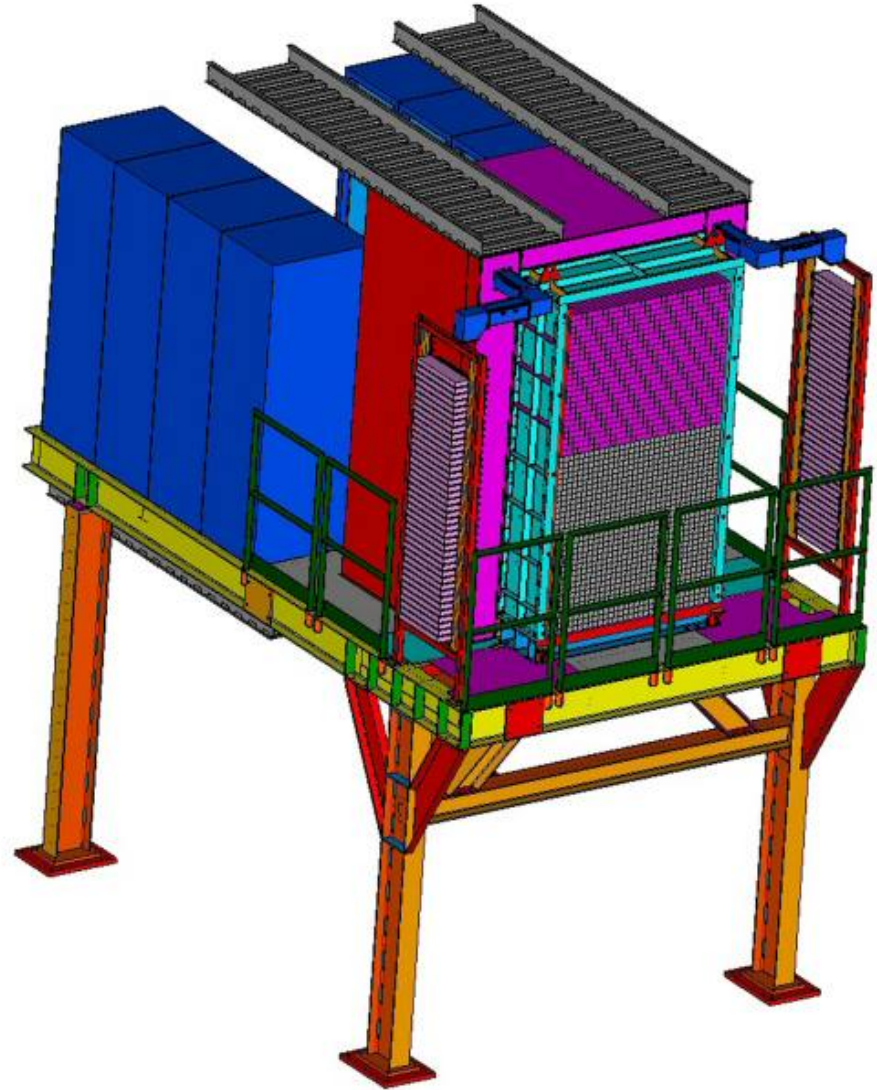


# BigCal and gain monitoring system

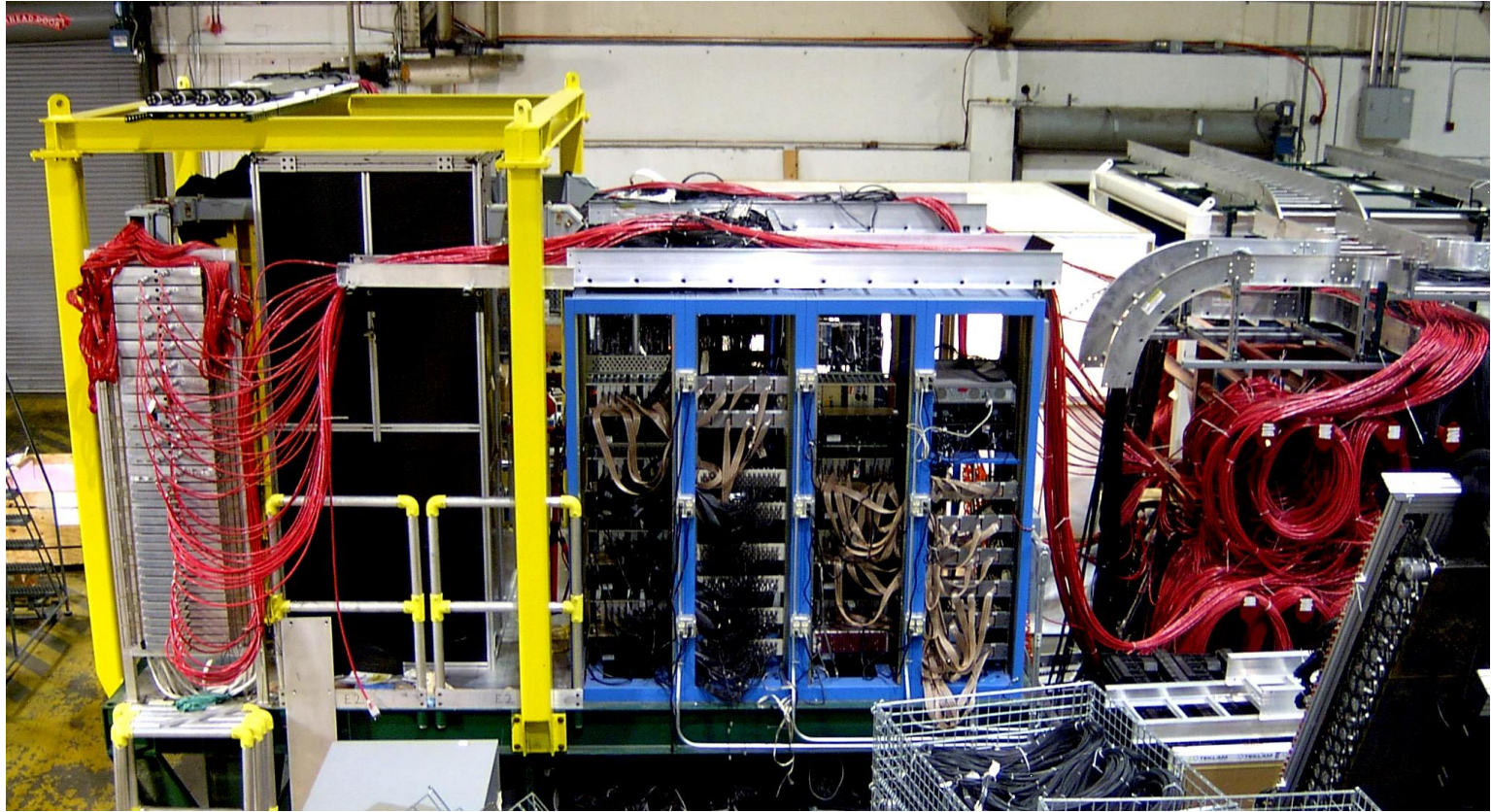
*Mark K. Jones, Jefferson Lab*

# BigCal overview

- BigCal consists of 1744 lead glass blocks
  - 1024 from IHEP, Protvino
  - 720 from Yerevan
- Groups of 8 Signals go to multiplexing units which pass individual amplified (5x) signal and produce sum.
- Sum output used for TDC and trigger.
- Individual signals delayed by 500ns cable which go to ADCs.
- DAQ electronics will be located on HMS side of beam. Maximum HMS angle is  $50^\circ$



# BigCal status



- BigCal has been assembled in Testlab and tested with cosmic data
- Will be installed in mid July 07 and used in Gep2 $\gamma$  and Gep3
- OSP will be the same needed for SANE.

# Gain Calibration and Monitoring

- Initial calibration using elastic  $ep$ .
- Ongoing calibration during experiment using  $\pi^0$  reconstruction.
- Monitor gain using the Hall C UV laser system to illuminate a 1" thick lucite plate in front of the lead glass.
  - The laser system will be located in the counting house.
  - Transmit light to distribution box in the hall using the existing quartz fiber.
  - Transmit light to a secondary distribution box near BigCal using quartz fiber and then distribute light to lucite plate.

# Status of Gain Monitoring System

- Need to restore Hall C UV laser and update the safety documentation and protocols.
- The lucite plate and holder assembly are being fabricated.
- Need to build secondary distribution box and connections to the lucite plate.
- Develop expertise during the GEP experiment



# Annealing BigCal for SANE

- Two possible approaches:
  1. Large intense UV source ( as was done in Hall A). Need to remove and then remount PMTs. *Time to complete 4 weeks.*
  2. Smaller UV source ( as was done in Mainz). Done with PMTs in place. *Time to complete 2 weeks*
- Second option is preferable since PMTs do not have to be removed.
- Will test 2nd option by irradiating spare leadglass and annealing to see effect on PMT.

# Effect of magnetic field on BigCal

- Expect  $<9\text{G}$  at BigCal PMT for SANE
- Reduce field by placing a 6mm thick sheet of iron in front of BigCal. Minimal effect on energy resolution.
- Can confirm reduction by tests in the EEL with the polarized target.

# Experts on BigCal

- IHEP Protvino, *Andrei Davidenko, Yuri Goncharenko, Vladimir Kravtsov and Yuri Melnik*
- Yerevan *Hamlet Mkrtchyan, Vardan Tadevosyan, Arshak Asaturyan and Arthur Mkrtchyan*
- Yerevan *Hakob Voskanyan, Albert Shahinyan and Samvel Mayilyan*
- College of W&M, *Lubomir Pentchev*
- U. of Virginia, *Dinko Pocanic, Emil Frlez and Maxim Bychkov*
- JLab, *Mark Jones*
- Ample opportunity during GEP experiments to develop expertise.