

The DAQ side of commissioning.

D. Mengoni

University of the West of Scotland, Paisley - U.K.
INFN - Sezione di Padova, Padova - Italy

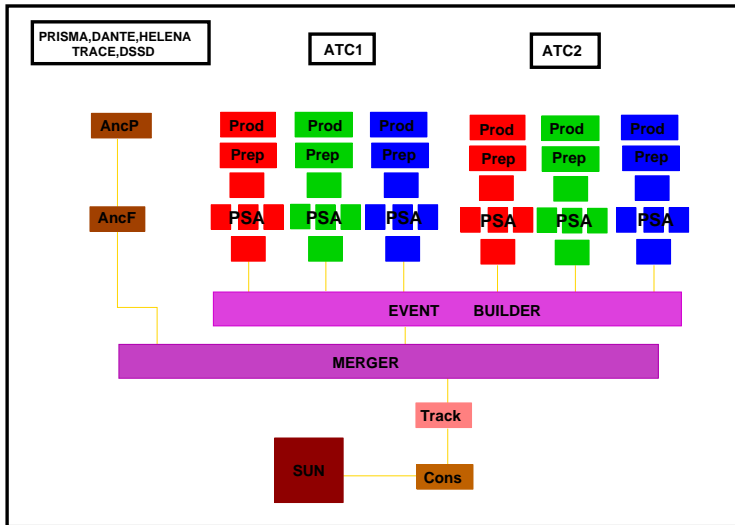
AGATA WEEK, LNL
Jan 20th ÷ 22th, 2010

Outline

- 1 Introduction
- 2 Algorithms
 - Local&Global Level
- 3 DAQ commissioning
 - WeekX DAQ Commissioning
- 4 Conclusion

DAQ

Current Conf



Libraries

Local level processing

Two class approach

- The mother class usually binds with the ADF:
I/O methods, configuration, initialization
- The daughter class usually overloads the processing method where the job is done

ORGANIZATION IN&OUT NARVAL

- All the C/C++ code is in a dedicated machine where all the libraries have been ported and build. Afterwards they are copied to a common nfs directory, loaded and configured inside NARVAL.
- Self contained emulator and shared library emulator(for debugging purpose).

CrystalProducer/CrystalProducerATCA

Data readout from carrier/disk

Data import inside the DAQ

- Input: Disk/Carrier reading and mezzanine decoding
 - independent threads with a ring buffer
 - local level EB
- Output: ADF event *data:crystal* format
- Raw mezz data (14kB/ev) written on disk
 - debug, replay data
- with/without ADF
- WEEK27(22) DANTE
- ONLINE/OFFLINE spectra

PreprocessingFilter/PreprocessingFilterPSA

Data preparation for PSA

SetInput()/SetOutput()

- Decoding/Coding

Process

- Energy calibration and integral cross talk correction
- Time normalization, baseline removal
- Alignment of the traces(digital CFD on core)
- Output: *data:ccrystal*
- ONLINE/OFFLINE spectra

PSAFilter/PSAFilterGridSearch

PSA

Grid Search

- signal base(300MB) readout
- GS or AGS;
 - One interaction in the hit segments
 - first neighbouring signals
 - One or two steps
- Parallelism: threads or multiple NARVAL instances
- Output: *data:psa*
- ONLINE/OFFLINE spectra

AncillaryProducerTCP

Ancillary readout

- non blocking TCP server (libskstream)
- Output: *data:ranc0*
- no ADF
- AGAVA data on disk

AncillaryFilter/AncillaryFilterDante

Ancillary analysis

SetInput()/SetOutput()

- Decoding *data:ranc0*/Coding *data:ranc1*
- VME ADC, TDC, SCALER decoding

Process

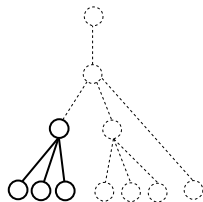
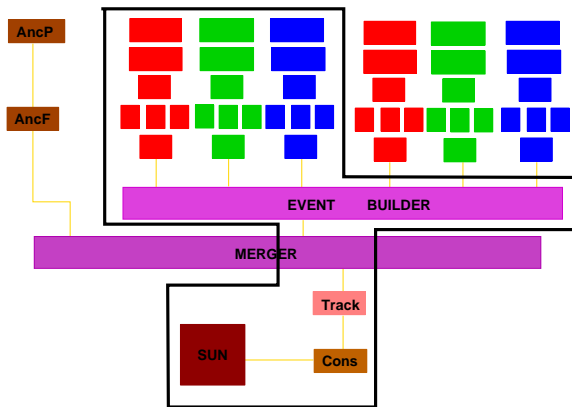
- Analysis of DANTE
- Analysis of PRISMA via the ext libPRISMA.so

Global Level

- **Event Builder:**
builds the event (TS or EN), moves from the same key (*data:psa*) of different crystals in *event:data:psa*
- **Merger:**
assembles two different keys (*ranc1,event:data:psa*) in *event:data*
- **Tracking:**
decoding, coding, OFT, Doppler corr
- **Consumer:**
dumps ADF data on disk

WEEK12

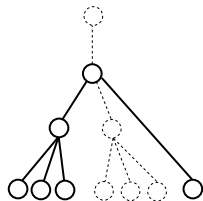
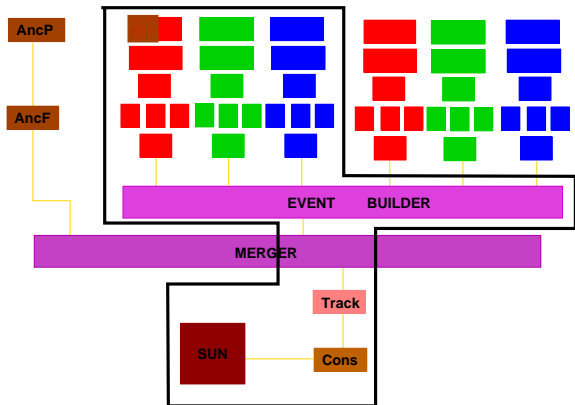
FE reaction: $30\text{S}(70\text{MeV})+12\text{Ca}$



- 1 ATC
TS based EB
- ONLINE Analysis,
ViGRU
- Acq rate: 1kHz/crys
- Data on disk(14TB)

WEEK27(+WEEK22)

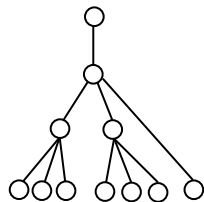
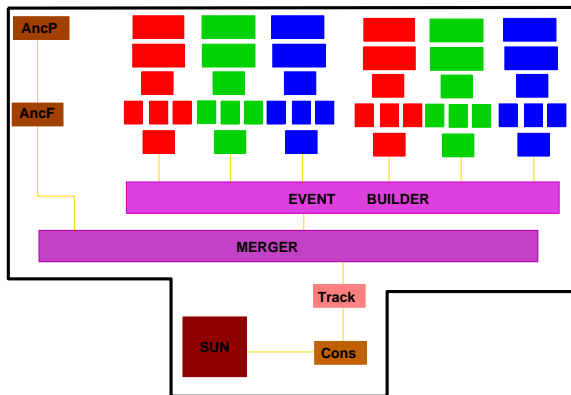
Coulex reaction: $56\text{Fe}(220\text{MeV})+197\text{Au}$



- 1 ATC+DANTE
- Digital trigger EN based EB
- ONLINE Analysis, ViGRU
- Data on disk(few TB)

WEEK43

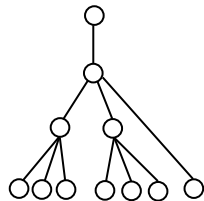
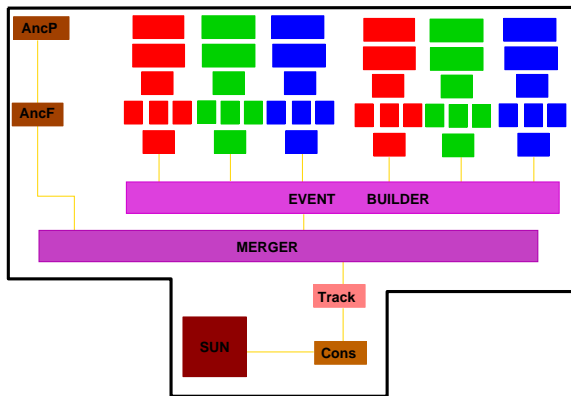
FE reaction: $^{32}\text{S}(130\text{MeV})+^{110}\text{Pd}$



- 2ATC+16Si+5LaBr
- MERGER, Sync
- ONLINE Analysis, ViGRU
- Data on disk(few TB)

WEEK49(+WEEK46)

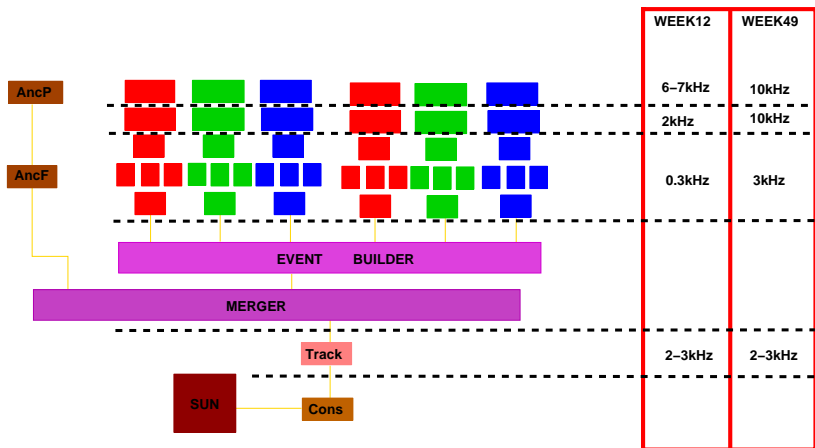
MNT reaction: $58\text{Ni}(235\text{MeV})+96\text{Zr}$



- 2ATC+2DANTE +PRISMA
- PRISMA ONLINE Analysis [Go to](#)
- Data on disk(few TB)

Performances

rate estimation



Local level: $\gtrsim 1\text{kHz/crys} \rightarrow 5\text{kHz/crys}$

Summary and conclusions

- ON-LINE analysis at a rate of $\gtrsim 5$ kHz/crys, with two ATCs
- AGAVA coupling and sync achieved
- System looks easily scalable and reliable
- Major limit: debug

TO DO/ ON GOING

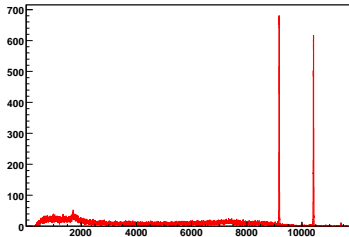
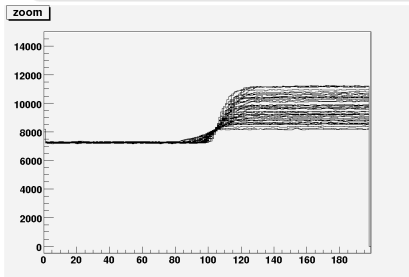
- Improv. of the algorithms and online analysis
- last commissioning test + physics campaign (displacement of the ATC3)
- ROOT based OFFLINE analysis

Mezzanine producer

data reading from disk/carrier

Data import inside the DAQ

- Input: Disk/Carrier reading and mezzanine decoding
- Output: event Crystal Frame conversion
- Data compliant with ADF 2.0: 12.648 kB/ev

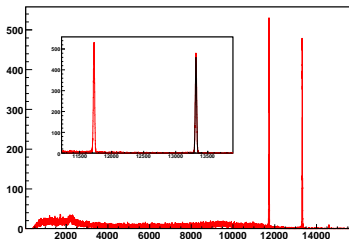
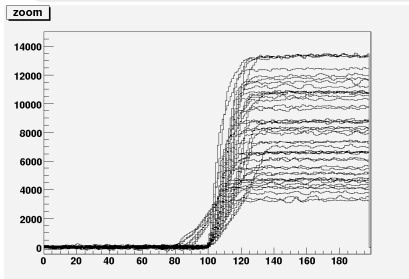


► Return

PSA preprocessing

ADF crystalFrame

- Energy calibration and integral cross talk correction
- Time normalization, baseline and offset removal, alignment.

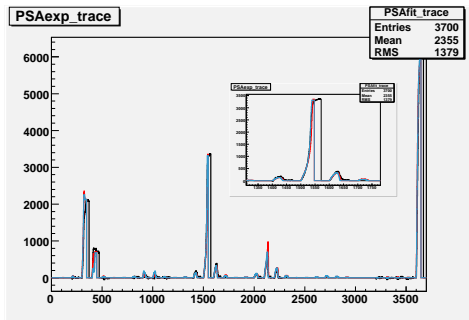


► Return

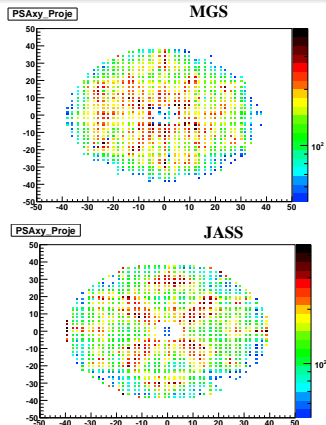
PSA

ADF psaFrame

- Simple grid search: JASS and MGS basis (2 mm, 5 ns).
- Comparison: different exp point in the same segment.

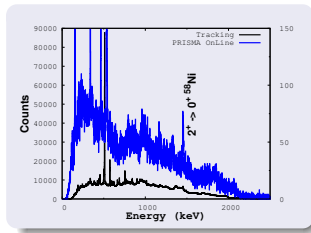
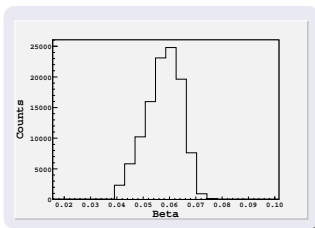
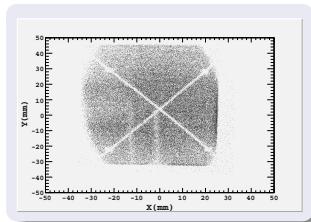
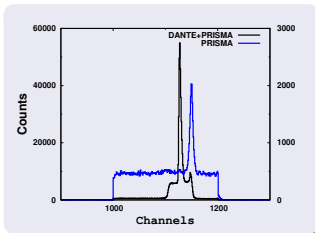


► Return



ONLINE Analysis

preliminary results



► Return