

Electronics & DAQ

present, upgrade and near future plan

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- **Prespec EDAQ scheme**
- **GSI specifics**
- **Coupling proposition**
- **Discussion (if any)**

AGATA coupling – for PRESPEC

First meeting : one march 2008 (no really emergency)
AGATA week Koln 2009 → Meeting with AGATA EDAQ people
initiated by Andres
Fruitful discussion between Nik Kurz and Marco Bellato for example

*Meeting on the EDAQ integration for the AGATA demonstrator for its GSI campaign.
Held in Cologne the 31.03.2009*

*Those minutes try also to include the content of informal discussions that happen in Cologne, plus
the points raised in a second “casual” meeting that happen in GSI the 15th July.*

Attendee:

Present:

*M.Bellato, S.Brambilla, P.Bednarczyk, N.Kurz, C.Nociforo, J.Gerl, S.Pietri, H.Schaffner, R.Isocrate,
O.Stezowski, V.Pucknell, P.Molini, N.Dosme, Ch.Theisen, M.Gulmini, A.Gadea, J.Nyberg, H.Simon.*

**All what I will present are not definitive, just on-going propositions
to be discussed again with the AGATA WGs**

AGATA@PRESPEC why?

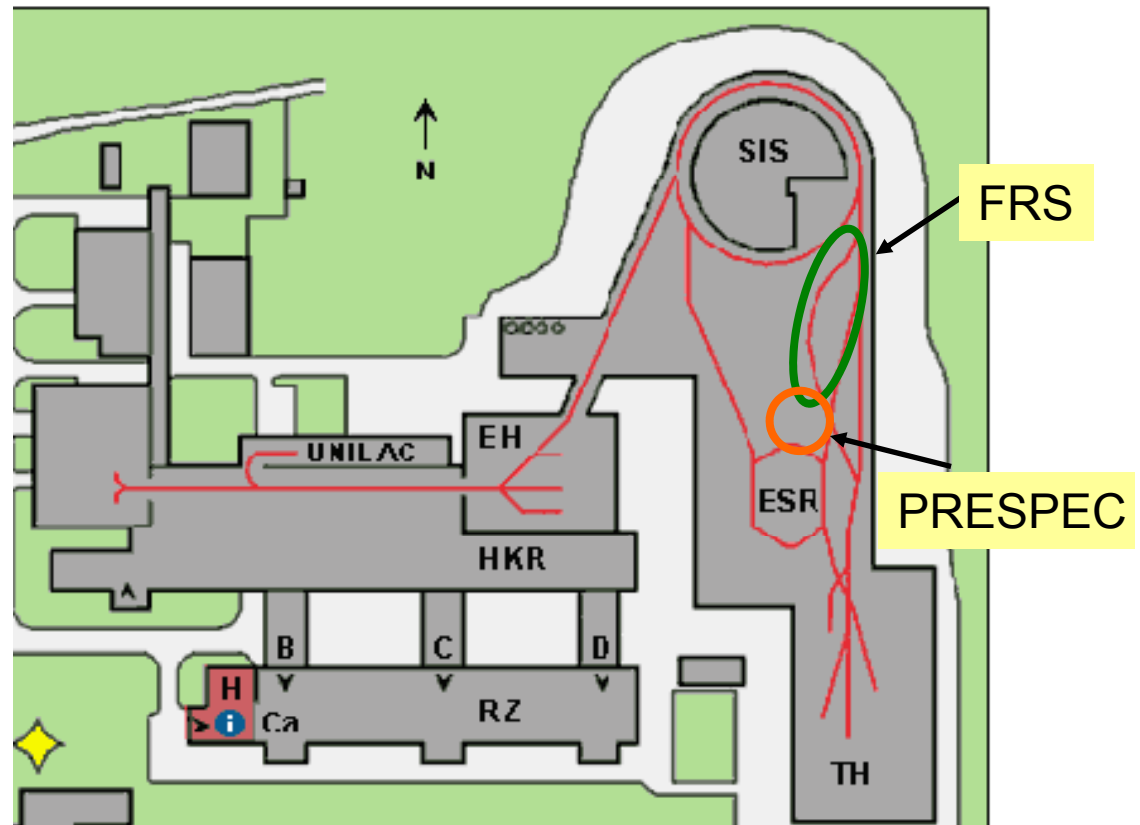
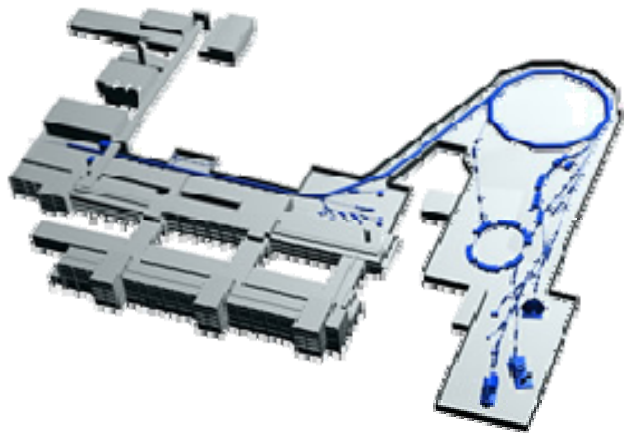
Why at GSI : unique opportunity

UNILAC + SIS :

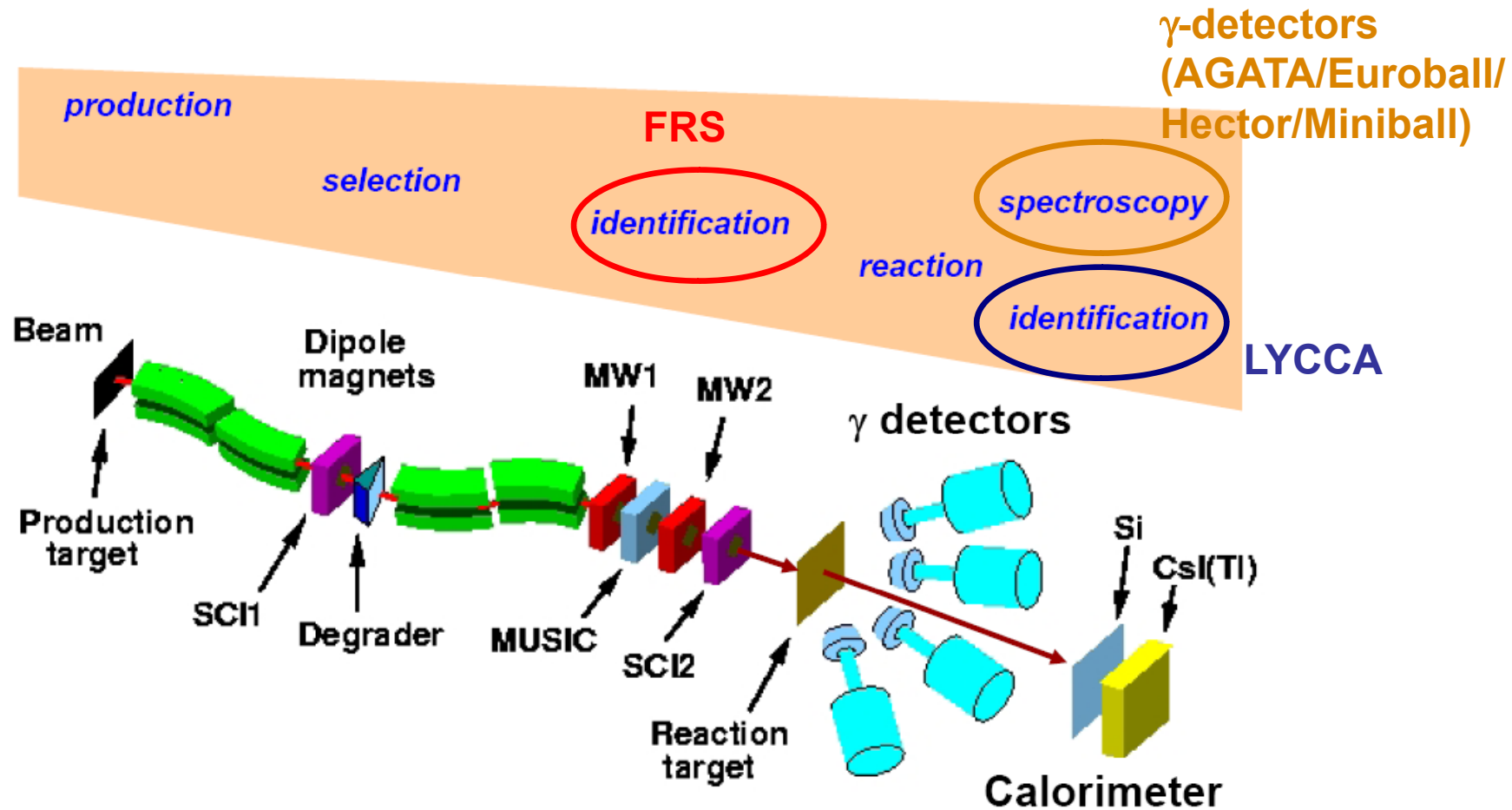
1 GeV.A beam of all stable isotopes (and Uranium)

Intensities : 10^{11} to 10^9 pps

Can be use to produce (very) exotic species in all the nuclear chart by fragmentation reactions

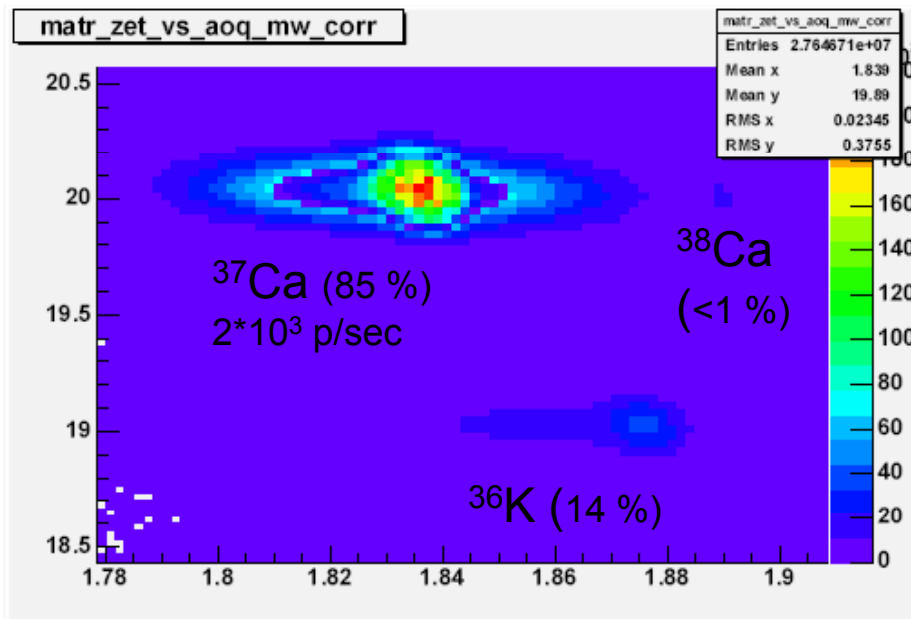


PRESPEC = FRS + LYCCA + gamma detectors



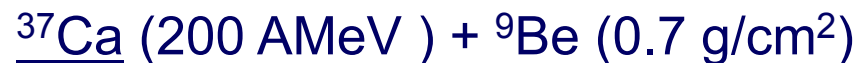
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Identification example – ^{37}Ca fragmentation (2004)

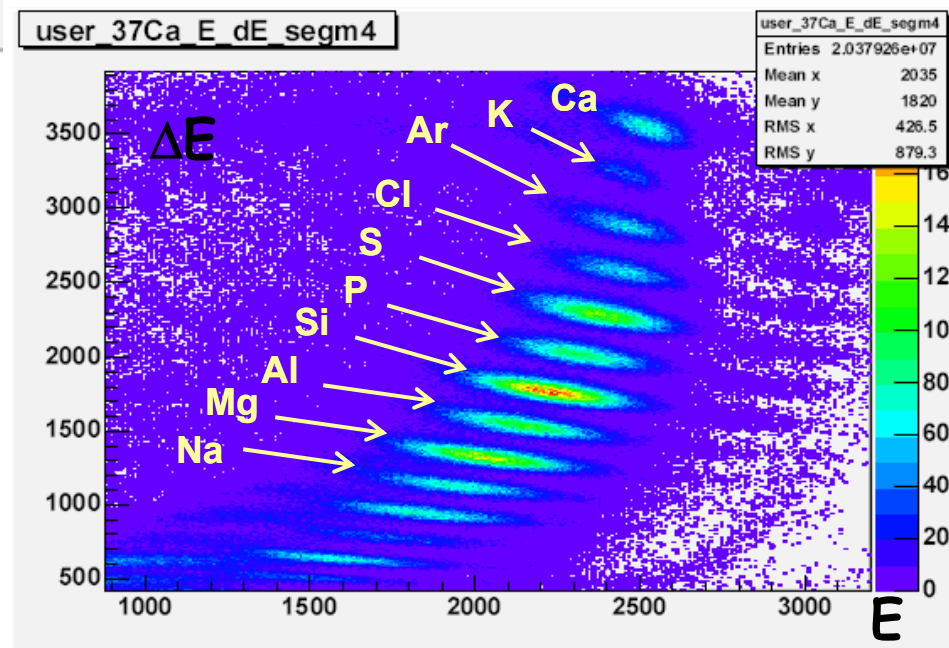


FRS id (cocktail beam)

Double fragmentation reaction:



Id after secondary target

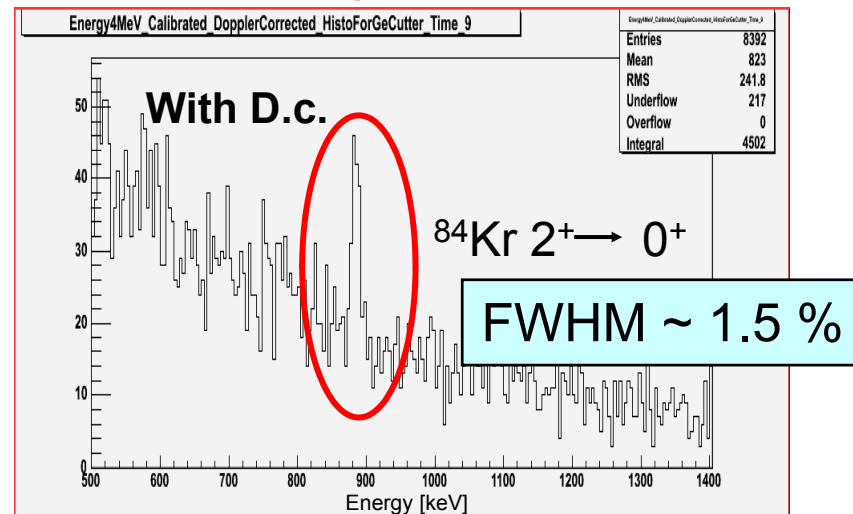
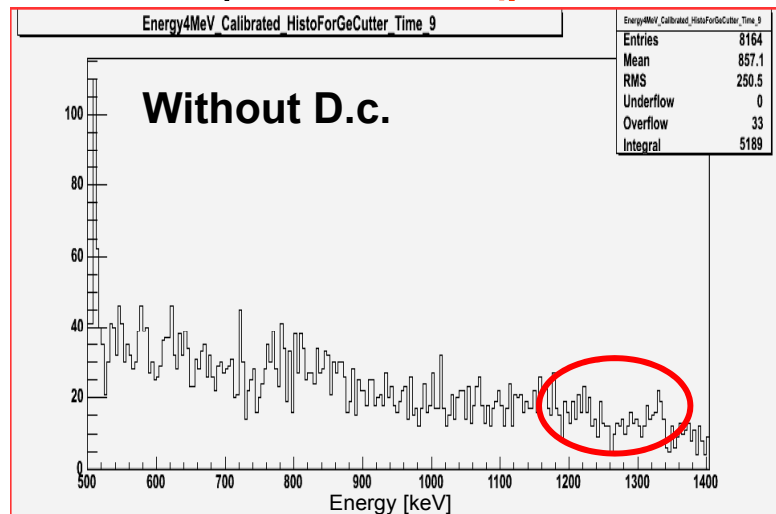


Importance Doppler – ^{84}Kr (2004) – Euroball cluster

^{84}Kr at 113 MeV/u on a 0.4 g/cm² Au

Conditions for the analysis :

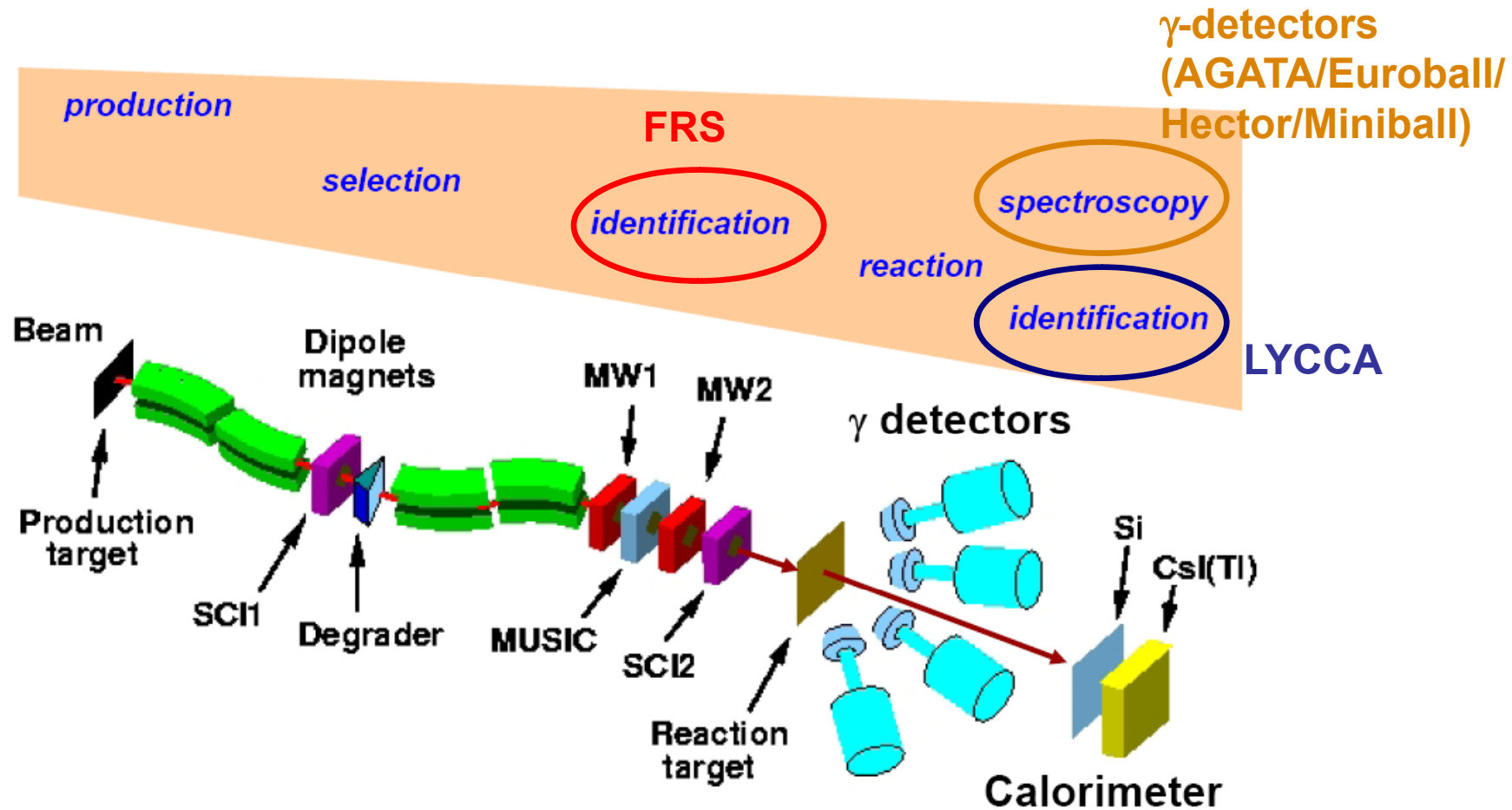
- Particle Identification before and after the target
- Scattering angle selection ^{84}Kr : 0.5 ~ 2.5 degrees
- Selection of one-step Coulomb excitation $\langle M_\gamma \rangle = 1$
- ^{84}Kr : $\beta = 0.396$ (β from TOF measurement)



At 100 MeV/u need doppler correction to even see if gamma present
→ Importance for the online-near line analysis

From N. Saito

PRESPEC = FRS + LYCCA + gamma detectors



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FEE used

Tracking detectors :

FRS : all VME, mostly conventional CAEN v7XX, scalers v830, v1290
SIS modules (shape processing for high rate IC detectors)

LYCCA : for the foreseeable future all VME CAEN electronic v7XX and v1290

Complementary gamma detectors (excluding AGATA):

HECTOR : all VME (S. Brambilla)

Clusters (?) : CAMAC (XIA DGF-4C), but through VME interface

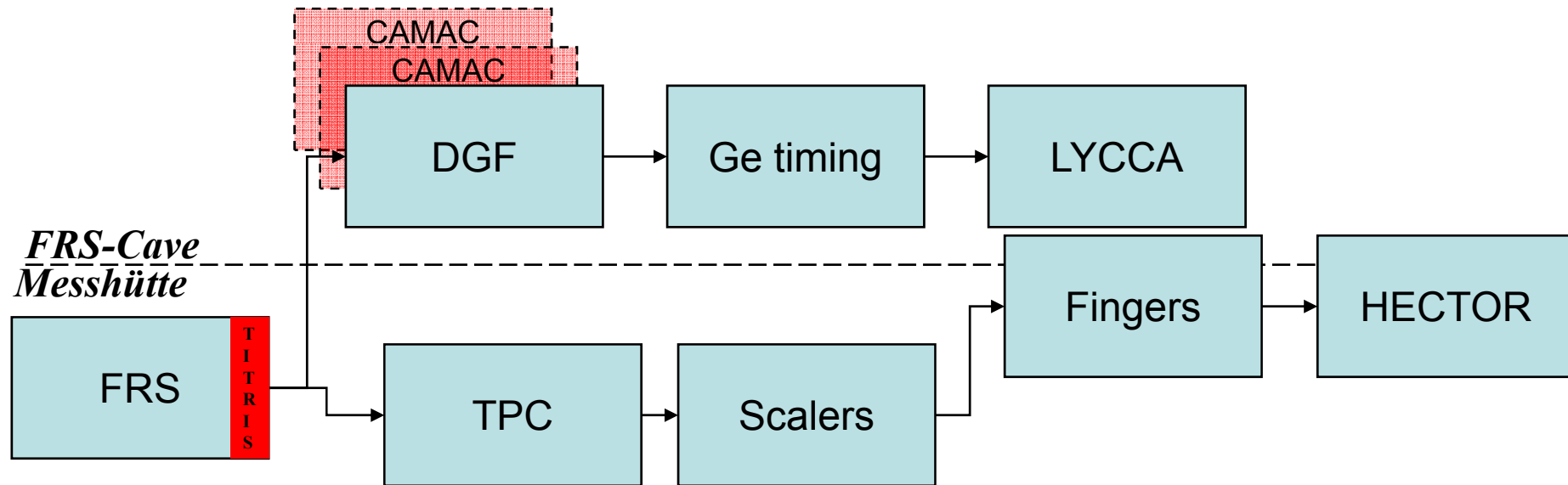
Miniball : idem

All systems run under MBS, CIS RIOx, GSI made Trigger unit/synchronization
modules

PRESPEC fast beam - pre-AGATA

Master crate (FRS) + all the other branches in one system

Trigger = gamma + particle + LYCCA (otherwise no physics output of the event)



We could have to separate : LYCAA/ FRS-TPC.../Ge running as separate acquisition and correlating streams with time stamp

AGATA coupling – GSI specifics

AGATA@FRS is AGATA+LYCCA+FRS+HECTOR + (MINIBALL)

1. The AGATA demonstrator data flow will need information from the tracking detector (FRS and LYCCA) before the tracking stage.
2. a “good event” being FRS+LYCCA+gamma in any gamma detector it could happen that some events do not contain AGATA data
3. We will be using MBS in the readout and trigger scheme of the FRS and PRESPEC VME crates
4. The FRS requires his own dedicated online diagnostic
5. the data writing should happen in both ends???
6. Solution should be // of the ones for PRESPEC 2010

AGATA coupling – trigger scheme

Like in Legnaro :

Several AGAVA modules with their GTS in the trigger scheme + the GTS of AGAVA:

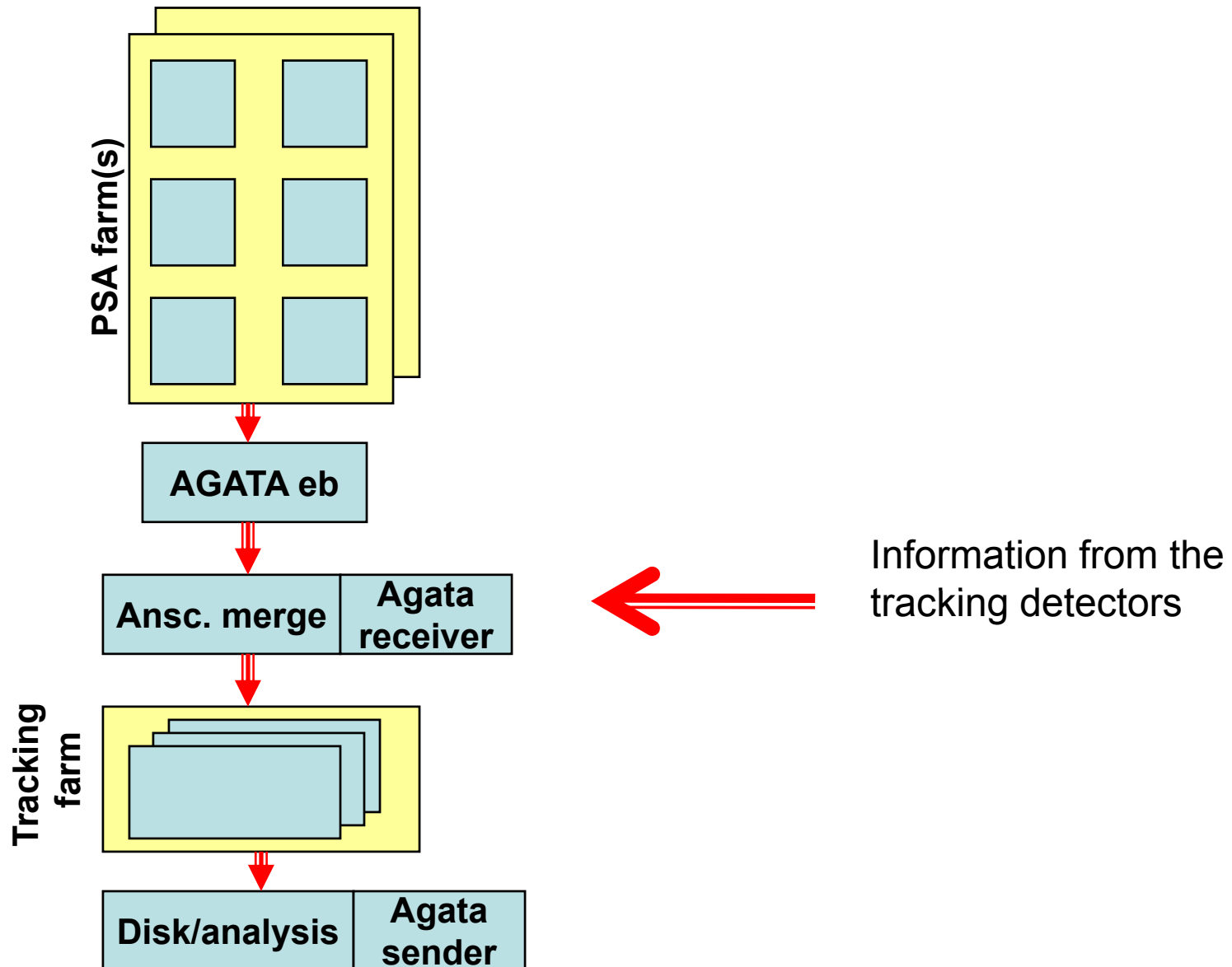
- allows triggering of ANY GTS, any comp. det. can contribute to the trigger and the trigger can be only complementary detectors
- a fast trigger generated outside the GTS tree, to open the gates
- when the late validation trigger comes : either fast clear of all the VME modules or readout (which ever is faster/simpler)

We had the idea : why not use it for the PRESPEC 2010...

WARNING : this depend stongly on the GTS avaiability

Request : we need a test bench of two/three AGAVA modules

AGATA coupling – data flow merging



AGATA coupling – data flow merging

MBS Note 8

N.Kurz, S.Pietri, GSI, 17-July-2009

AGATA – PRESPEC DATA FLOW COUPLING

Previous notion:

This document shall be a proposal for the data flow coupling of the AGATA - and the PRESPEC FRS MBS data acquisition systems for the 2011 campaign at GSI.

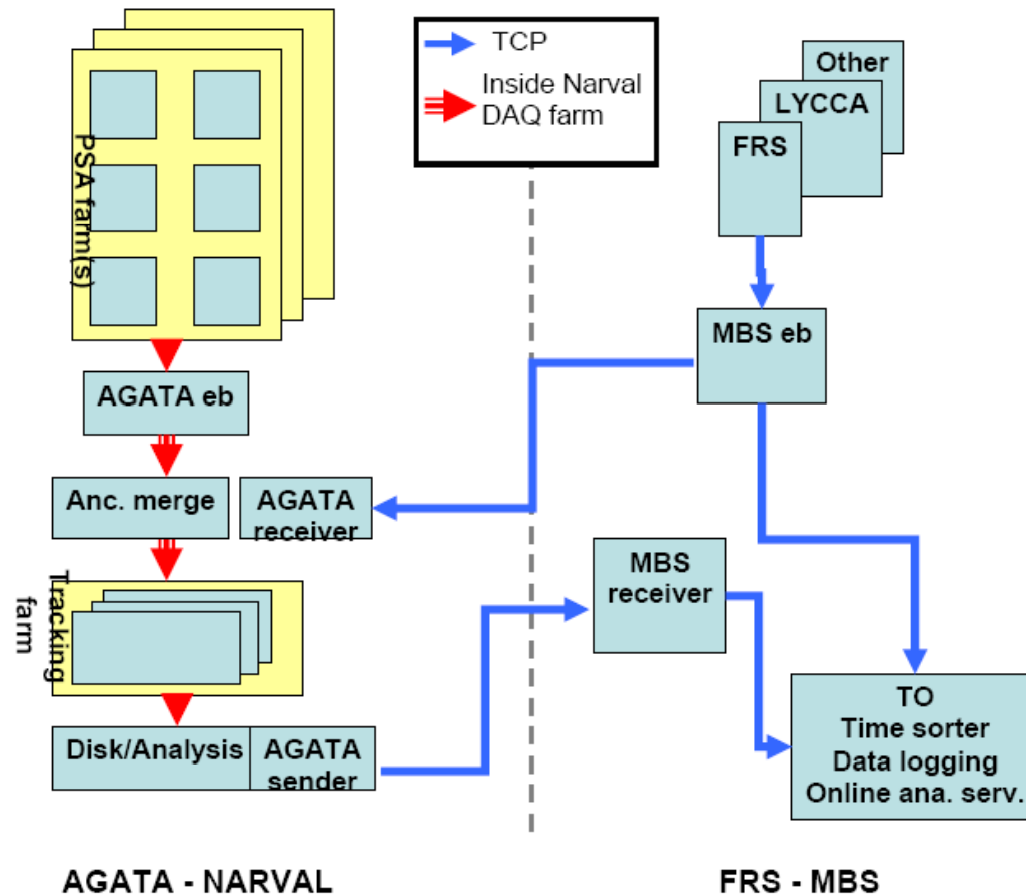
The hardware synchronization of events in both systems is not subject of this note. To understand the presented concept, it only needs to be mentioned, that the event sorting and merging will be done in software with time stamps. At the time being, it is foreseen to synchronize both systems with the AGATA GTS unit and AGAVA/GTS modules.

In principle the following proposal works with any suited time stamp systems, but it is not expected that the AGATA GTS system will be exchanged.

A trigger test bench at GSI, to check its functional behavior will hopefully be setup beginning in autumn this year, depending on the hardware availability.

The aim is to design a most flexible system with a minimal workload effort and to keep

AGATA coupling – data flow merging/coupling



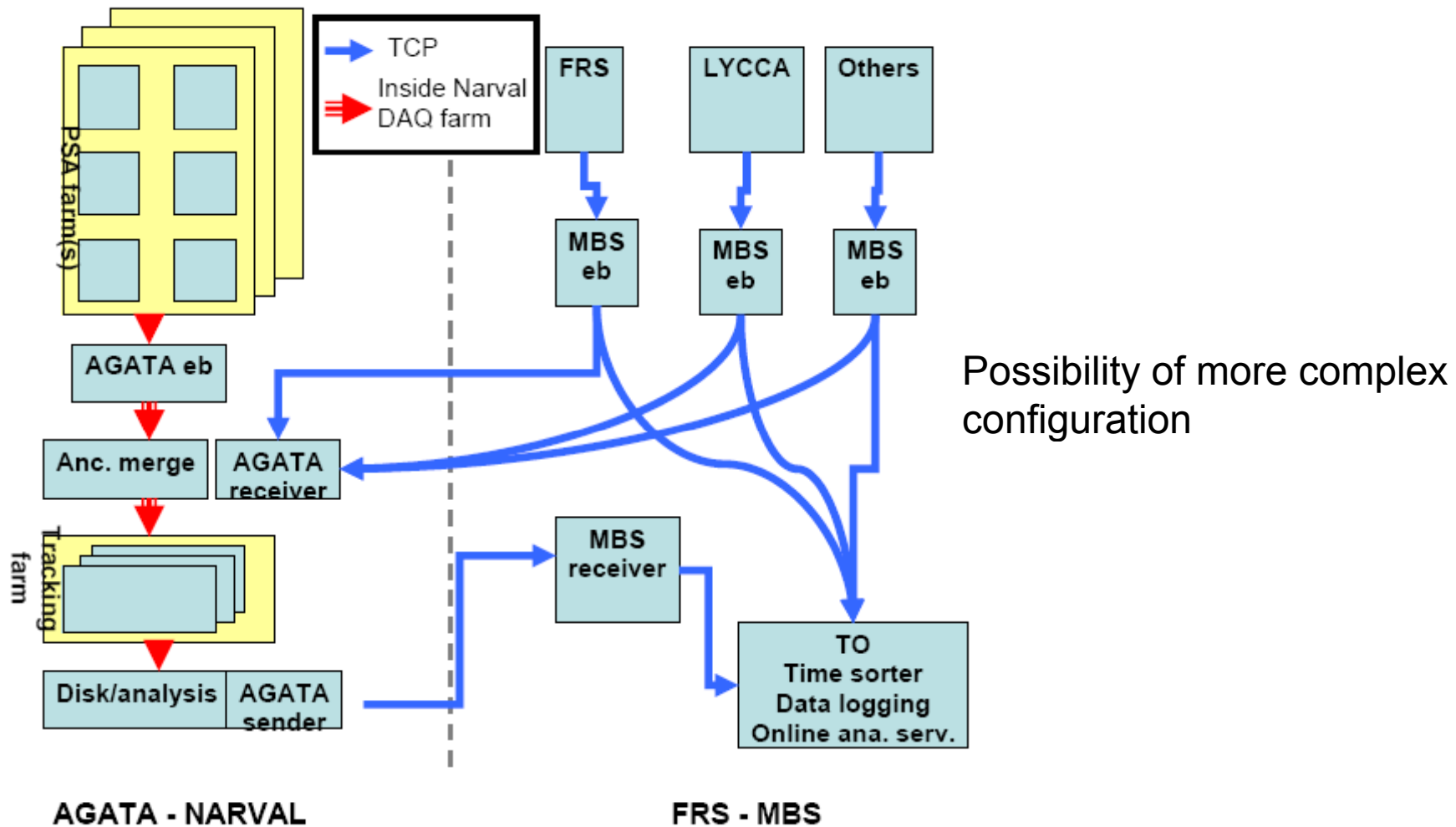
Two parallel data flow

Two options :

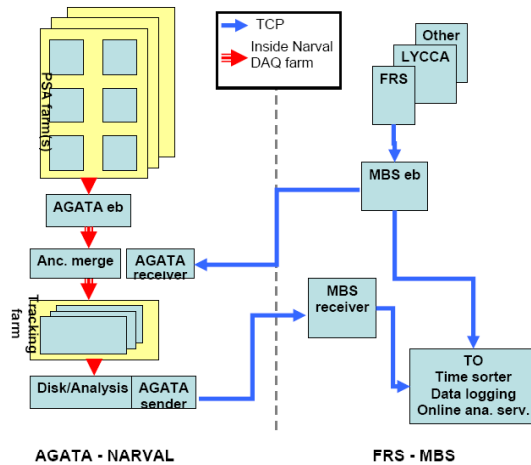
→ “MBS ed” send simply unprocessed data

→ “MBS eb” process data and send to the AGATA stream together with the unprocessed data the information needed by AGATA tracking

AGATA coupling – data flow merging/coupling



AGATA coupling – data flow merging/coupling

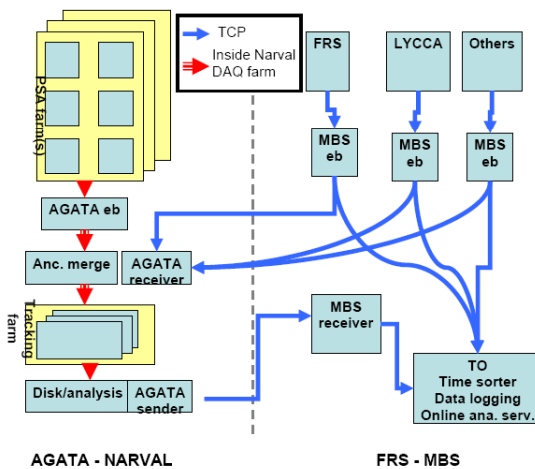


Those options are optimizing workload on the MBS and NARVAL people

We can have two data logging

BUT :

double analysis
double (??) online



AGATA coupling – last comment

Haik Simon proposed in the meeting to run AGATA EDAQ on the GSI computing farm (no?)

PRESPEC should pave the way toward NUSTAR, shall we integrate as soon as possible their new ideas???

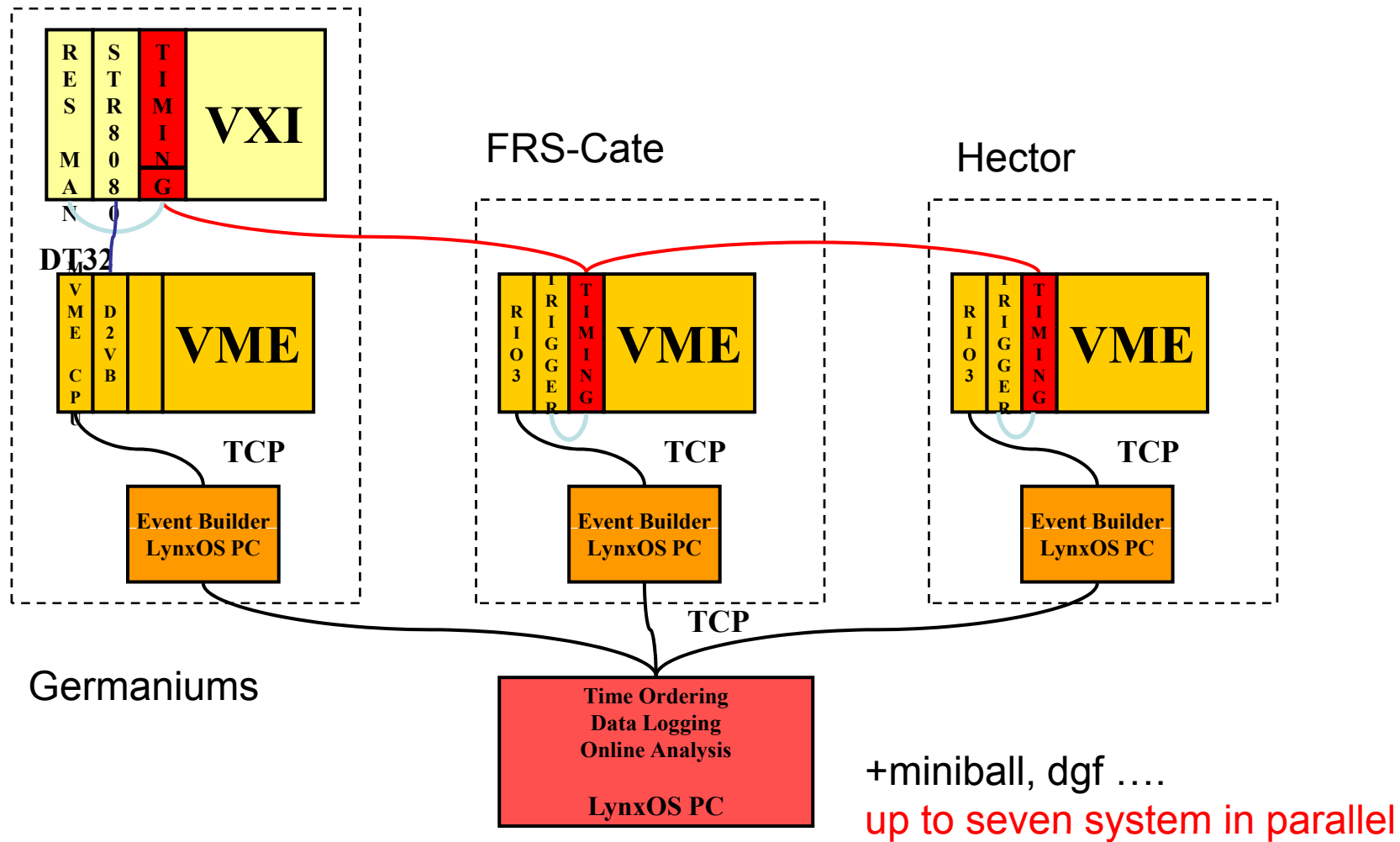
We need as soon as possible some AGAVA to test

We could need firmware upgrade for the AGAVA :

1. multi event buffer of the CAEN modules
2. BuTis interface for time stamping (Daresbury?)

Rising fast beam campaign

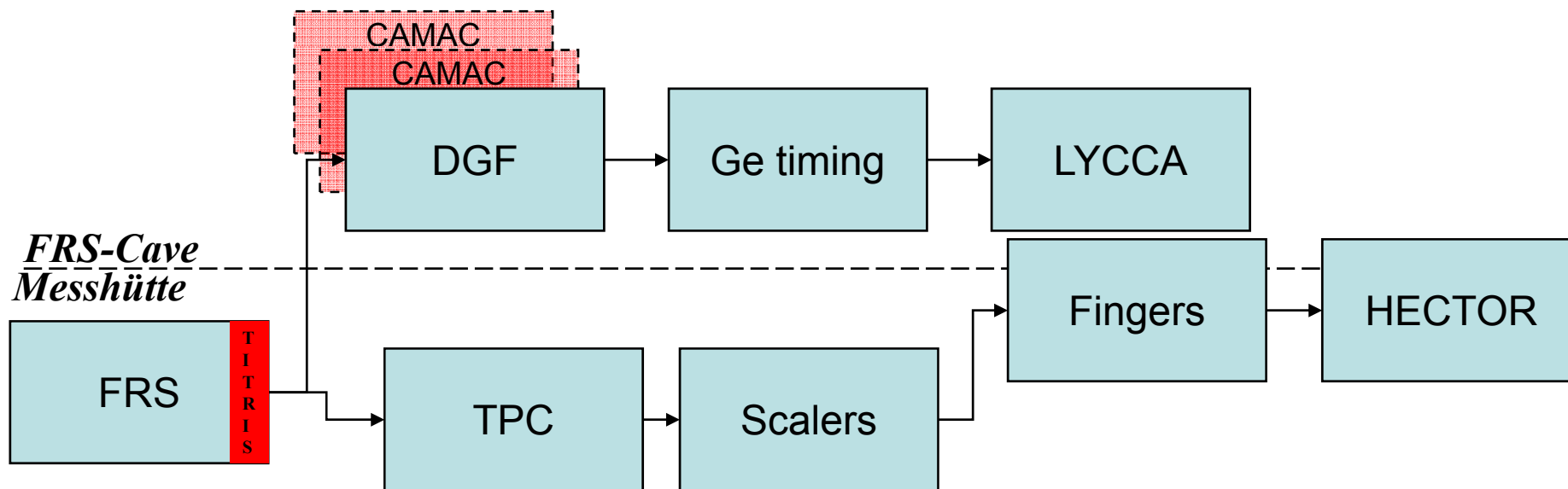
Several acquisition running in parallel synchronized by time-stamp module TITRIS



PRESPEC fast beam - pre-AGATA

Master crate (FRS) + all the other branches in one system (no VXI this time)

Trigger = gamma + particle + LYCCA (otherwise no physics output of the event)



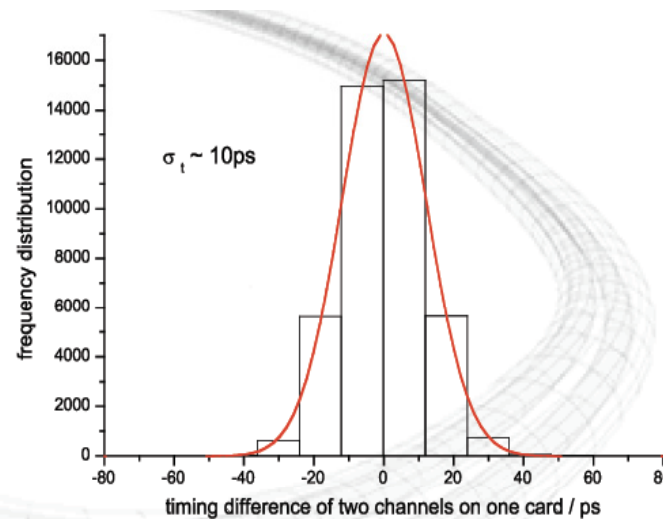
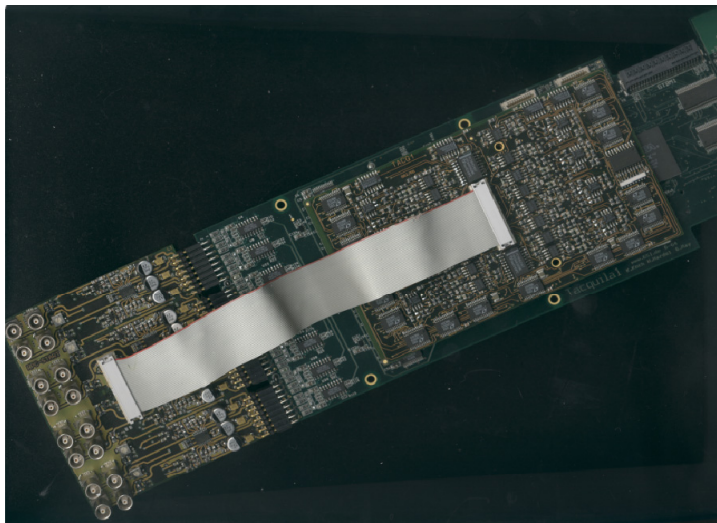
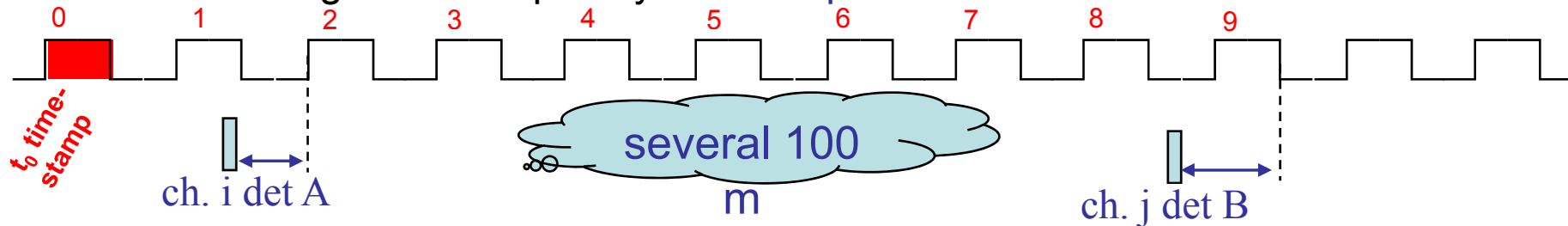
If we need to run several acquisition we are not sure to have the TITRIS modules again

Could use AGAVA for time stamping, while triggering with normal NIM electronic
→ we need a clock : BuTiS????

Precision timing (<50ps) vs. Campus Clock

- avoid extended cabling and dead time domains

→ free running time stamped systems SuperFRS -- Caves



Timing FEEs:

Tacquila system
(ASIC FhG/GSI)

New systems
(ASIC dev. GSI)

We plan to test this end of this year??? Beginning of next year

Concluding remarks

To write anything on the EDAQ for HI/DESPEC is utterly hard (nothing is still definitive)

We need to plan few years ahead (TITRIS PRESPEC problem)

We would like information to be able to define what/how to couple the sub-systems
→ especially if PRESPEC commissioning are planned (AIDA, neutron...)

I would propose some meetings with each of the subsystem before they come in GSI