

**Novel DAQ and Trigger Methods  
for the KLOE experiment.**

**Paolo Branchini**

**INFN - ROMA III**

(on behalf of the KLOE Collaboration)

**ICHEP 2000**

**Osaka, July 29<sup>th</sup>, 2000**

---

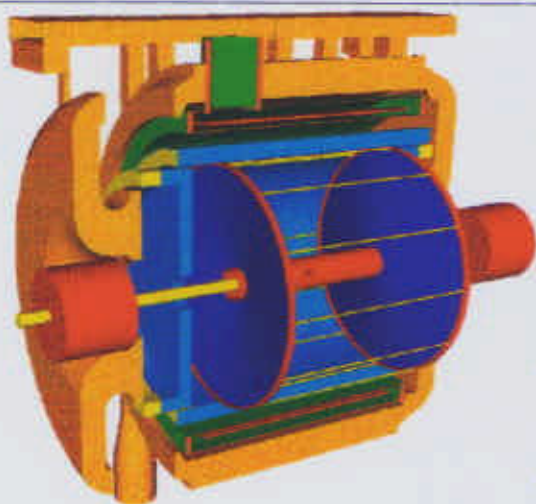
***P. Branchini ICHEP 2000 @ OSAKA***

## DAΦNE



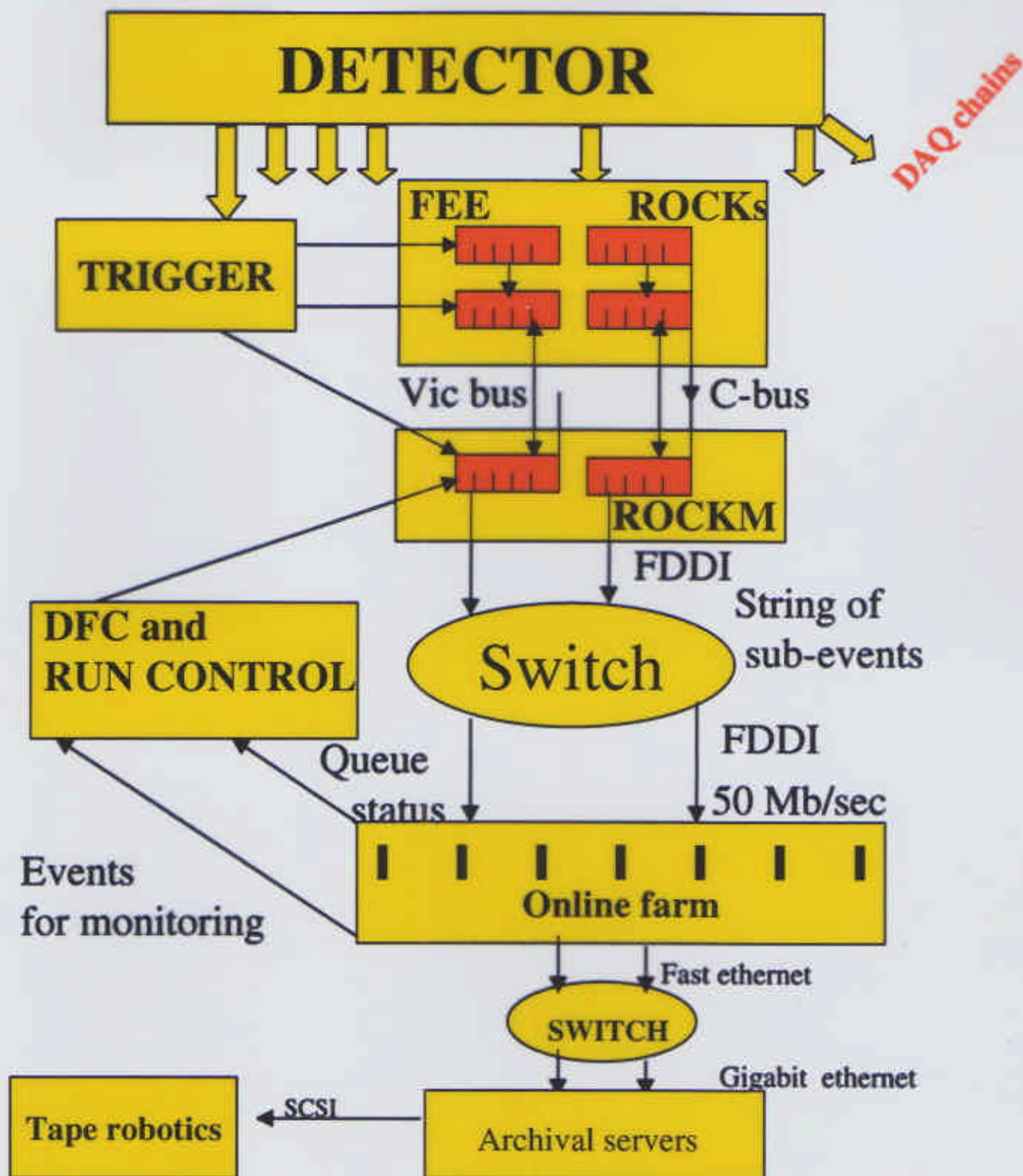
- $e^+e^-$  machine at  $\Phi$
- design luminosity  $5 \times 10^{32} \text{ cm}^{-2} \text{ s}^{-1}$
- peak luminosity  $10^{33} \text{ cm}^{-2} \text{ s}^{-1}$
- bunch spacing  $2.7 \text{ ns}$
- $10^{10} \Phi$ 's per year

## KLOE



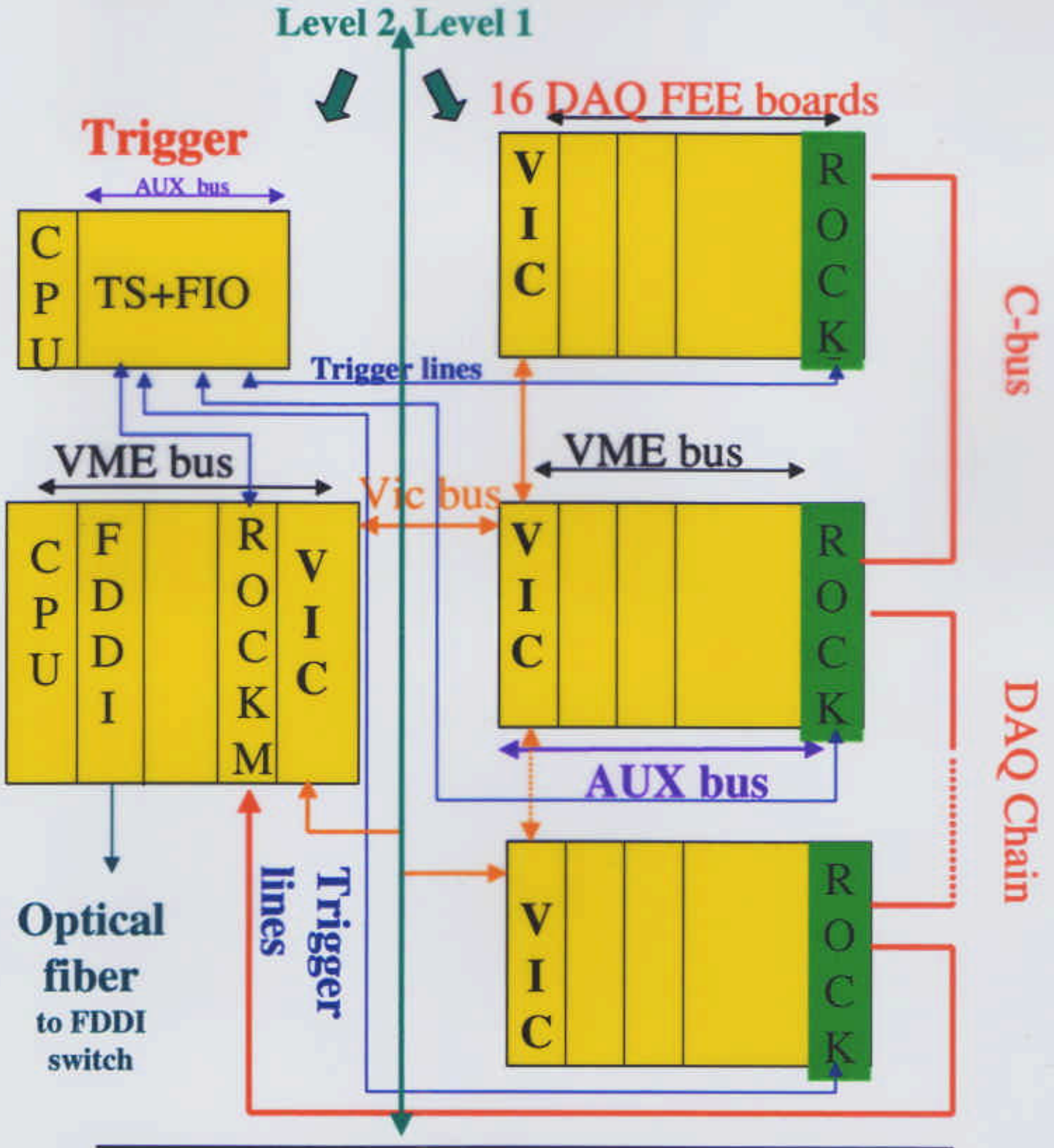
- CP violation at  $\approx 10^{-4}$
- 23000 electronic channels
- 60 DAQ crates
- 10 kHz trigger rate
- average event size 5 kB

## DAQ hardware 1

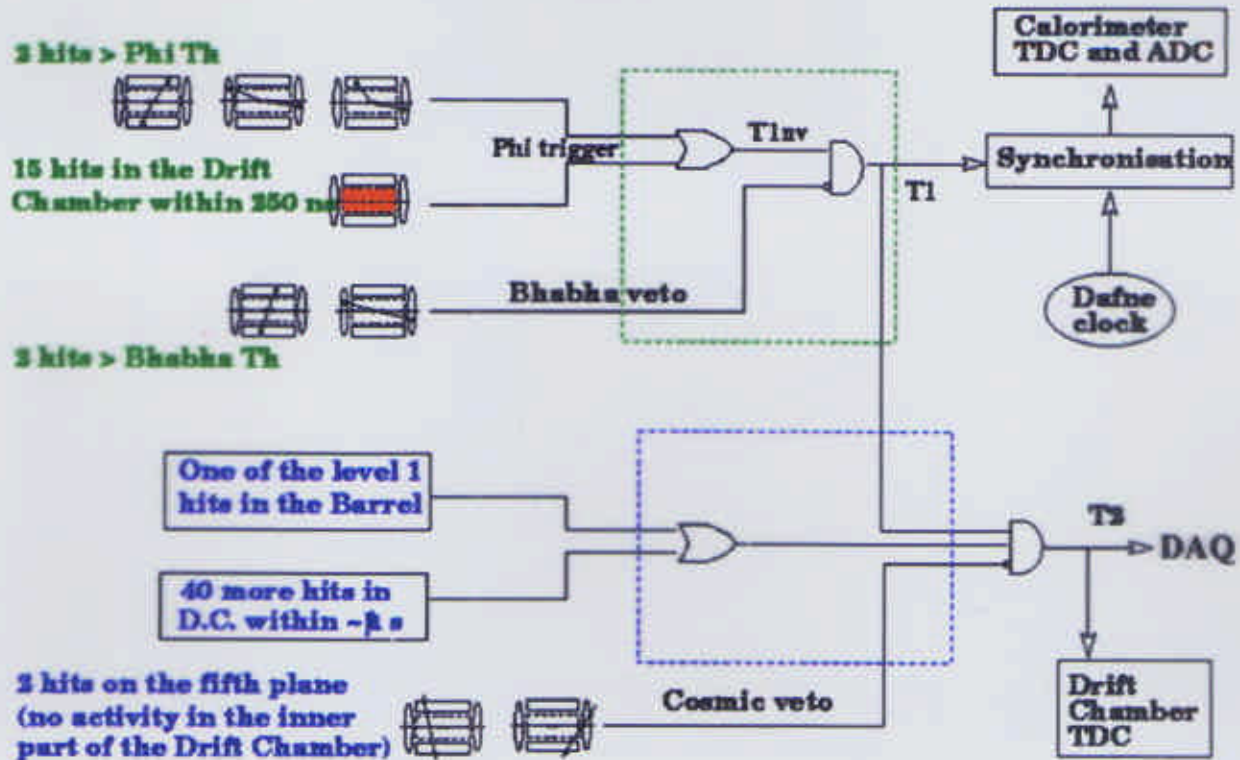


P. Branchini ICHEP 2000 @ OSAKA

DAQ hardware 2

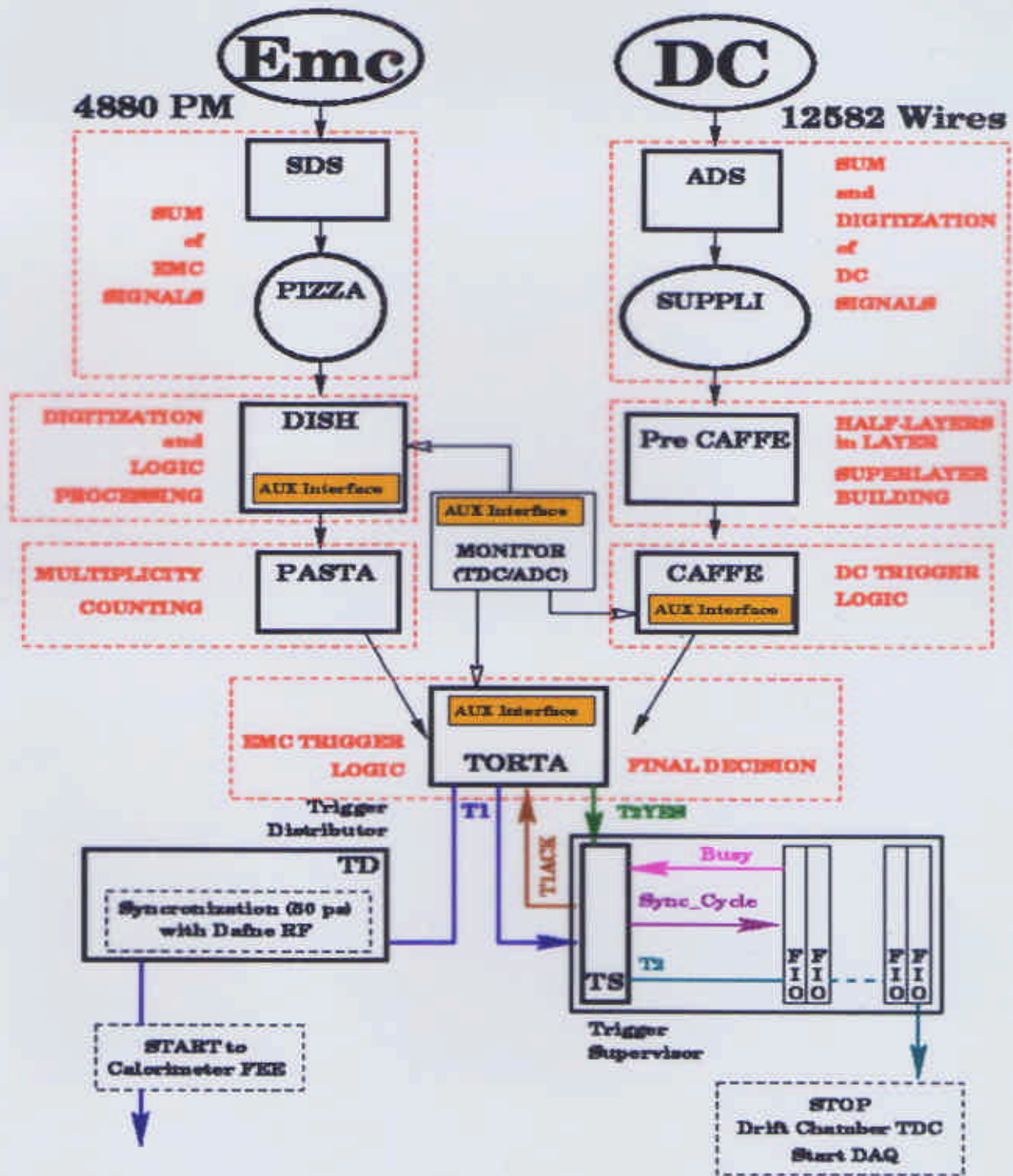


## The principle of the KLOE trigger

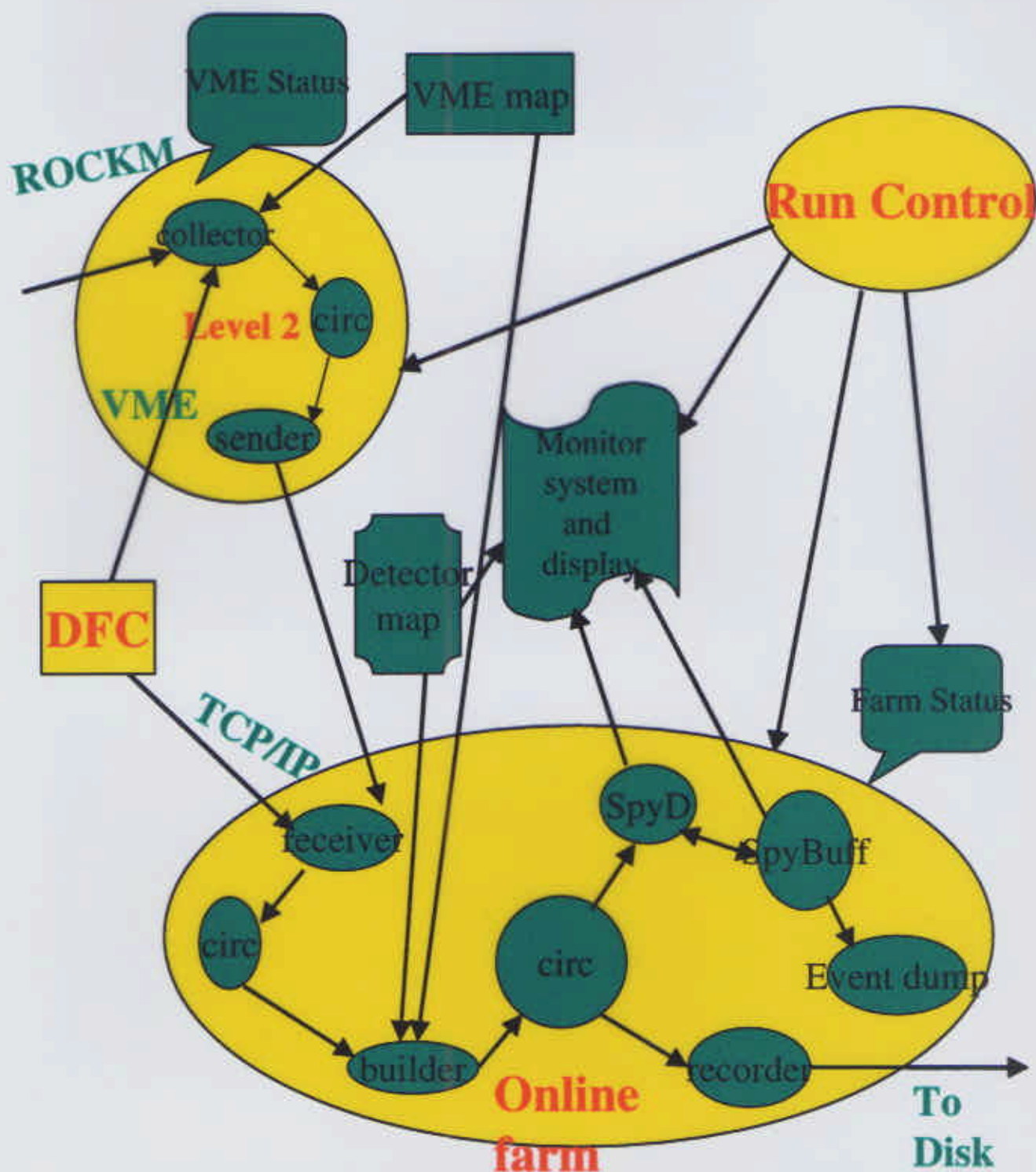


- Continuous mode operation (**2.7 ns** interbunch spacing).
- **Two level** scheme:
  - 1) fast decision within 200 ns to start calorimeter tdc's.
  - 2) Confirmation after **2.5  $\mu$ s** (drift time in the chamber cells).
- Local energy deposit in the calorimeter
  - a) **double threshold** on each channel: low energy for  $\phi$  events (LET) and high energy for Bhabha (BBT)
  - b) Energy from the external plane for the cosmic veto.
- Multiplicity information from the drift chamber (enhancement of trigger efficiency on charged events).

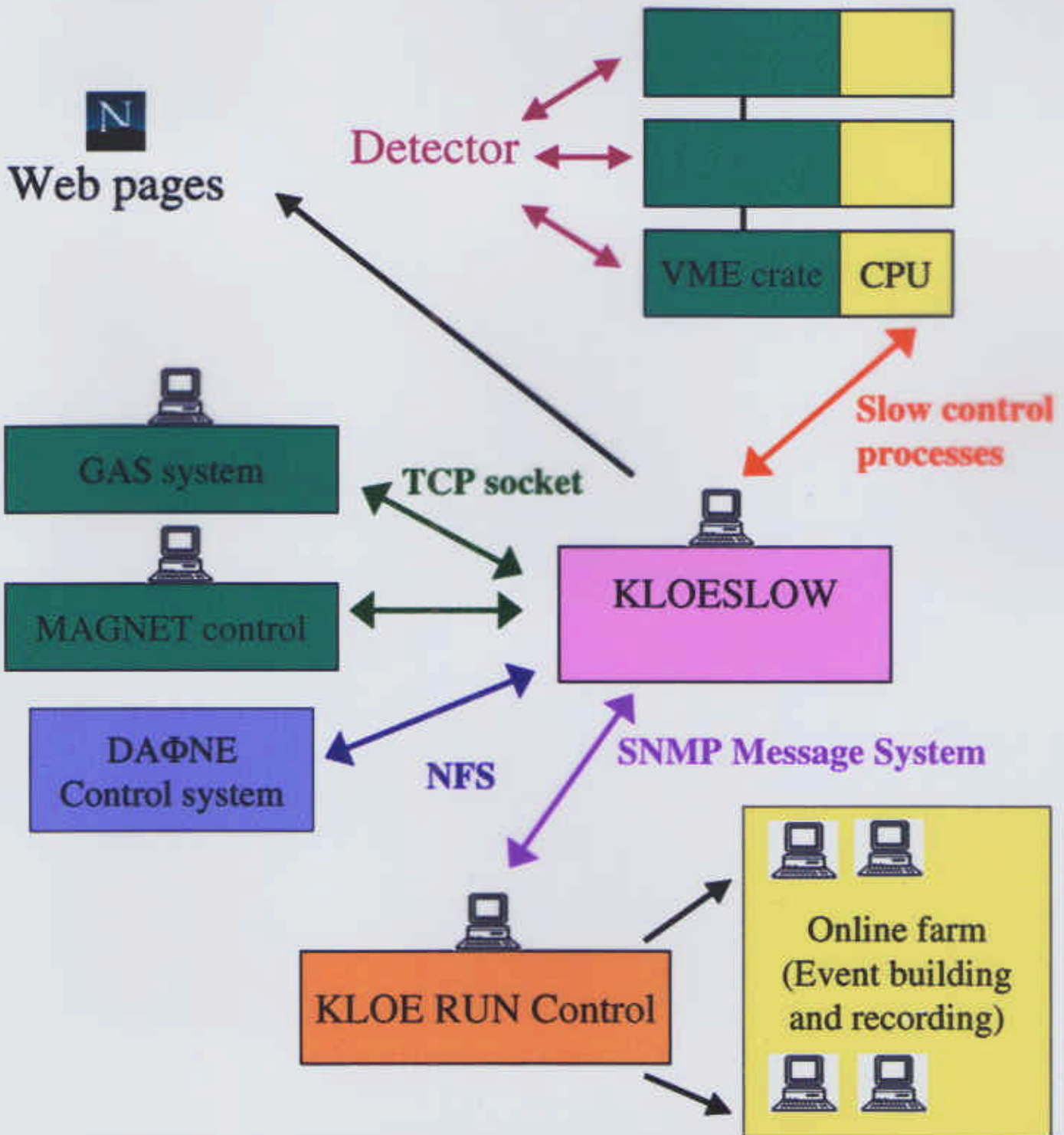
## Trigger hardware



## Running software



## Slow Control

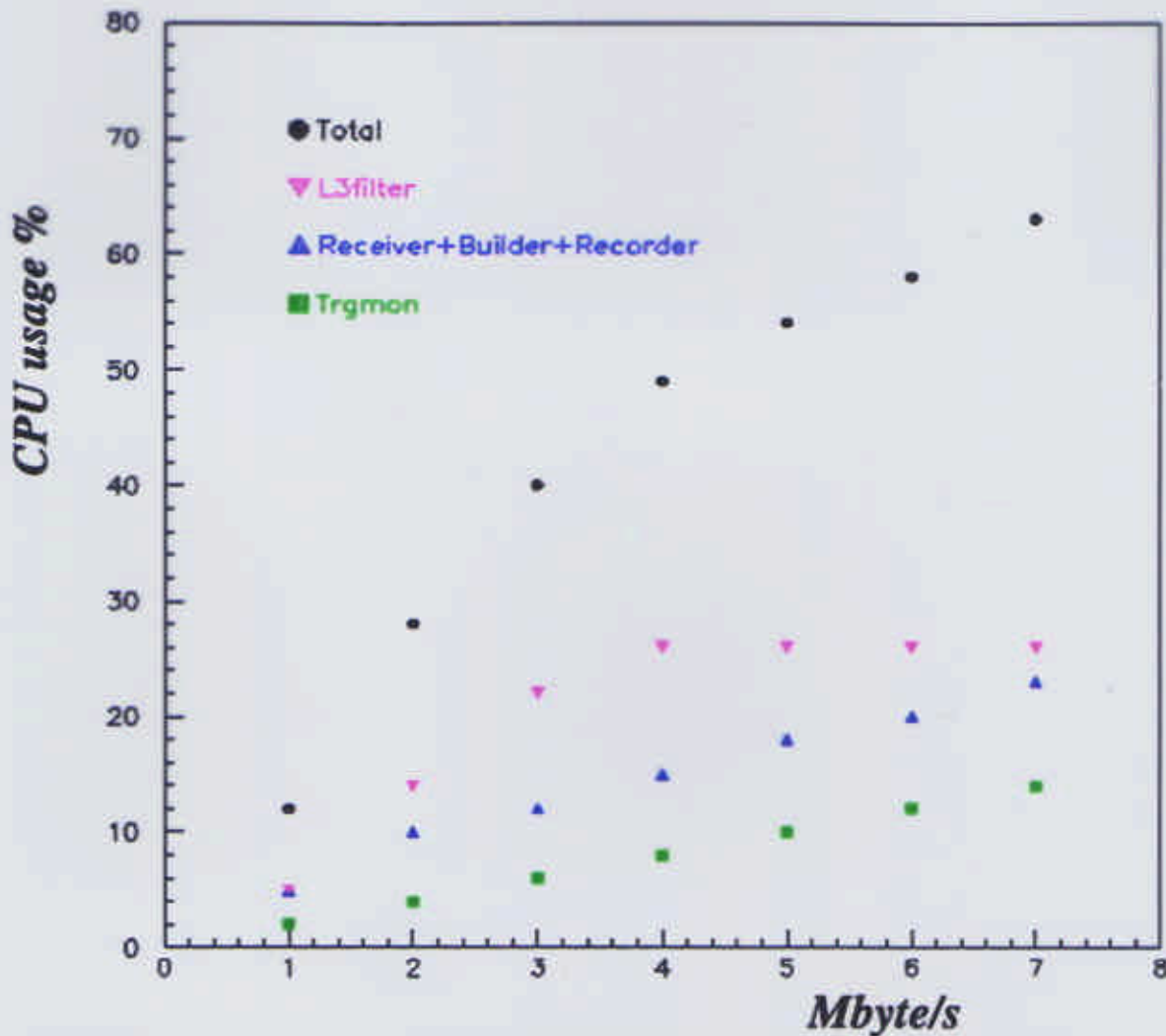




## DAQ performances

---

A spy process (trgmon or L3filter) is limited to use at most one processor.



## Conclusions

- About  $3 \text{ pb}^{-1}$  of data have been collected so far.
- AUX-bus, C-bus proved to work efficiently.
- On line real time trigger monitoring proved to be extremely usefull.
- Slow Control was intregated in the DAQ system and proved to work efficiently.
- The integrated system (DAQ, Trigger, and Slow Control) allows us for a tight control of the detector and beam condition monitoring. This is a precious feedback for the DAΦNE group.