Integration of new FHCAL and Forward Hodoscope

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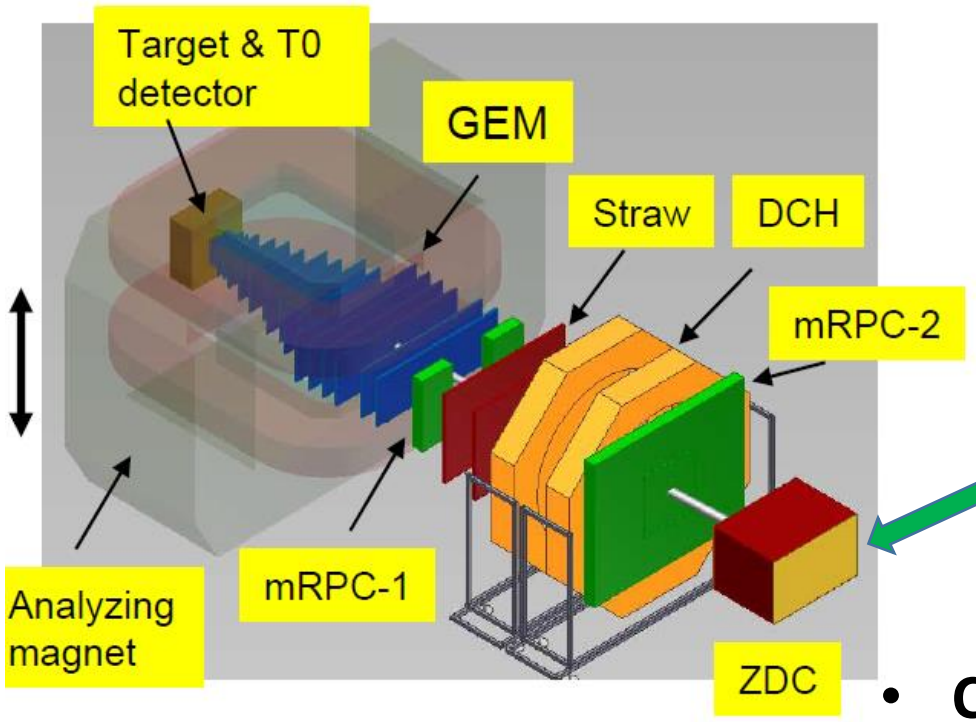
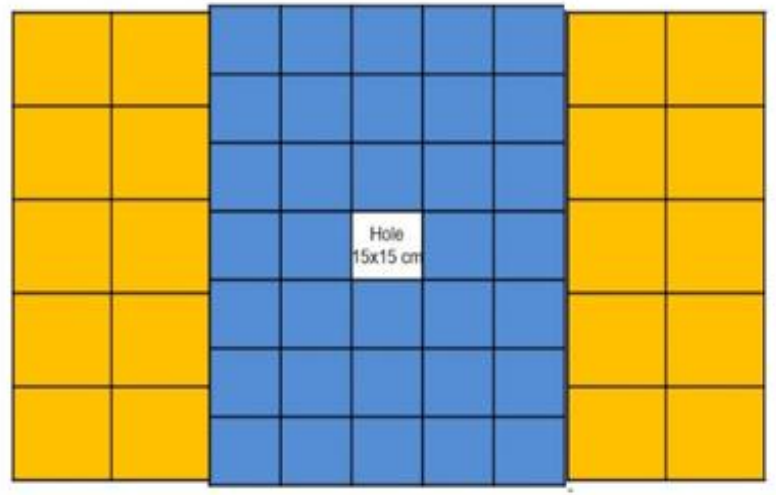
FHCal at BM@N

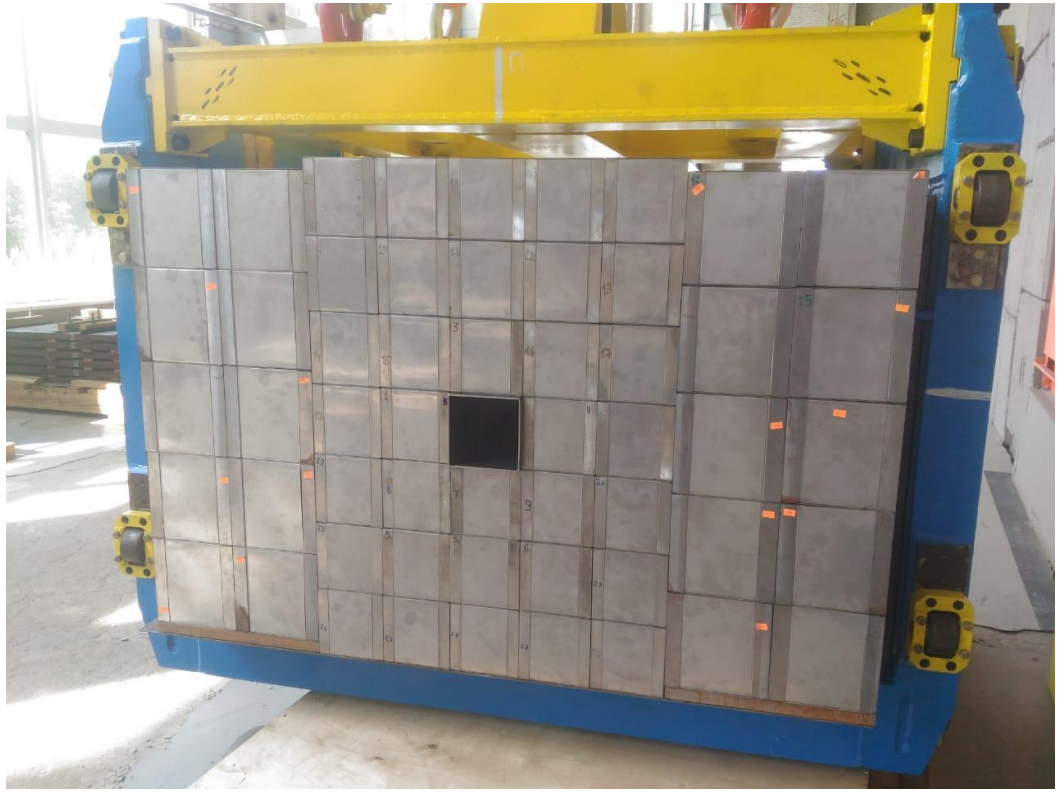


Previous ZDC is replaced by new FHCal .



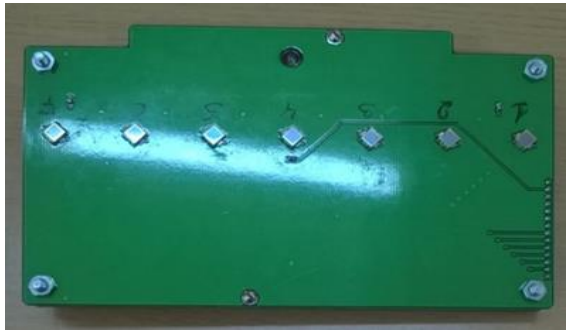
- **Central hole for high intensity ion beam.**
- **Central part – 34 MPD-like modules with 15x15 cm^2 transverse sizes. Longitudinal segmentation - 7 sections.**
- **Outer part – 20 CBM modules with 20x20 cm^2 transverse sizes. Longitudinal segmentation – 10 sections.**

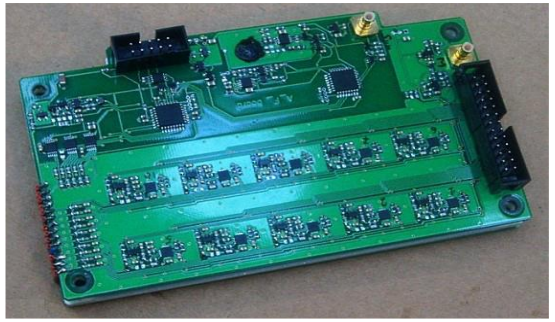
Front view of FHCal



FHCal is already in BM@N experimental area!

FEE of FHCal - already installed.





MPD module - 7 channels;

CBM module – 10 channels;

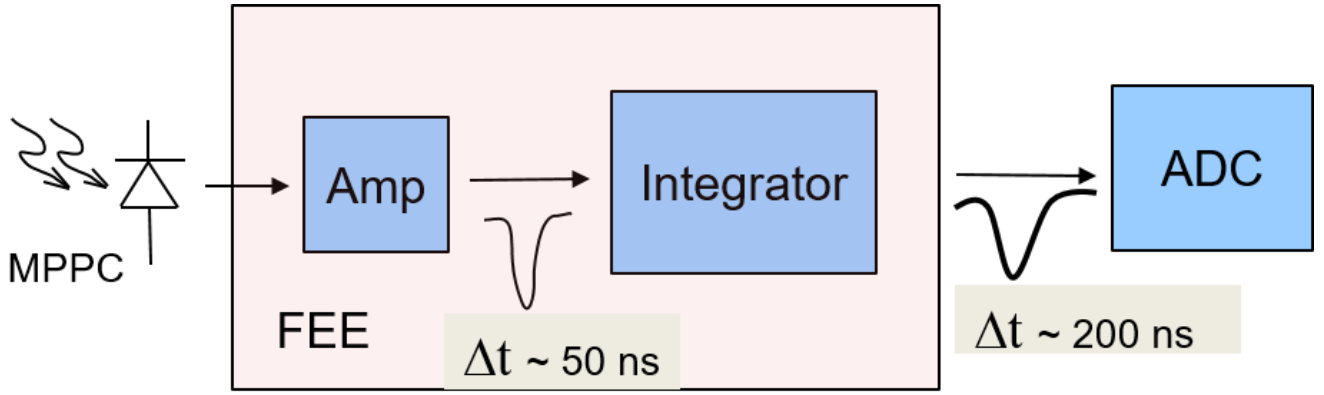
Photodetectors – MPPCs;

two-stage amplifiers;

HV channels;

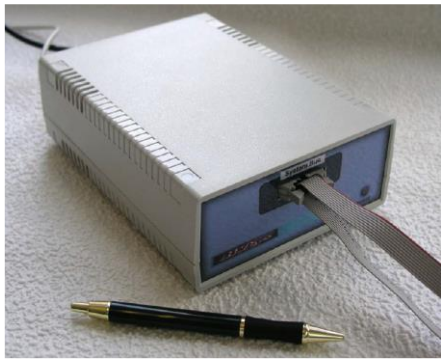
LED calibration source.

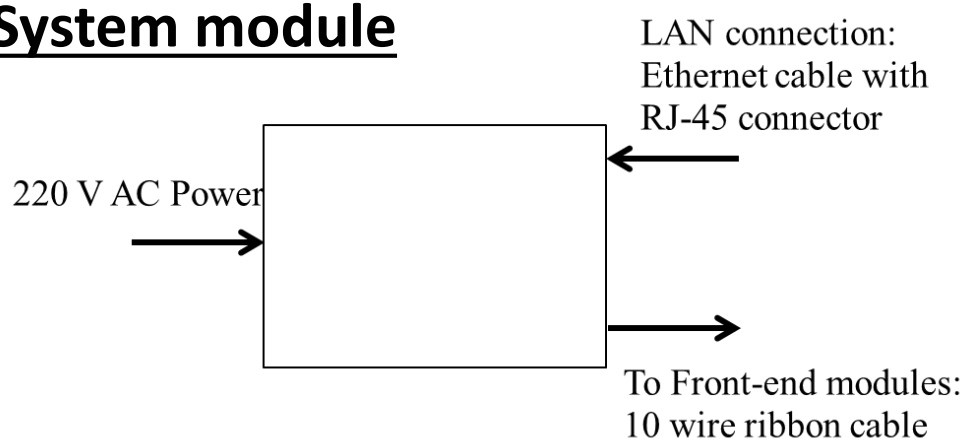
Optical connectors



Slow Control of FHCal - in progress.

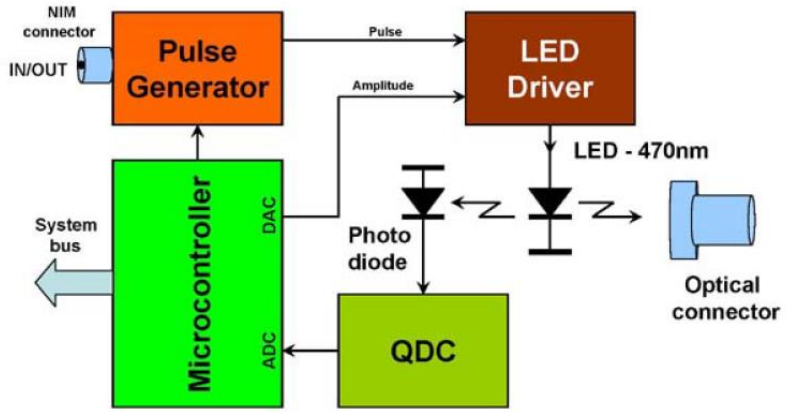
SC System module





- **Control of HV at photodetectors (MPPC);**
- **Temperature control of photodetectors;**
- **Compensation of temperature drift of MPPC gain;**
- **Monitoring of MPPC gain with stabilized light source.**

LED stabilized source



Readout of FHCal – to be done.

The readout electronics:
FPGA based 64 channel ADC64 board, 62.5MS/s (AFI Electronics, JINR, Dubna).

One ADC board for 9 central modules
or
One ADC board for 6 outer modules

Requested:

8 ADC boards;

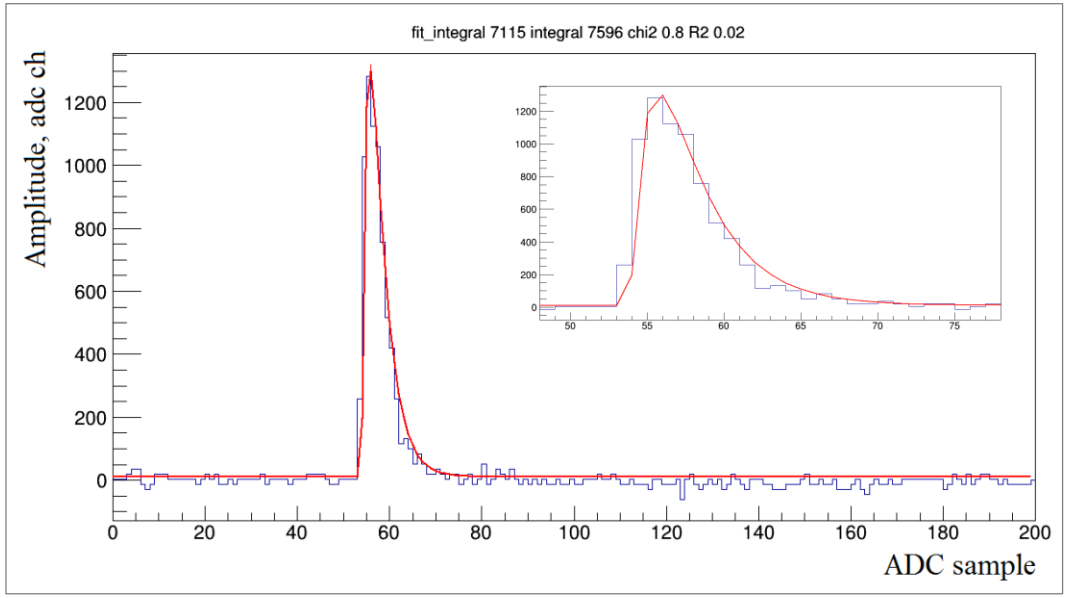
Cooling of ADC boards;

Power supply for 8 ADC boards;

Remote control on power supply;

Data Acquisition.

Data Flow from FHCal.



Minimum 20 ADC samples are needed to digitize the signal.

About 100 ADC samples are needed to reject the pile-up.

Occupancy ~100% for heavy ion beam.

Number of ADC readout channels – 440;

Number of samples per one ADC channel – 100;

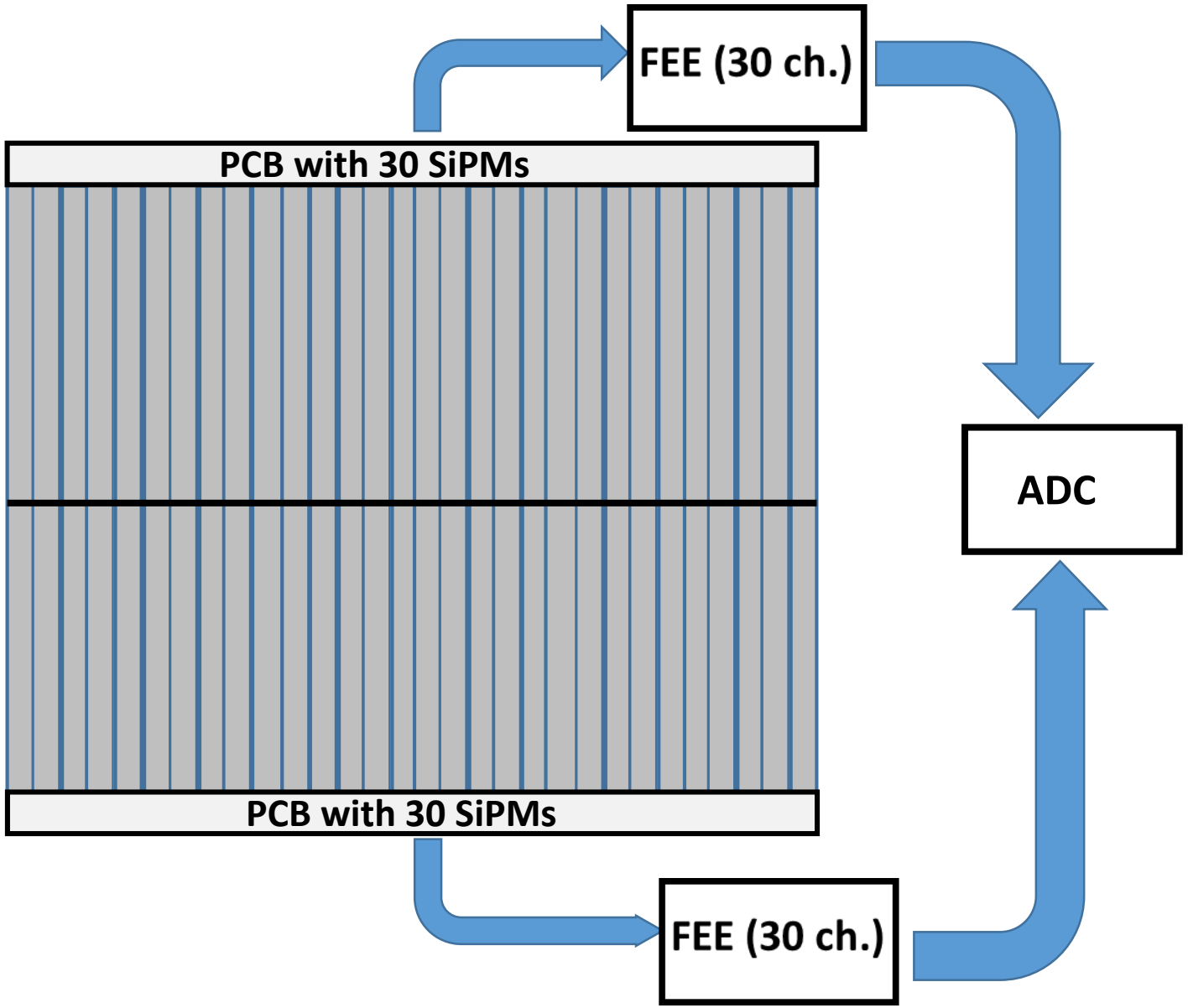
Size of one ADC sample – 2 Bytes;

Size of one event: ~100 kB;

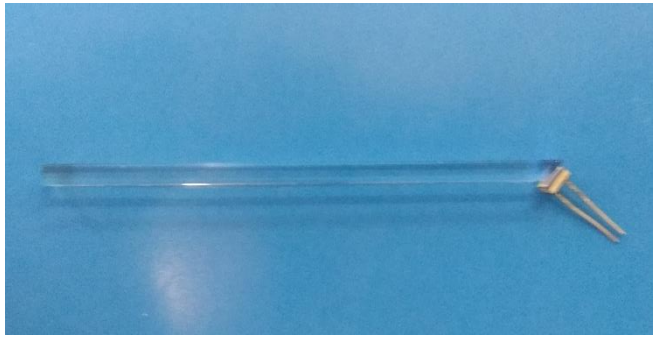
Trigger rate ~ 10^5.

FHCal Data Flow - 10 MB/sec.

Forward Hodoscope in FHCal beam hole – in development



30x2=60 quartz strips;
5x80x4 mm^3;
It covers beam hole 15x15 cm^2.



quartz strips 5x80x3 mm.
Light readout by Hamamatsu MPPC.

One ADC board is needed.

Slow control and DAQ would be the same as for FHCal.

Summary and open issues.

- **Next year FHCal and Forward Hodoscope must be integrated to BM@N setup.**
- **Data Acquisition is the most sensitive issue.**
- **9 ADC boards and power supplies are needed.**
- **Cooling system.**
- **Integration to general DAQ.**
- **Trigger? Centrality – FHCal? Minimum bias - Forward Hodoscope?**
- **<u>Collaboration with other detector groups is strongly appreciated!</u>**

Thank you!