Ecal Overview

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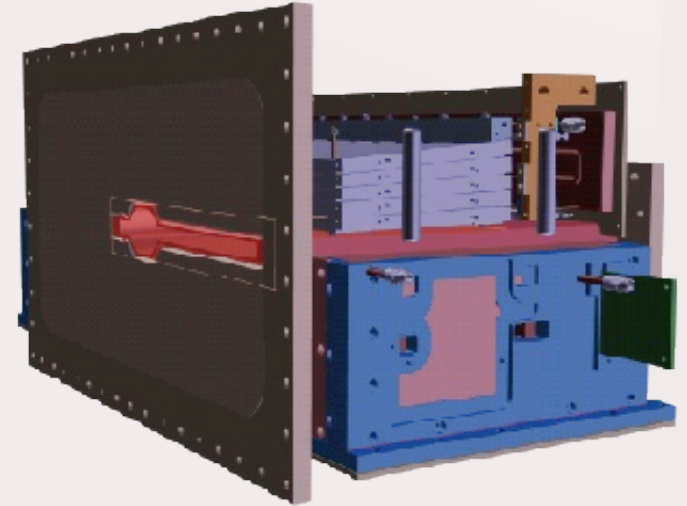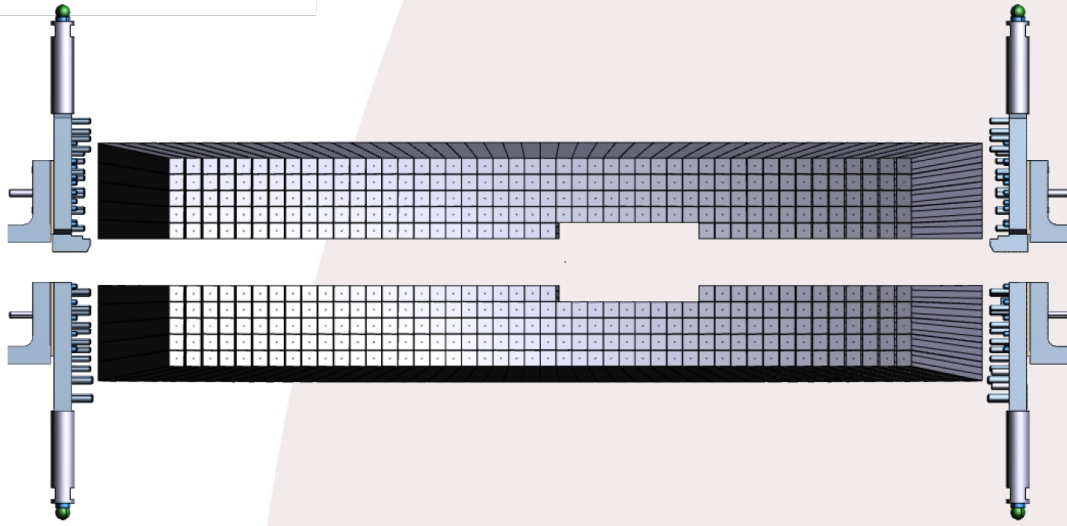
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General View

- **Main modifications to the test run ECal**
  - New mother boards: Done
  - Large area APDs: Done
  - Light monitoring system: Done
  - New preamplifiers: Done
  - Update of the mounting mechanics: Designed

- **Ecal Group meetings**
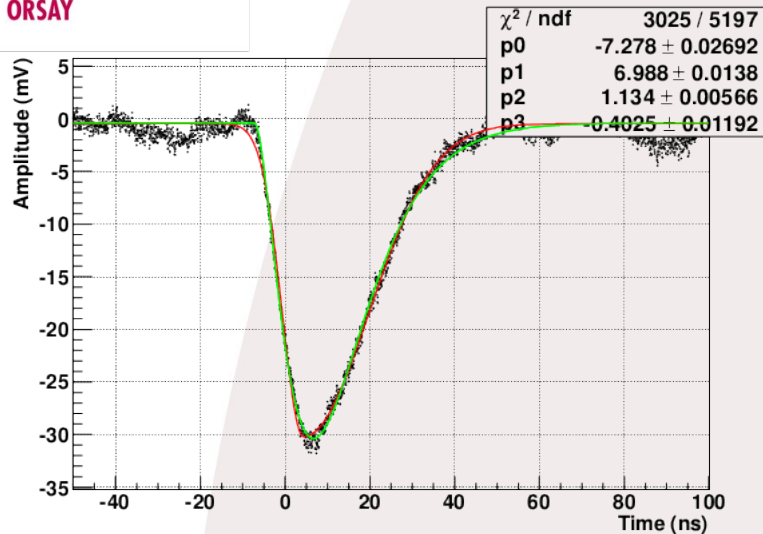 - Held on Mondays 11 AM EST (?)

Shielding

- **Kyle's studies showed extra background on the electron side**
- **Can we shield part of this background?**
  - First results are very promising to reduce this low energy background!
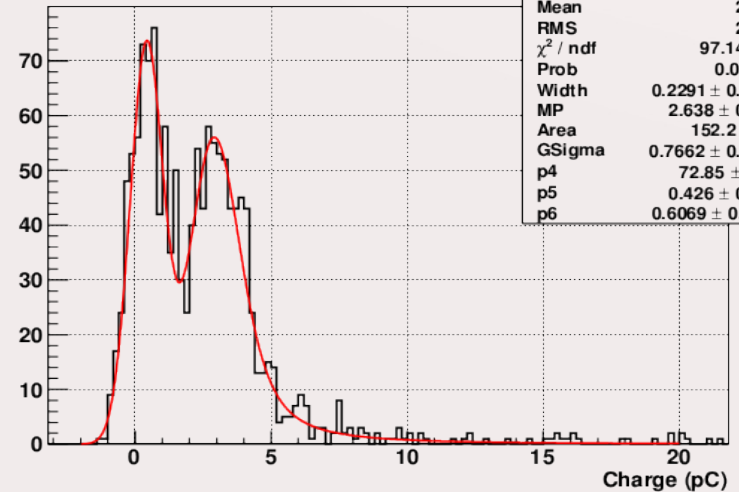 - A. Epsztein & G. Charles
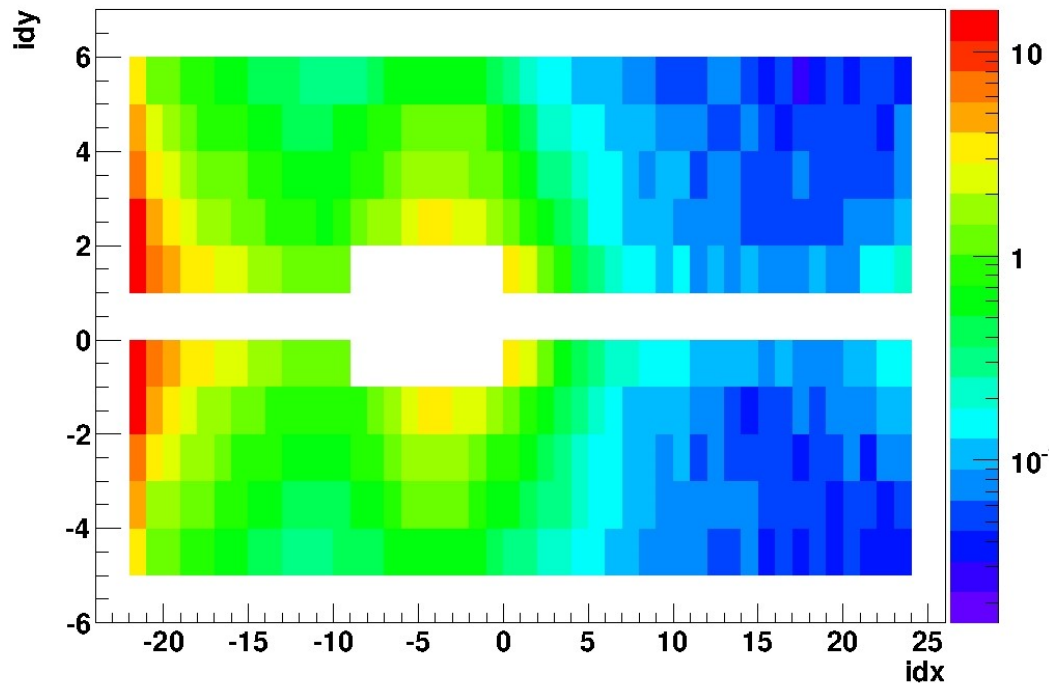
Amplification Chain

- **Large Area APDs**
  - All tested and glued (see Michel Garçon's talk)
  - Grouped and map of their position in the Ecal (see Gabriel Charles' talk)

- **Preamplifiers**
  - All ready and tested, with spares
  - Placed in the calorimeter to reduce gain variance (see Gabriel Charles' talk)

- **The Amplification chain is now well understood**
  - See internal note from G. Charles and A. Celentano

Calibration Strategy

- **We have various ways to calibrate**
  - Light Monitoring System (see Andrea's talk)
  - Cosmic muons
  - Coulomb and quasi-elastic scattered electrons (see Luca's talk)
  - Neutral Pions (we are late on this one)

- **They are very complementary**
  - They allow to cover, low to high energy range of detection
  - LMS should give indication of radiation damages with color difference
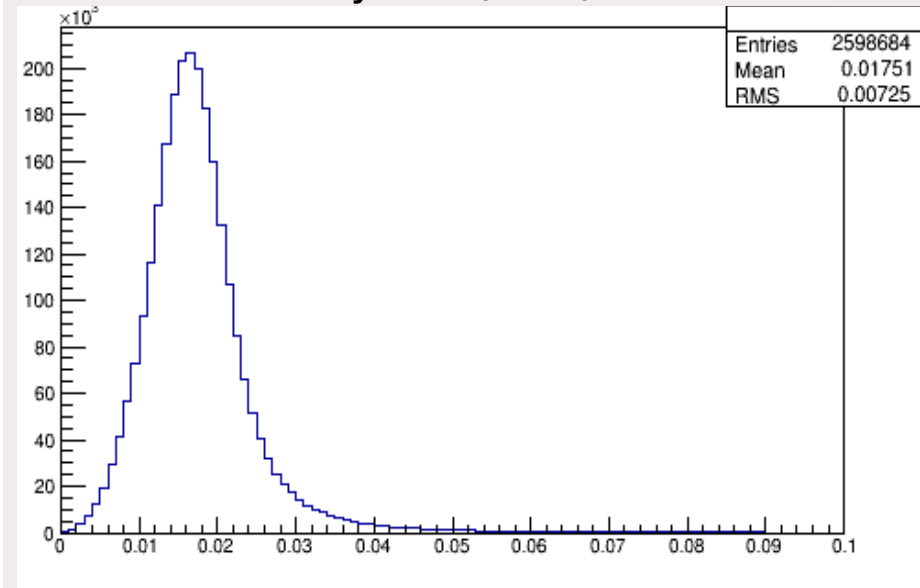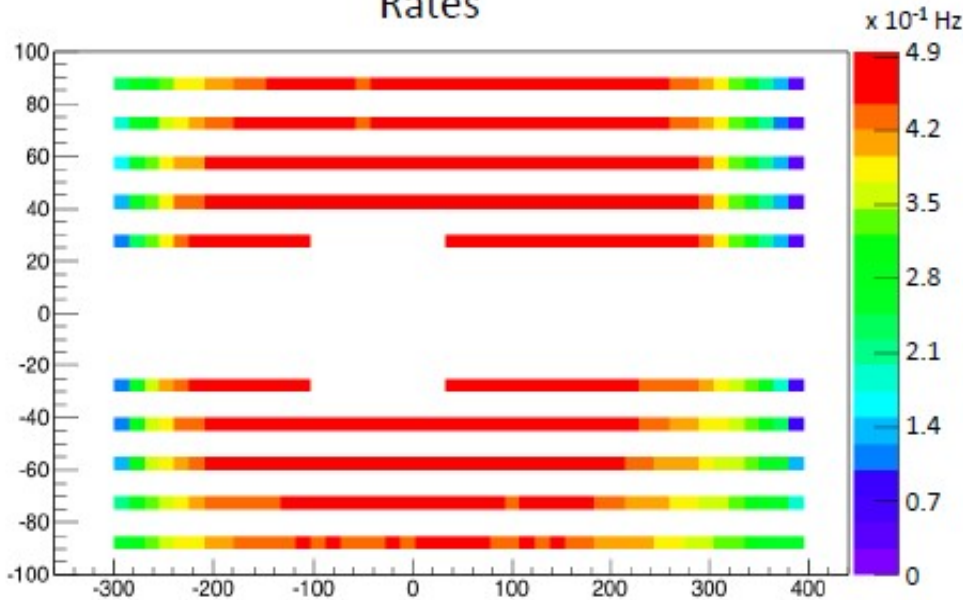 - Based on specific runs or beam data to understand effect of the backgrounds

Cosmics (H. Vance)

Scintillator
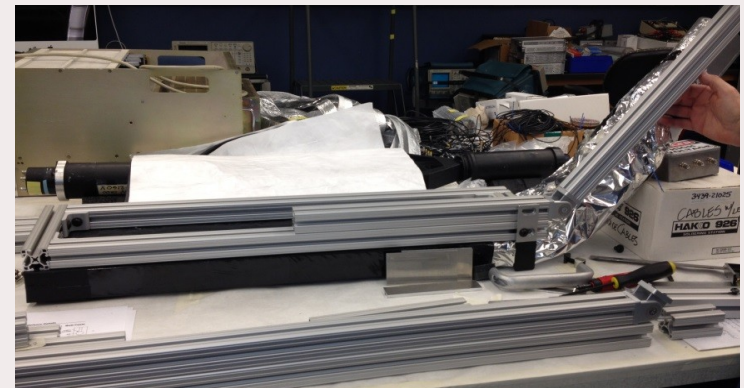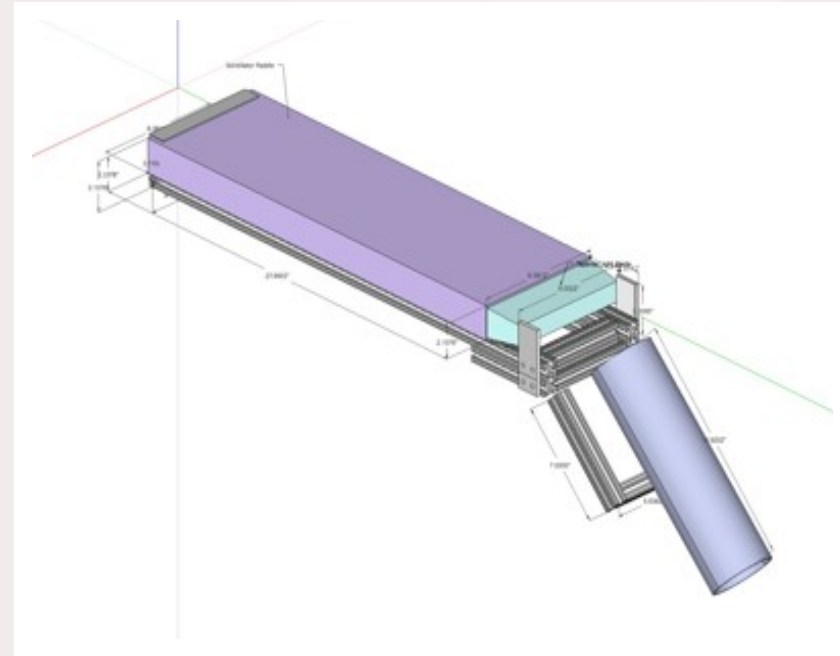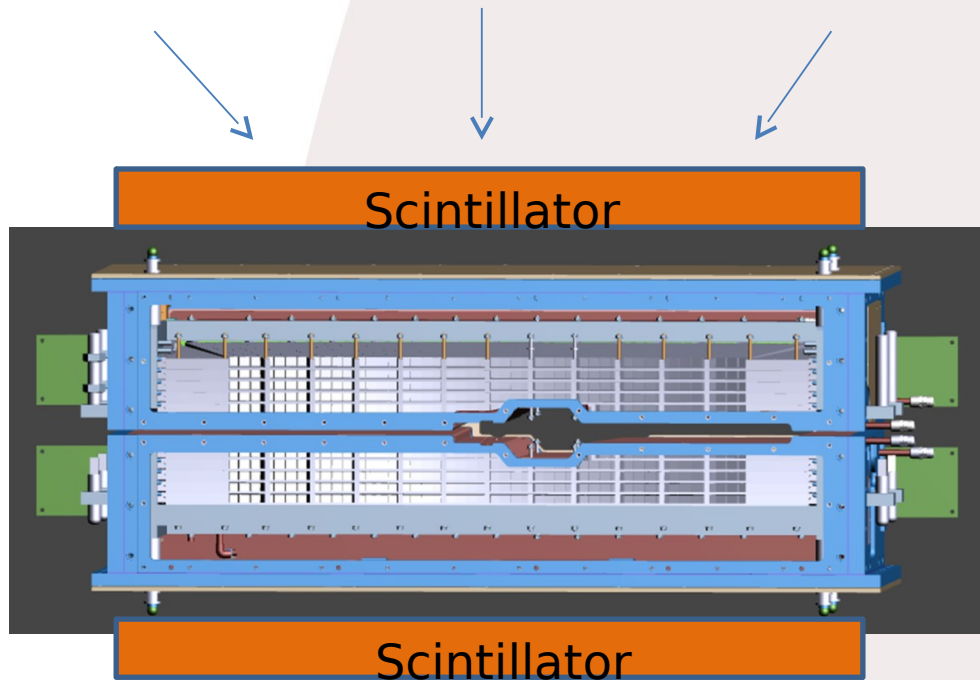
Scintillator

- Scintillator is BC408 from Hall B TOF
- Each scintillator is 75 cm x 22 cm x 5.08 cm
- Top/Bottom provide trigger

Cosmics (H. Vance)

Energy deposited in Crystals(GeV)

- Expected trigger rate: 24 Hz
- Simulations use average 4 GeV muons (from PDG) in all directions with cos2 dependence.
- Simulations include random sampling Gaussian to simulate pre-amp noise and 7.5 MeV crystal threshold.

7

Cosmics (H. Vance)

- **Analysis code can work two ways:**
  - Track fitting code fits a straight line fit through crystals that are hit. The fit can be compared between the top and bottom halves of the Ecal. This still sums energy in each half.
  - Reconstruction clustering will still find a local maximum energy crystal in the top and bottom halves of the Ecal. This can make two clusters where the energies in the top and the energies in the bottom can be compared.

Monitoring (A. Celentano)

- Entirely developed within the HPS online monitoring application (J. McCormick)
- Displayed plots have been discussed within the Ecal group.
- The Ecal event display (K. McCarty) has been integrated in the application and provide access to single-channel information and displays

Monitoring (A. Celentano)
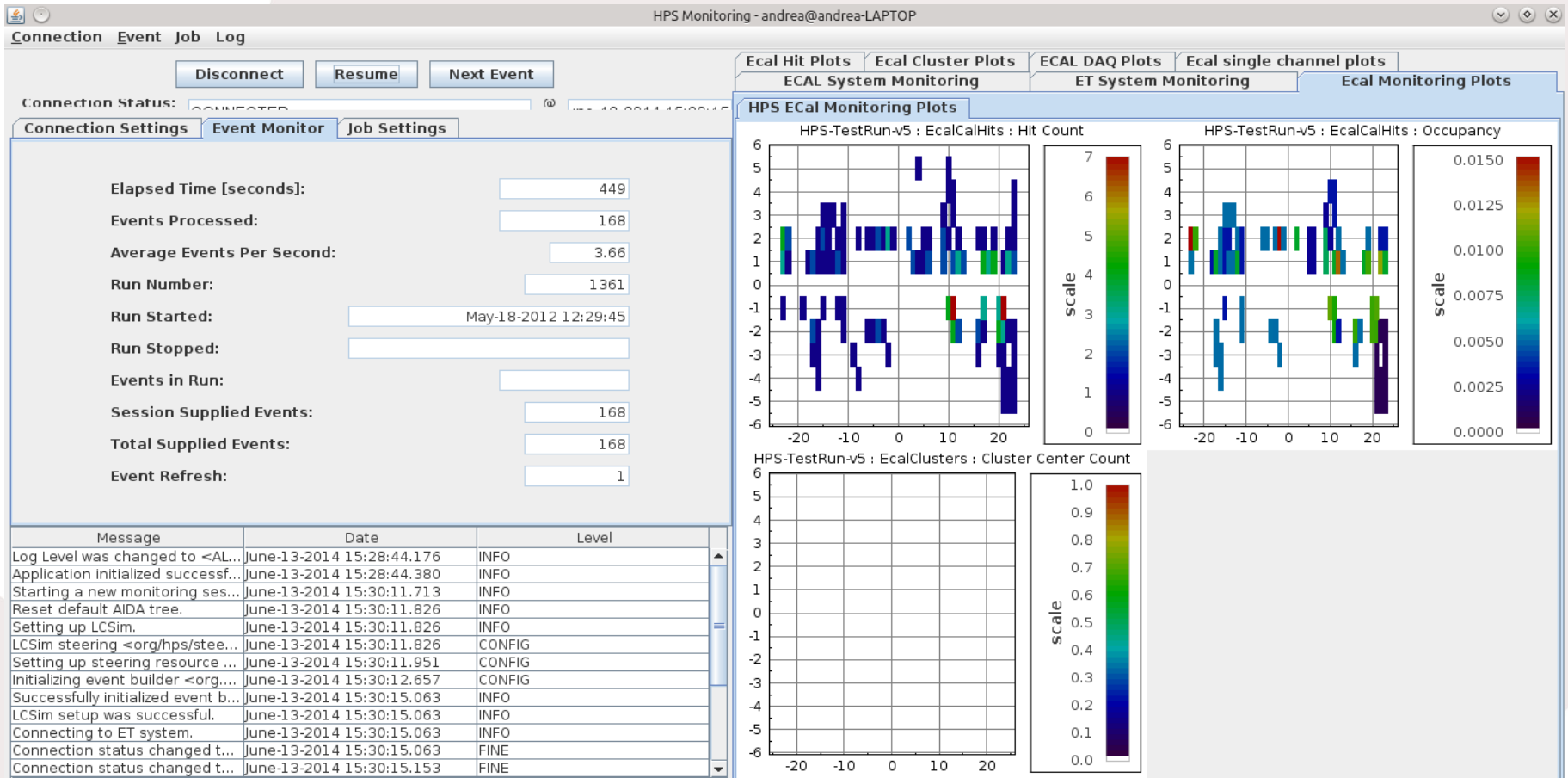
Foreseen tabs:
- "Main": the default tab, with general plots
- **"Single-hit"**
- "Clusters"
- "DAQ"
- "Event-display"

Monitoring (A. Celentano)
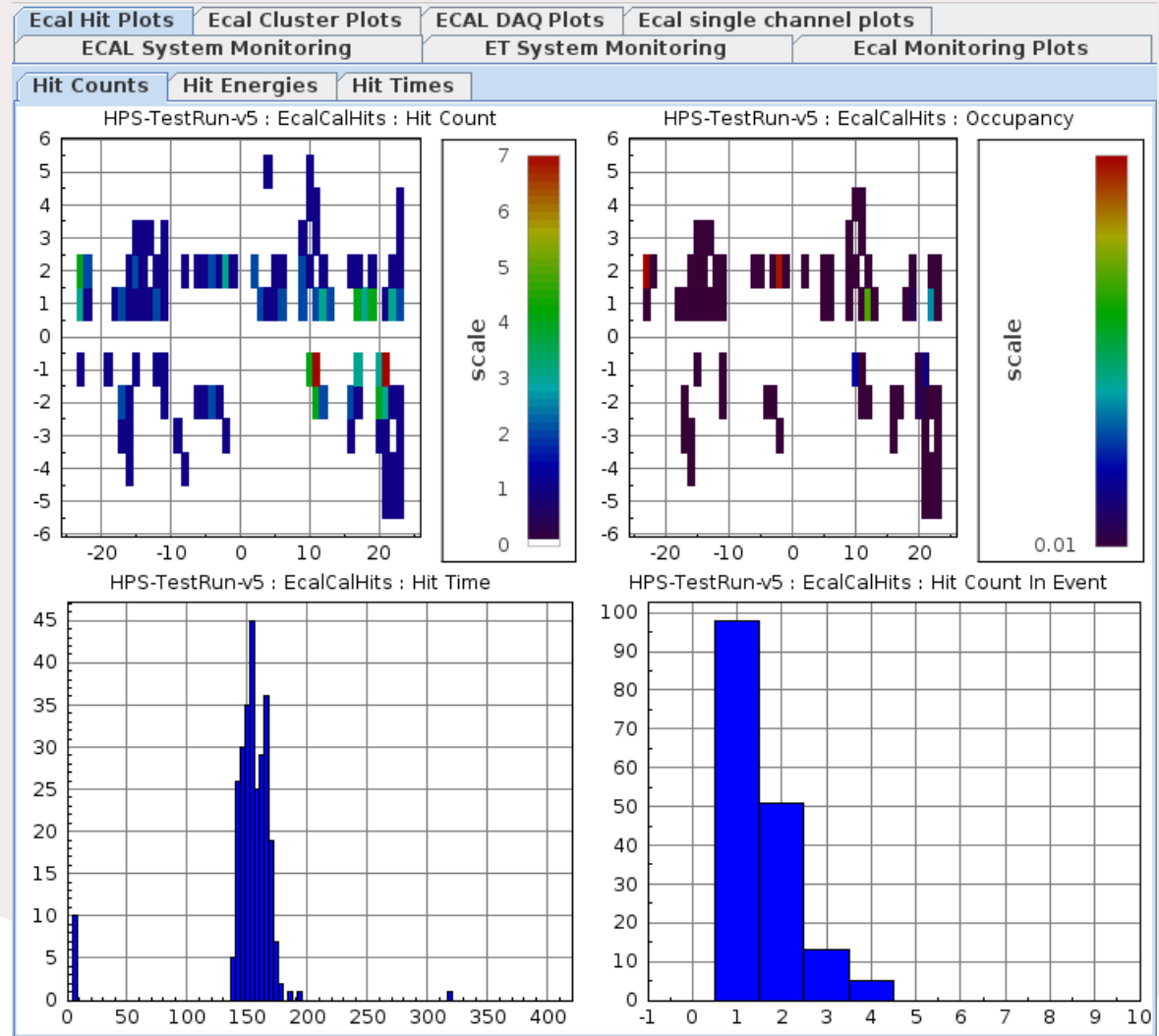
- **What is missing:**
  - Final integration with the new conditions system.
    - Actually, both the the "new" and "old" system are used.
    - Need to coordinate this with the whole Ecal software transition to the new system

  - Add strip-charts to quickly acknowledge any change during time
    - New feature just added to the monitoring application

  - Define a set of "standard" plots to be displayed during "standard" (non-commissioning, non-special) runs to people on shift
    - Are the plots in the "main" tab appropriate?
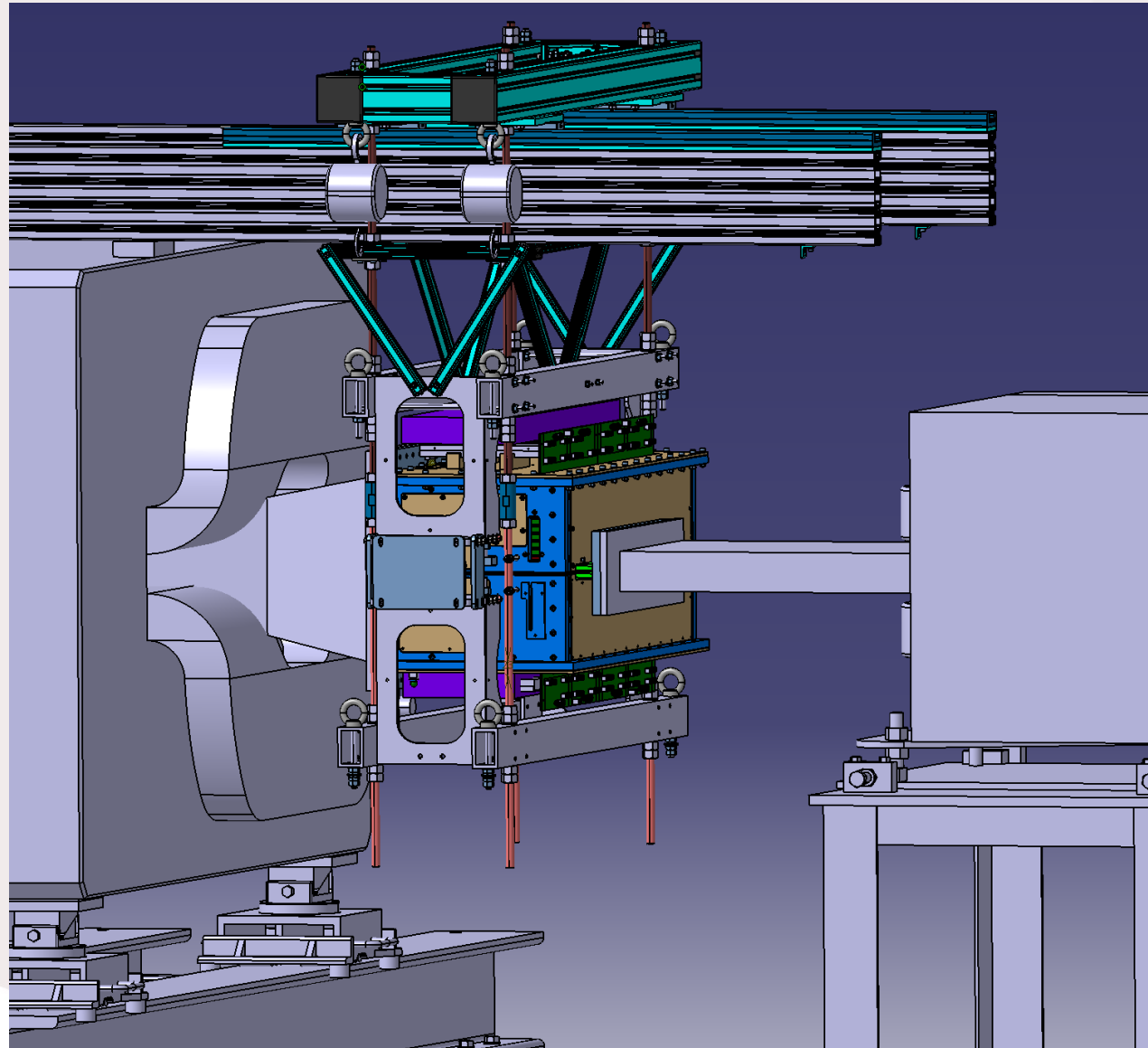
Mechanical Structure

- **ECal box**
  - Structure holding the crystals is unchanged
  - Box has been modified to fit the new electronics (Mother boards and LED system)
  - All is ready and in JLab
- **ECal construction begins next week!**

Mechanical Structure
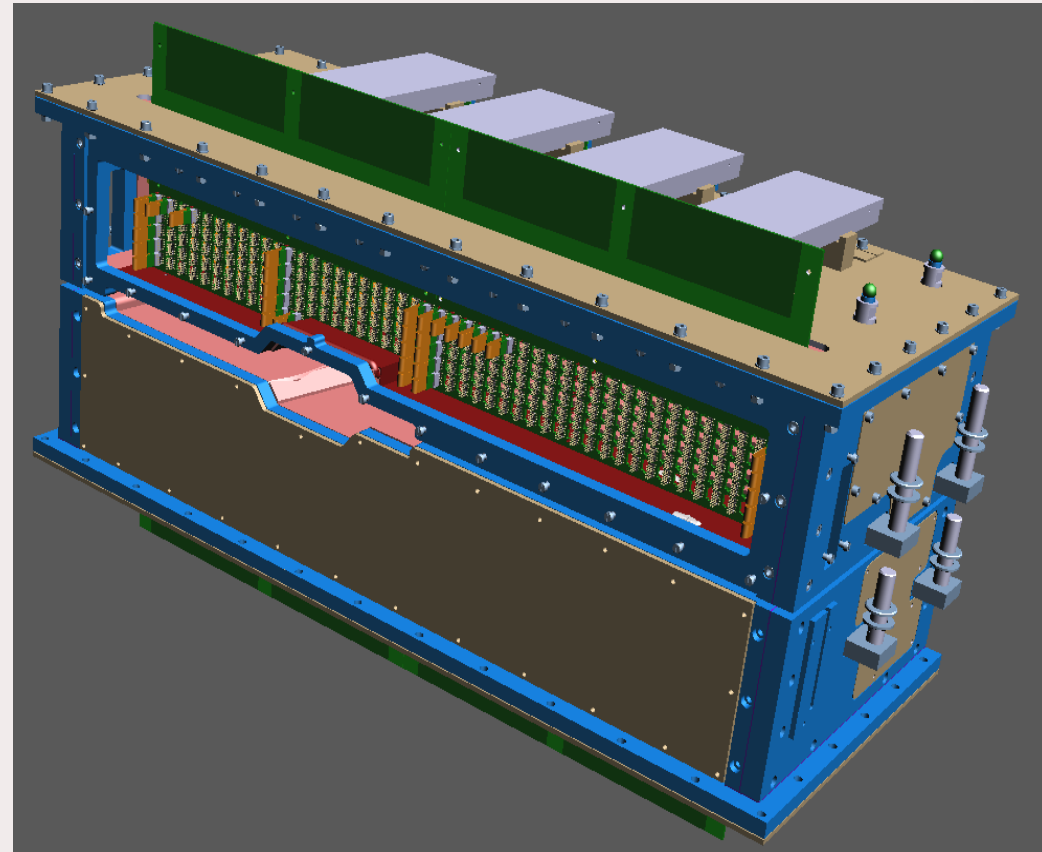
- **Installation of ECal**
  - Crane access difficult for top ECal, impossible for bottom Ecal (~200kg/ECal)
  - Necessitate to remove the ECal vacuum chamber for installation
  - ECal halves are fixed on threaded rods that allow precise vertical positionning
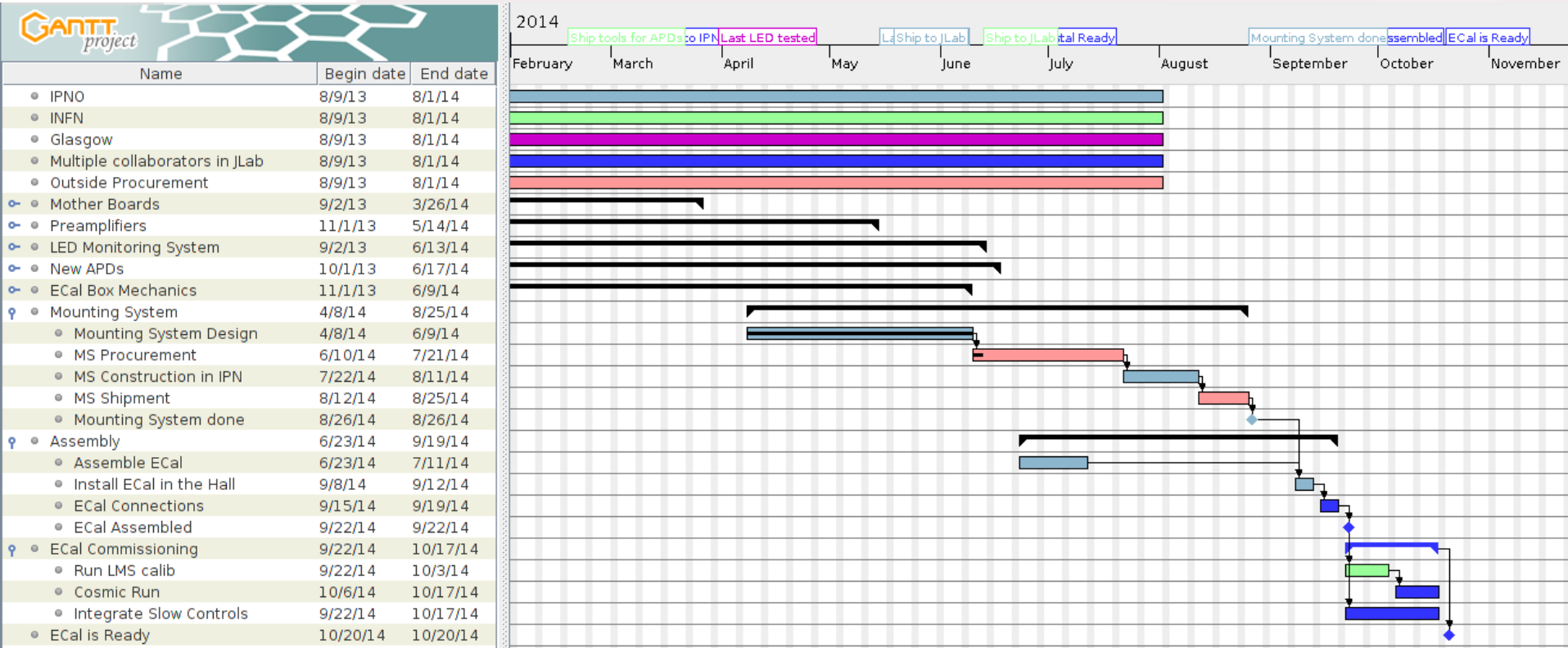
Mechanical Structure
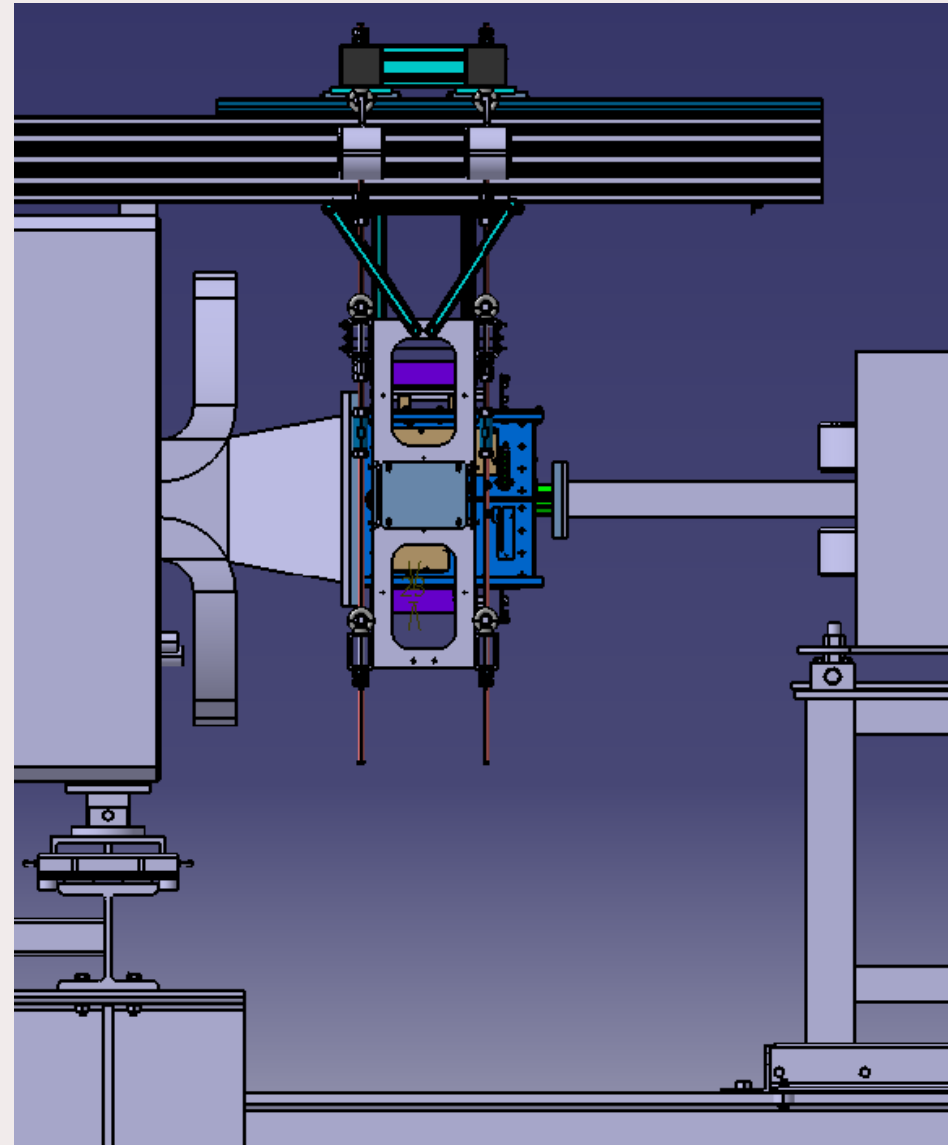
- **Solution to crane issue**
  - Install lifting devices on the mounting system directly
- **System rigidity has been reinforced**
- **ECal Mobility**
  - Necessary to access the PA and LMS

Mechanical Structure
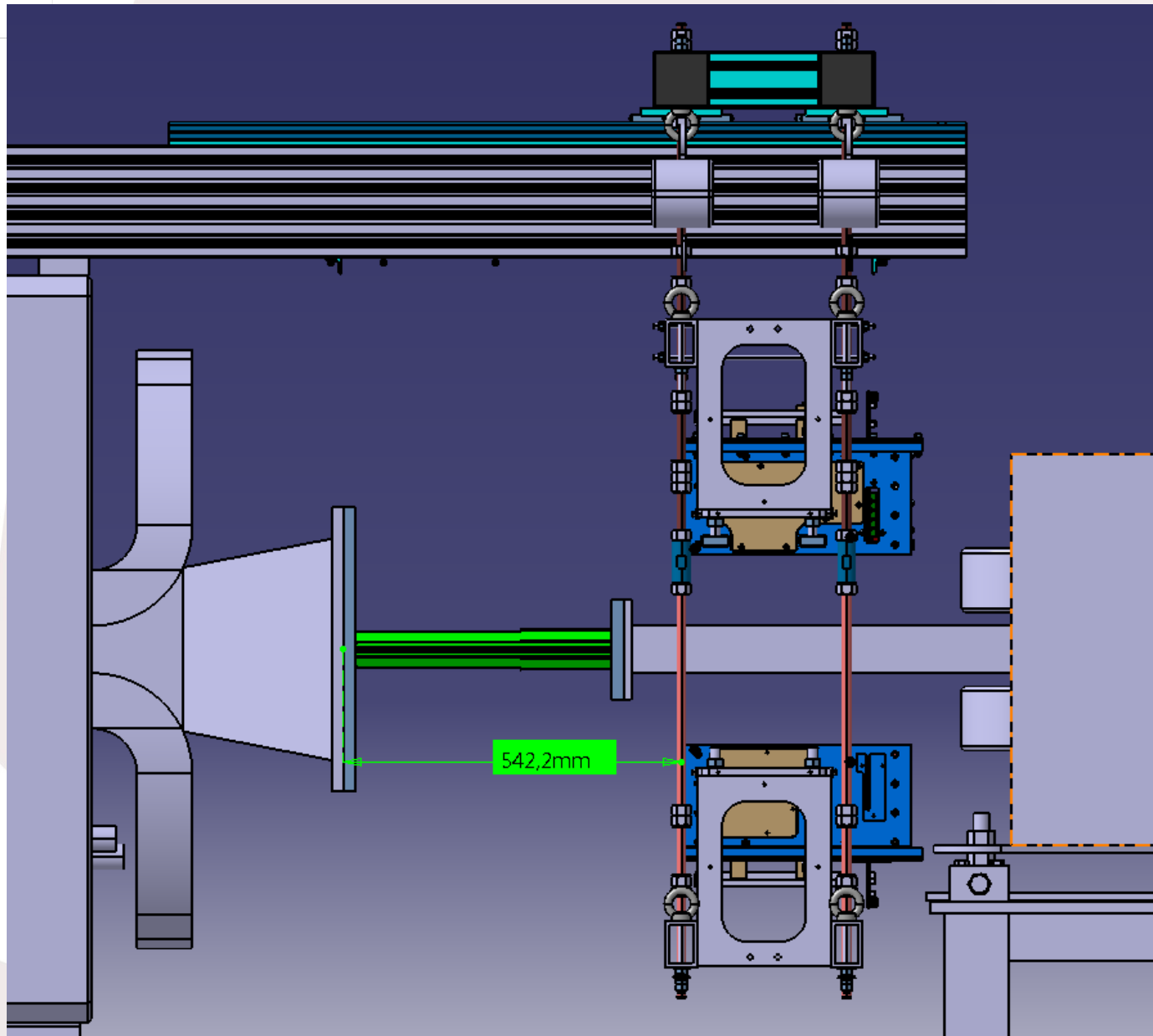
Schedule

- **Delay in the mounting system design and production leads to delay of the commissioning**
- **End date now expected for 10/20/2014**

Summary

- **Core parts are all finished and arrived in JLab**
  - ECal box with all new electronic elements
  - Light Monitoring system parts
  - Crystals with their new APDs
  - Studying the addition of W shielding
- **We have a good strategy for calibrations**
  - Mapped APDs and PAs to reduce variations
  - 4 different calibration methods
- **Monitoring software is in good progress**
  - Some EPICS feature are still to be developed but everything is well defined
- **Mechanical structure is designed**
  - Includes lifting device to grab detectors
  - Has increased rigidity
  - Can be moved around "easily"
  - Leads to a 1.5 month delay for completion of the project