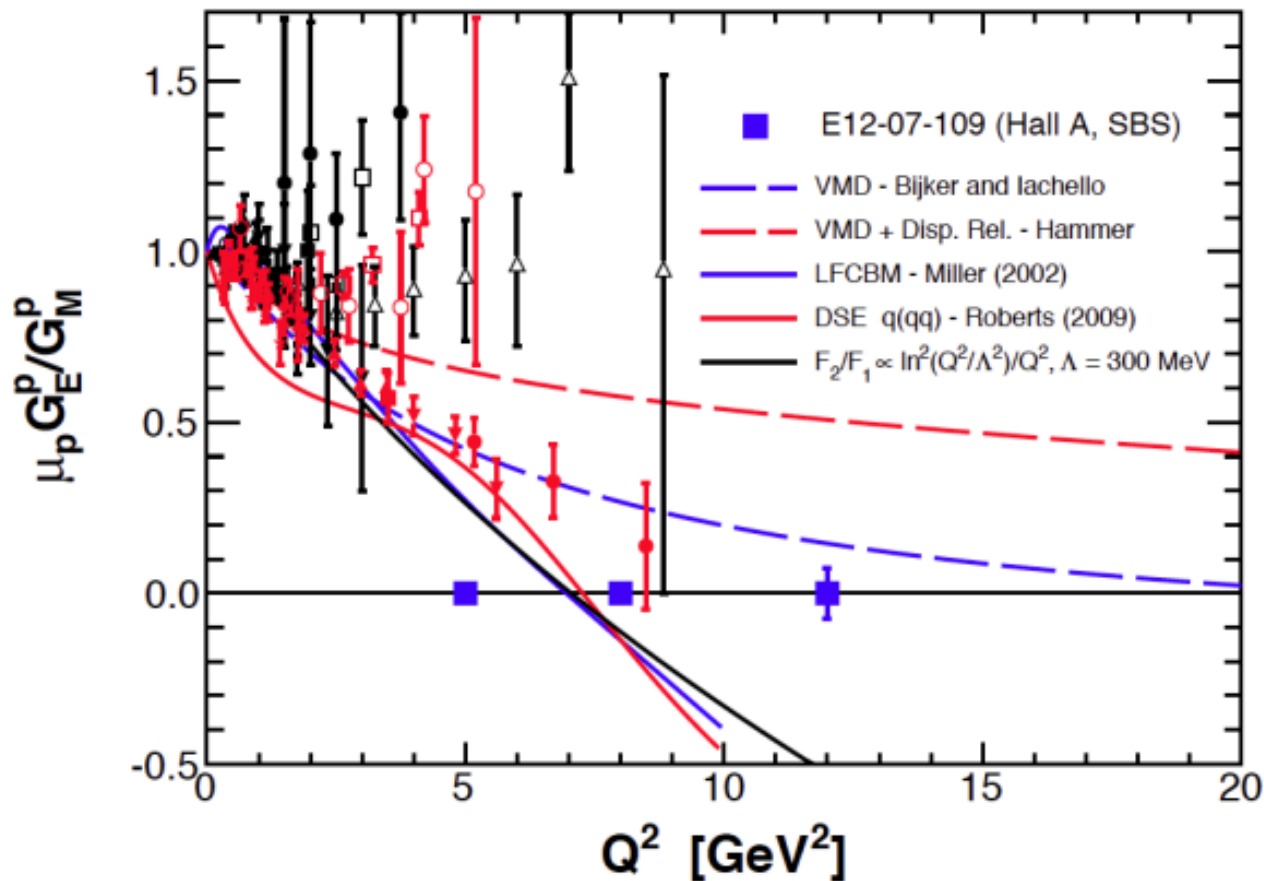


# $G_{Ep}$ experiment

Mark Jones

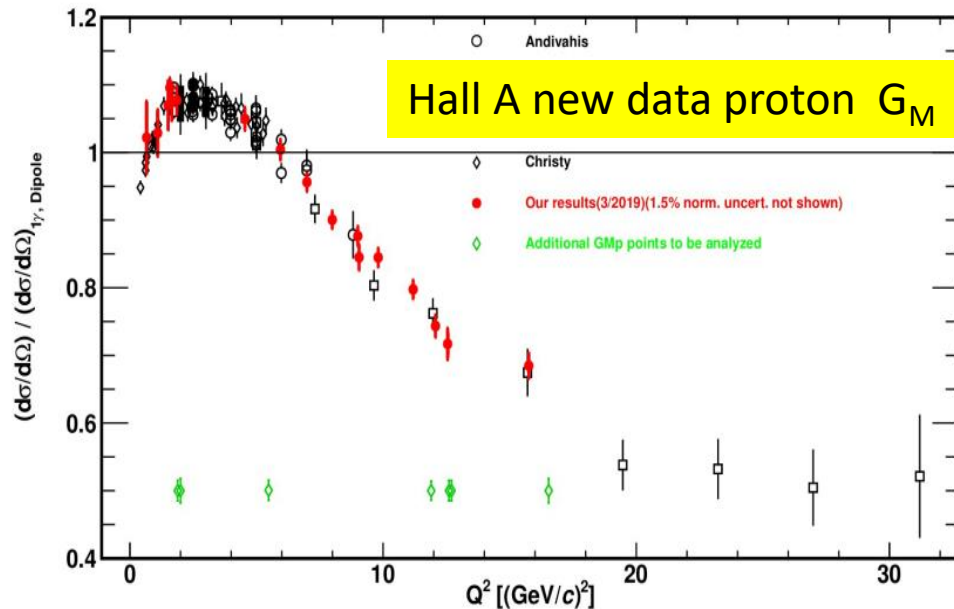
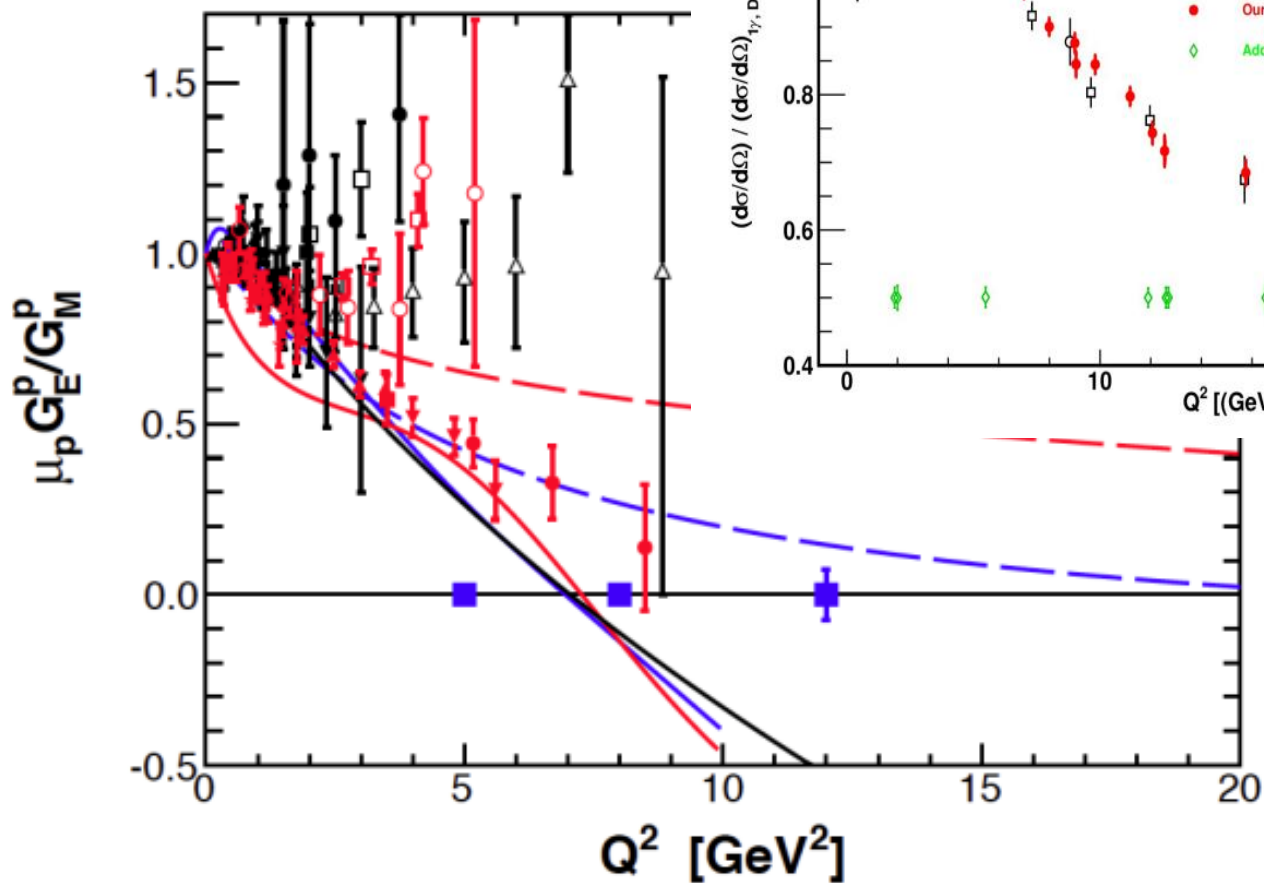
# Proton $G_E/G_M$ to high $Q^2$

Measure form factor ratio by recoil polarimetry in elastic ep scattering.



# Proton $G_E/G_M$ to high $Q^2$

Measure form factor ratio by rec



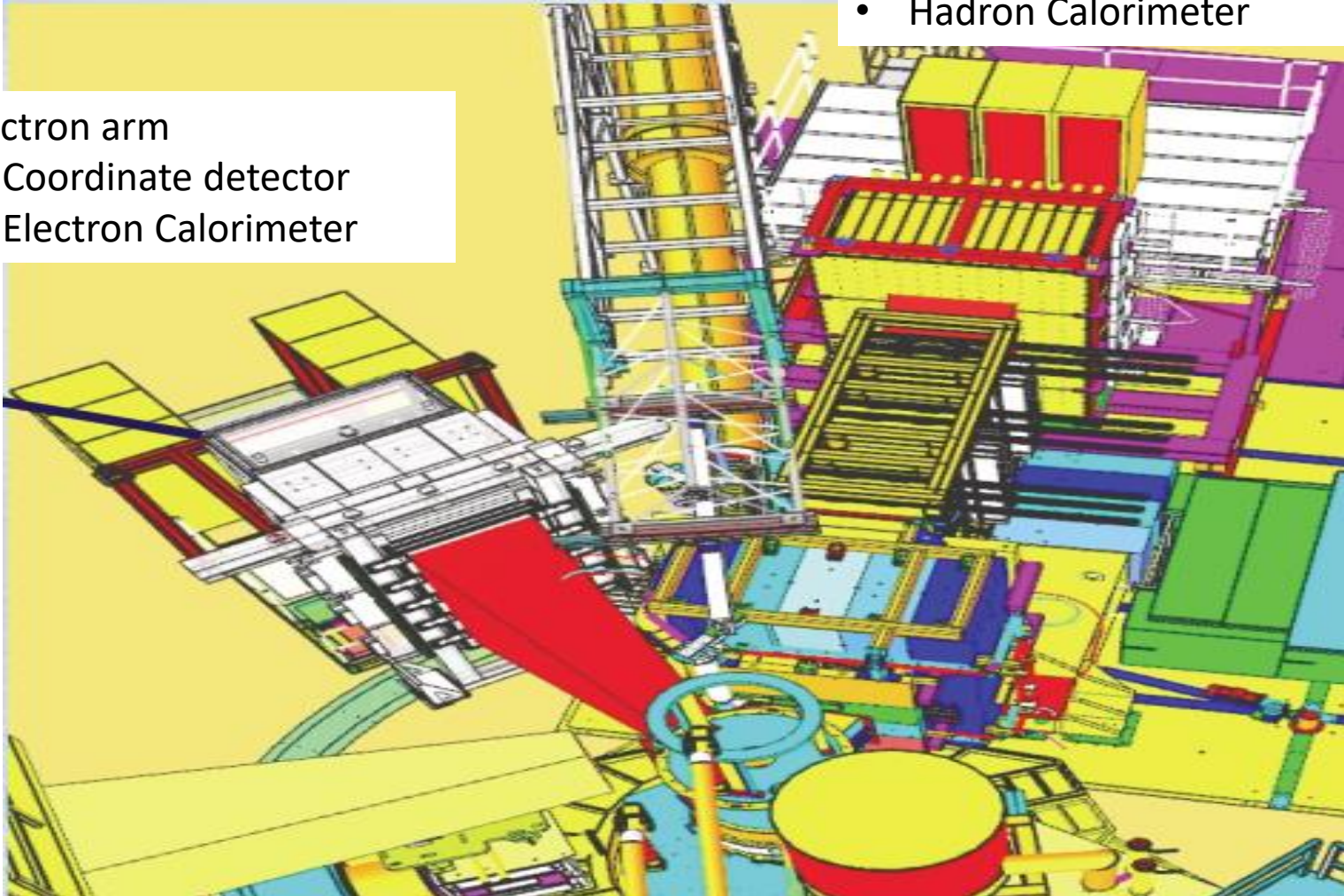
# Detector setup

## Proton arm

- Double analyzer polarimeter
- Hadron Calorimeter

## Electron arm

- Coordinate detector
- Electron Calorimeter



# Proton arm status

- Hadron calorimeter (HCAL) is the same as previous experiments.
  - Need to have FADC trigger (which is already in place).
  - Need to add VETROC for ECAL discriminated summed signals and VTP to form L2 coincidence trigger.
- Recoil Polarimeter
  - Same GEMs will be used from GEn-RP and BigBite
  - Will have experience from earlier experiments.
  - Recoil polarimeter frame is at JLab.
  - The rates and occupancy will be much higher than earlier experiments.
    - Need to evaluate status at end of GEn-Rp running.
  - Ideas of using just single analyzer and/or using charge exchange need to be fleshed out.

# Electron arm status

- Coordinate detector status given by Peter Monaghan.
- Electron Calorimeter (ECAL)
  - ECAL was not funded in the SBS Project, so funding had to come from universities and Jlab Hall A operating budget.
  - North Carolina Central University received a large grant for designing ECAL and building the ECAL frame. The frame is at Jlab.
  - ECAL platform will be made from previous Hall C ECAL platform.
  - Frontend electronics is on ECAL platform.
  - Separate ECAL DAQ weldment for HV and FASTBUS.

# DAQ/HV weldment

- HV mainframes in place.
  - Need to finish setting up HV patch panels and short HV cables
  - Need to define the long HV cables.
- FASTBUS crates in place.
  - SFI/CPU/VI are in place. Checked out all crates.
- Need to identify the VME crate/TS/SD to use
  - Had them for checking out FASTBUS but now used for other detectors
  - Do we have extras for testing while experiment running?
- Need to design the cabling/patch panels from long signal cables to the FASTBUS.

# Frontend Electronics

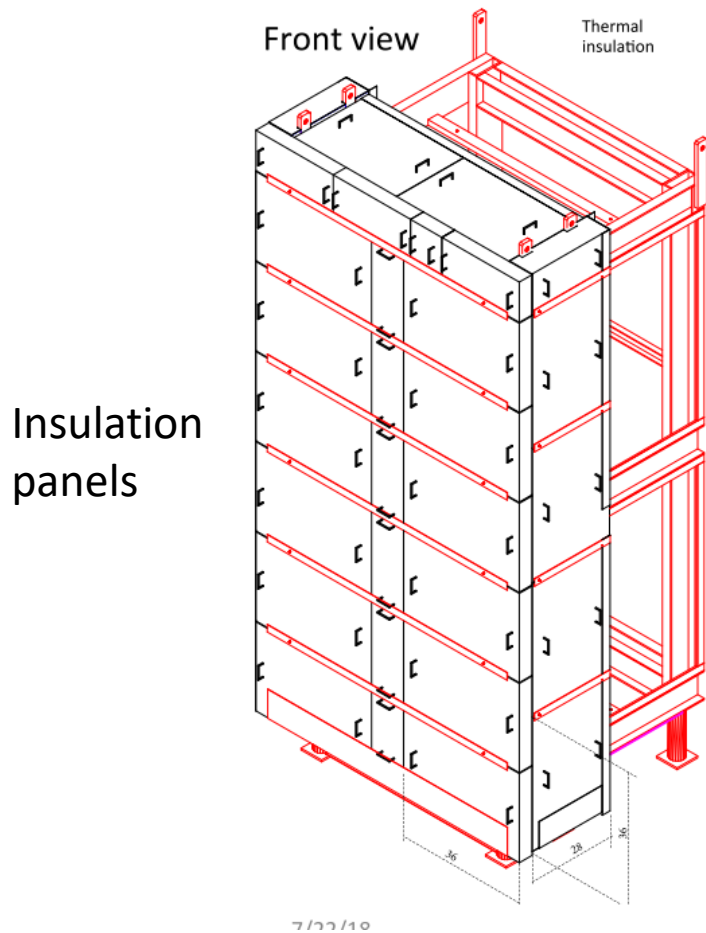
- ECAL fast trigger (“L1A”) for ADC gate is formed in NIM.
- Produce 192 discriminate overlapping 32-block sums are sent to VETROC for L2 coincidence trigger.
- The individual signals are amplified and sent by 100m cables to FASTBUS. Need to account for cables.
- Trigger mostly uses NIM electronics for previous Hall C ECAL
  - Need to identify new NIM modules and cables.
  - Need to setup of the frontend electronics.
- Need to identify the HV patch panels



# SBS Electron Calorimeter

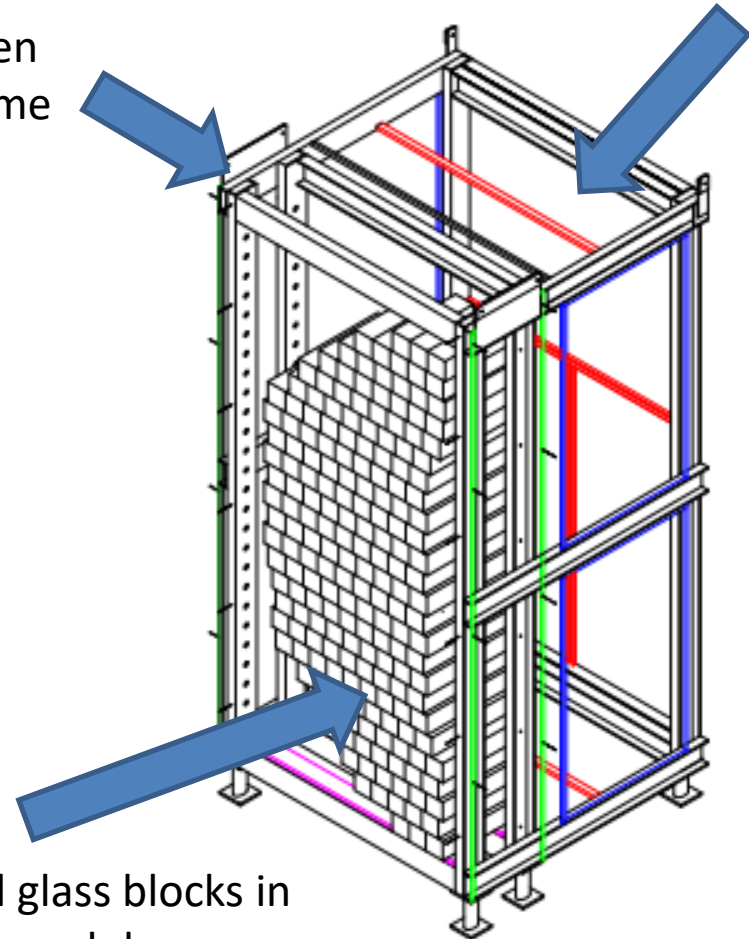
- Design by Yerevan, NCCU and JLab

PMT light box with  
air distribution



Oven  
frame

1719 lead glass blocks in  
191 supermodules

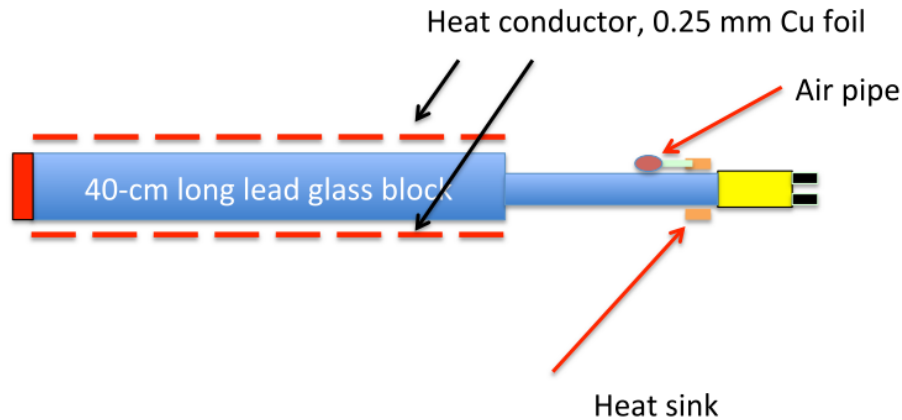


# SBS Electron Calorimeter

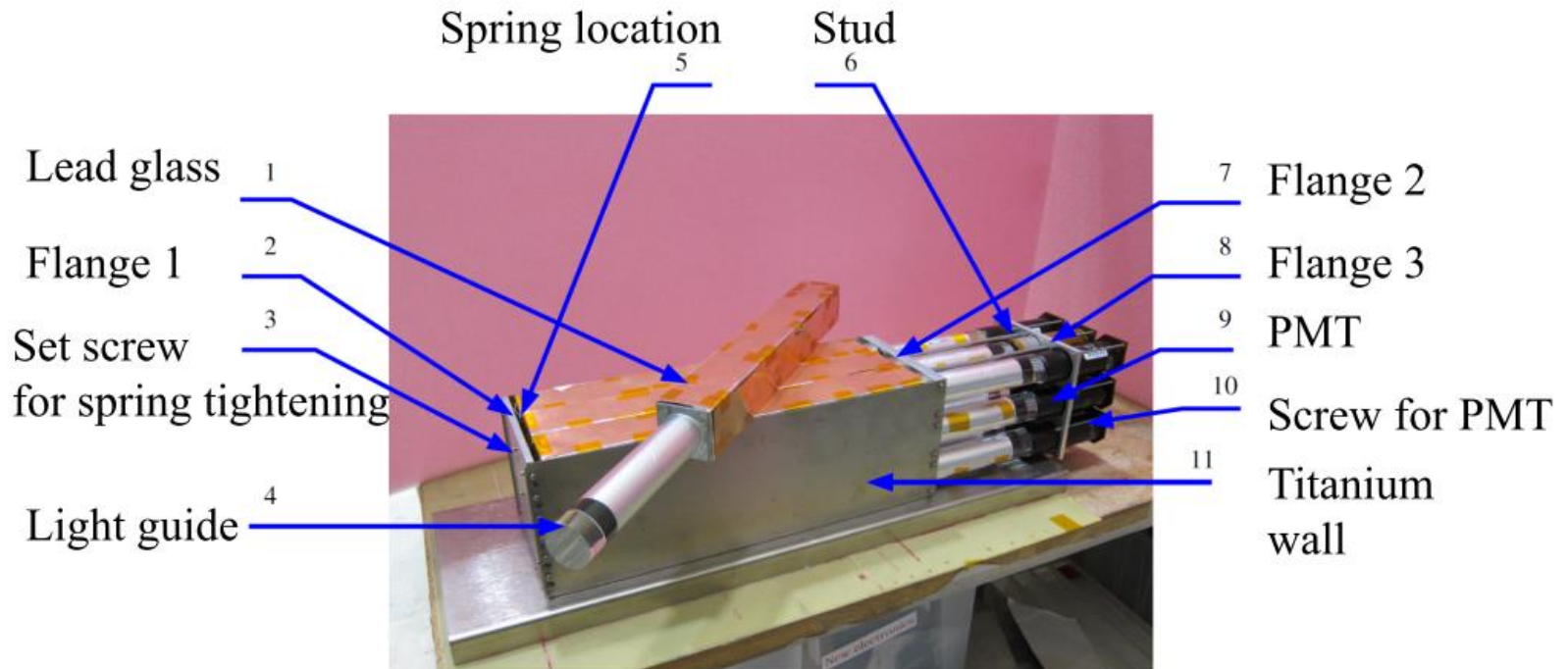
- NCCU purchased oven frame and arrived at Jlab summer 2018



# SBS ECal Supermodules



Extensive testing of design concept at Jlab and SBU



# ECal status

- Completed assembly of supermodule frames and cutting of materials for wrapping by Feb 2019.
- 130 of out 191 supermodules (SM) have been assembled.
- JLab Detector Support Group is contributing manpower to assembling supermodules.
  - DSG has agree to assemble remaining SMs from September 21 to Jan 22
- The cooling test is under preparation in EEL 122 for the 9x9 blocks system.
- Need to assemble SMs into full calorimeter with heating system
  - Design is done.
  - All parts at Jlab (need to add heating).

# JMU work on PMTs and bases

- PMT work
  - Completed testing of 2400+ PMTs by summer of 2018.
  - Measured relative QE, after pulsing, and gain vs HV curves for all PMT. [Report on work](#)
- Need to replace about 1000 Protvino style bases. JMU designed the new bases.
- With help from the Jlab Fast Electronic Group, the 1100 boards for the bases have been ordered.
- JMU will work on assembly the bases.

# Conclusion

- ECAL assembly path is defined.
  - Need workforce for testing/ final assembly.
- JMU committed to HV base assembly
- Much work is needed by myself to develop timeline/workforce/material needs for the FE and DAQ electronics and High voltage.

# Backup slide