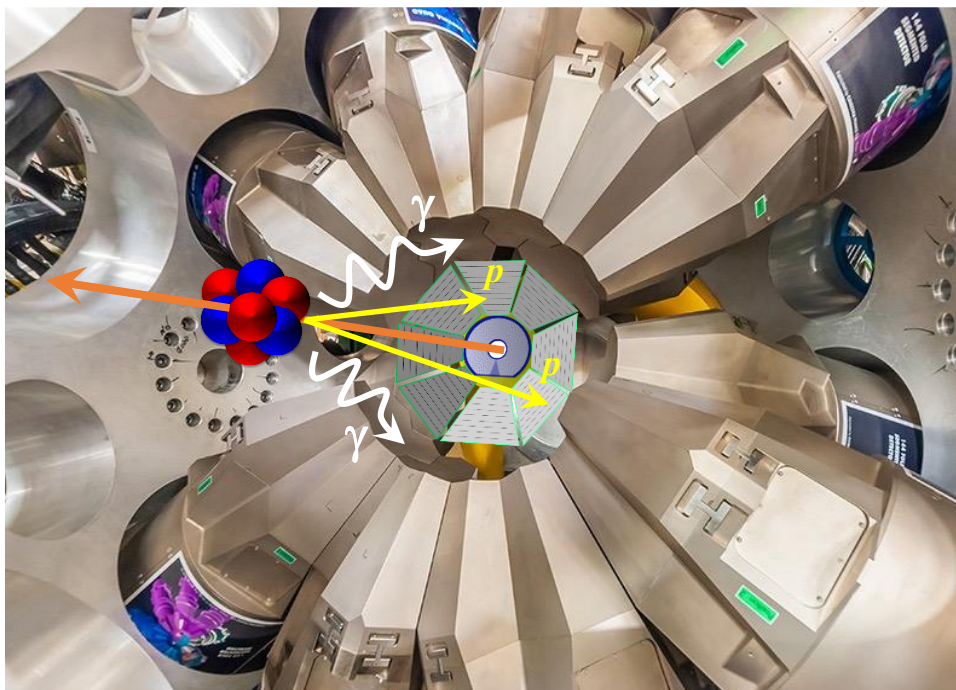
Summary of Work Package 3

Joint **Surrey** - **Daresbury** Work Package

(**Dan Doherty**, **Jack Henderson**, **Mos Kogimtzis**, **Carl Unsworth** plus Aaron Chester and Giordano Cerizza from the FRIB DAQ group)

- Procurement and testing of all the FAUST electronics and digitisers
- Integration with the FRIB data acquisition
- The development of tools for online data monitoring
- Construction of a simple test setup

FAUST in one slide



Electronics Considerations

- Large number of channels (~1k for the full array)
 - Cost per channel, space considerations/ form factor
 - reliable supplier and ongoing support
- Ability to integrate with the FRIB DAQ
 - Supported commercial system, FRIB support, ability to integrate with GRETA
- Versatility
 - Large sampling rate for nTD silicon and/ or use in 'other' experiments
 - PSA for CsI?
- Construction of a simple test setup

Preamplifier Solution

- Have already procured all of the FAUST preamplifiers from Mesytec (MPR-64 modules)
 - <https://www.mesytec.com/products/datasheets/MPR-16.pdf>.
 - To be used outside of vacuum, compact form factor
 - Differential output 0 to ± 1 V, twisted pair connector
- Preamplifiers and power supplies etc currently in the lab at Surrey
- Need to identify and procure suitable cabling
- Need to design a suitable mounting system for the S800 area at FRIB



Digitiser Choices (1)

- Suitable modules exist made by XIA, Mesytec, CAEN etc
- Currently planning to use (and have ordered) CAEN 2740 digitisers
 - <https://www.caen.it/subfamilies/2740-digitizer-family/>
 - 64-channels per board, 125 MHz, 16-bit
 - Widely used by the UK and other communities
 - Several firmware options
 - Supported by the NSCL/ FRIB DAQ group
- Sampling rate likely not sufficient for nTD silicon (forward array)
- Currently exploring other CAEN options

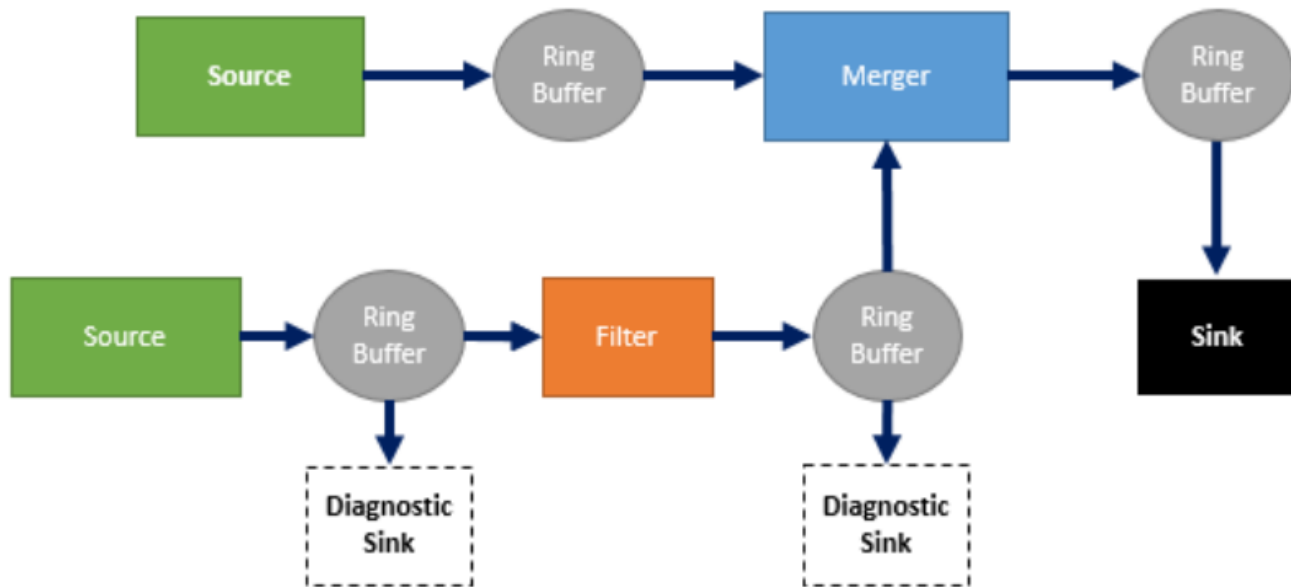


Digitiser Choices (2)

- Intend to make use of the Daresbury PyDAQ system
 - Midas replacement (see Carl's talk)
 - Testing at Surrey once CAEN 2740 modules delivered
 - Online diagnostics
- Merging data from multiple modules
 - Build upon work done for the ISS
- Exploring options for filtering on the digitizer board
 - Want to readout front-back Si events (similar to Compton-suppression done at JYFL?)



NSCL-FRIB DAQ



- Modules connected via optical link to a dedicated FAUST server PC (not using multiple crate controller cards)
- Clock from GRETA, linked to one module and then patched through to each of our modules
- Also have the ability to run our own DAQ, FAUST as an ancillary device
- Triggering needs some thought (to be explored this summer). Make use of veto/ enable from A1900?



On-going Work

- Have ordered several CAEN 2740 modules (64-channels, 16-bit, 125 MHz)
 - Desktop form factor for quick testing with PyDAQ software at Surrey
 - Standard Pulse-height analysis (PHA) firmware
 - Solution for the backwards part of the array
- Additional 'fast' 1 GHz CAEN module (16-channel) ordered for R&D
 - Supported commercial system
- Investigate local install of NSCL-FRIB DAQ via container
- First test with our modules at FRIB this summer (July and August 2025)
 - DTD and Carl Unsworth and others
 - Coincides with GRETA's arrival