FNC Reconstruction status

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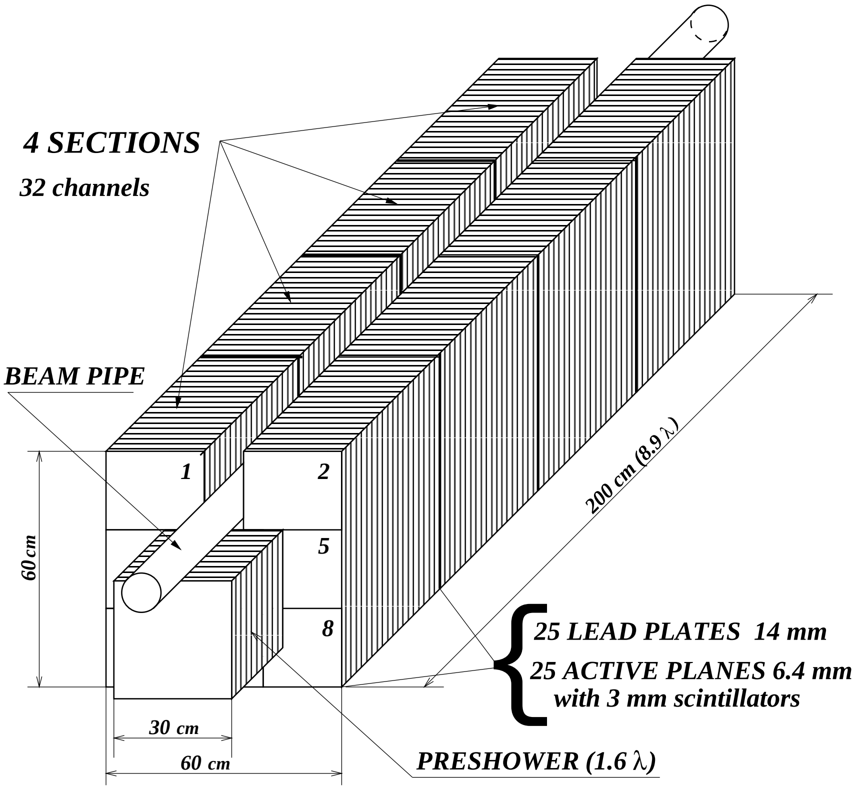
New FNC detector setup:



Main Calorimeter (32 = $4 \cdot 8$ ReadOut channels)
Preshower (18 channels = 9x+9y)
Veto Counters (2 channels)
<u>total 52 ReadOut channels</u>

Signals from PM readout by new **FADC SIS3300** and RAW data **LFNC** bank is formed.

Reconstruction program devided on 2 parts:
RAW data decoding (LFNC bank):

- **FADC dig. samples of 52 channels $\longrightarrow$ GeV**
- **LED correction applied**
- **Array of elm.scale cell energy filled: E_i^{elm}**

Final LFNC bank format will be fixed in nearest future.

Physical reconstruction:

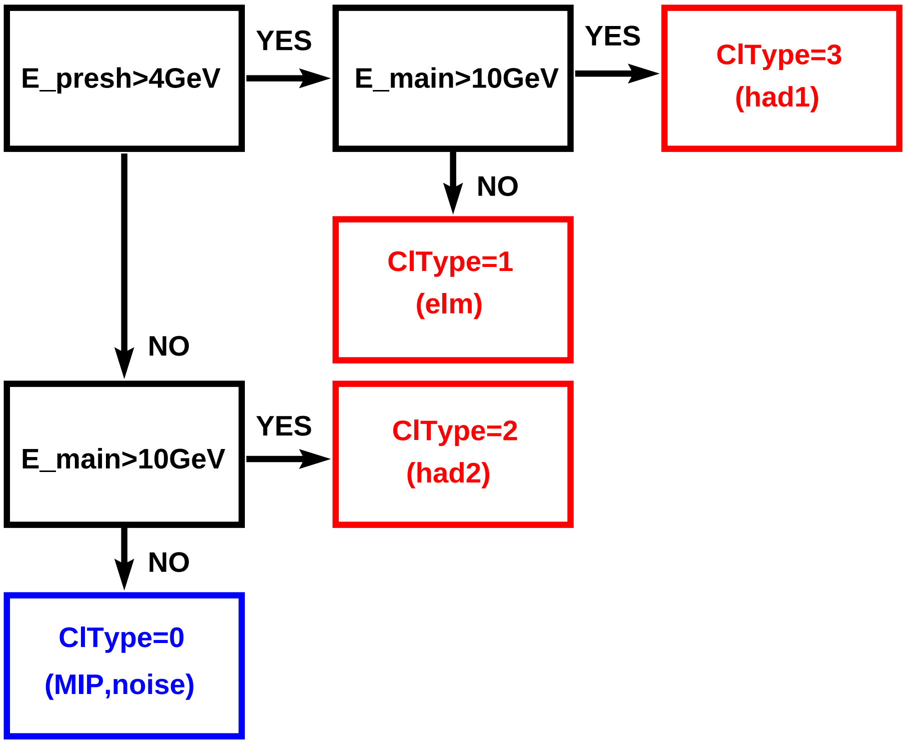
- **Define charge of particle (neutral/charged)**
  by Veto Counters.
- **Define type of cluster (electromagnetic/hadronic).**
- **Calculate energy and position of cluster**
  reconstruction algorithm depends on Cluster Type
- **Additional estimators calculated (ECRA,SecMom,BEN)**
- **Hadr.scale cell energy calculated: E_i^{hadr}**
- **Output banks: FNCE (cells), FNCL (cluster)**

Format of FNCE and FNCL banks are already fixed.

Reconstruction was tested with CERN test beam data:

- **Array E_i^{elm} filled with data from CERN test ntuples.**
- **FNCRec program used to make reconstruction.**

Define of Cluster Type



- **Electromagnetic clusters (γ, π^0):ClType=1**
- **Hadronic clusters (n):**

  ClType=2 - energy only in Main Calorimeter

  ClType=3 - energy in Preshower and Main Calorimeter

  Need to distinguish 2 and 3 types because of different reconstruction algorithms are used

Cluster Energy

- **ClType=1 - elm. scale**

$$\boldsymbol{Ecl = E^{elm}_{presh}}$$

- **ClType=2,3 - hadr. scale**

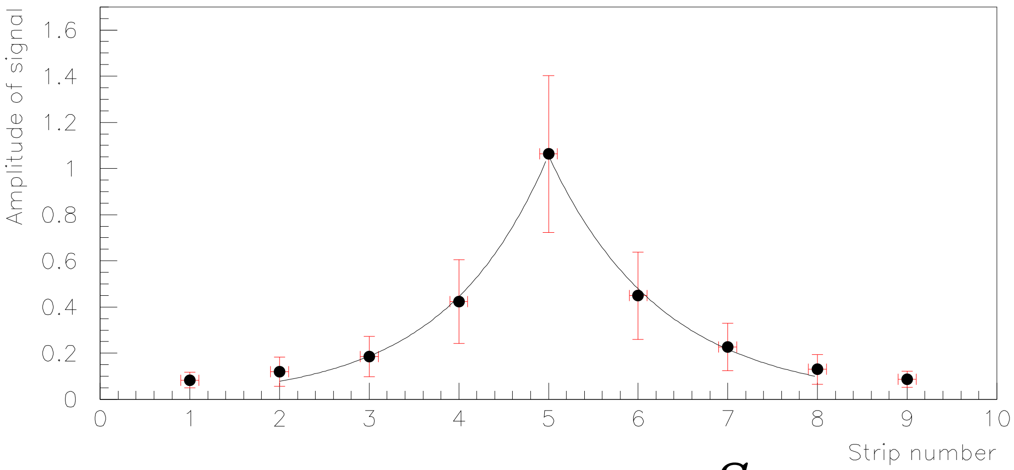
$$\boldsymbol{Ecl = C_1 \cdot E^{elm}_{presh} + C_2 \cdot E^{elm}_{main}}$$

$\boldsymbol{C_1 \neq C_2}$ **because of different detector types**

All constants stored in NDB

Cluster Coordinates

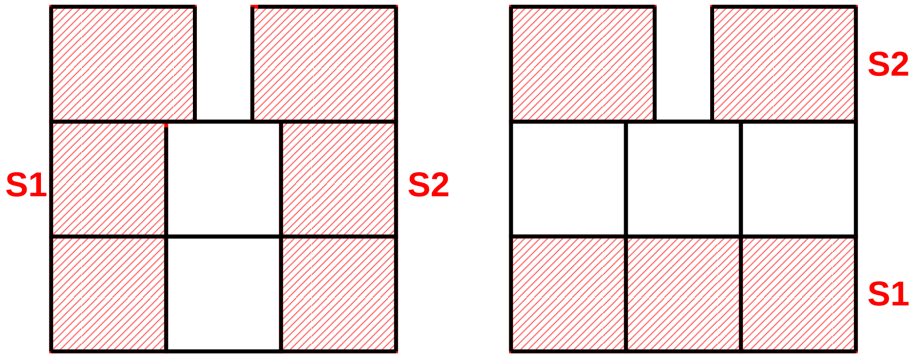
- ClType=1,3 - energy exist in Preshower
  Coordinates defined by only Preshower:



$$X_{rec} = X_m + C \cdot ln\left(\frac{S_{right}}{S_{left}}\right)$$

where X_m - position of strip with maximal signal,
S_{right}, S_{left} - signals in neighbouring strips

- ClType=2 - energy in Main. Cal. only
  Coordinates defined by only MainCalorimeter:



$$X_{rec} = C_1 + C_2 \cdot ln\left(\frac{S_1}{S_2}\right)$$

Conclusions

- **FNCRec program is almost ready for official release.**
- **Format of output banks FNCL and FNCE is fixed. Raw data LFNC bank's format will be fixed soon**
- **Reconstruction algorithm is based on analysis of CERN test beam data. Information stored in output (DST) banks is sufficient to improve reconstruction algorithm during offline analysis.**

To be done

- **Monte Carlo branch: subroutine to fill E_i^{elm}**
- **Tests in real datataking conditions (Beam gas)**

Further information on "The H1 FNC upgrade page":
http://www-h1.desy.de/idet/upgrade/calo/fnc/fncupgrade.html