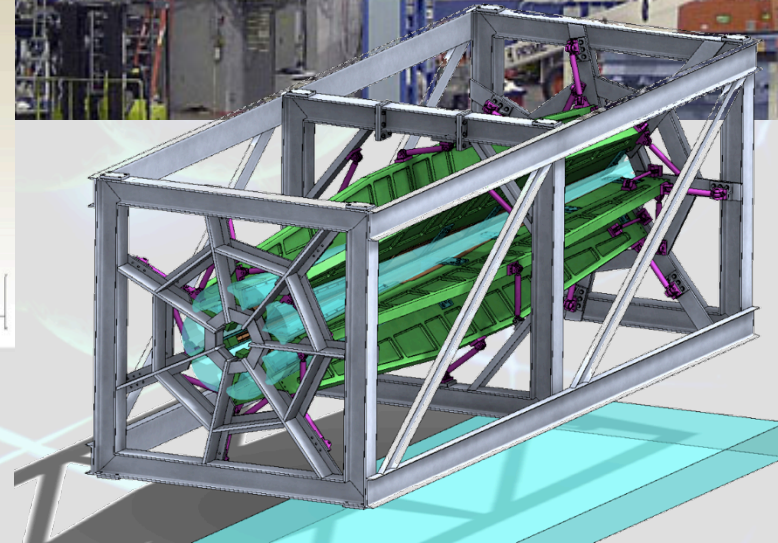
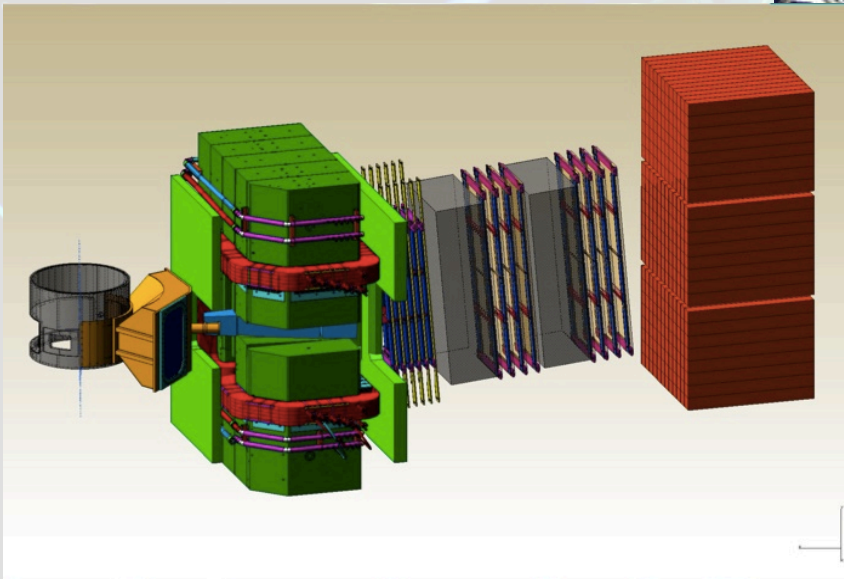
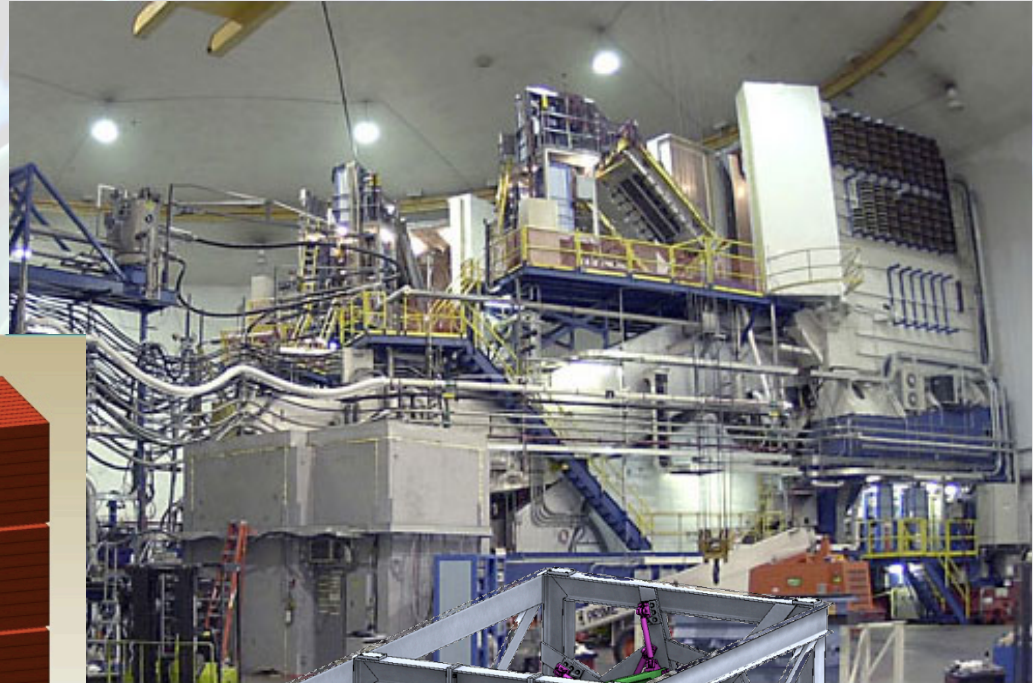
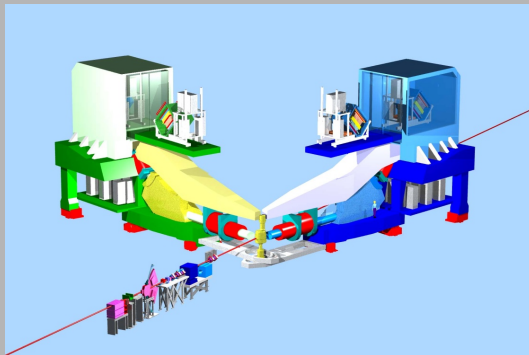


Hall A Update

Thia Keppel





Hall A Planning

- 3 high impact experiments in first years of running
- G_M^p (HRS-R) and DVCS (HRS-L + calo) run are combined
- Some flexibility incorporated

16 mo.
Shutdown

12 GeV
Commissioning

Early Experiments

DVCS-I and G_M^p

Access to GPDs
EM Form Factor
Photon calorimeter to be installed on floor

$^3\text{H}/^3\text{He}$ APEX/PREX (A1n)

d/u at High x
Requires tritium target, venting system and BigBite spectrometer
Dark photon A' / Neutron skin
Both require additional small angle septum magnets

Neutron spin structure
Polarized ^3He target

SBS Experiments

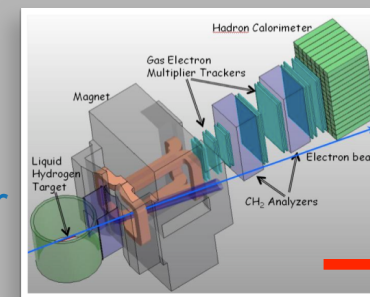
EM Form Factors at high Q^2

12 GeV Projects:

1. Moller polarimeter
2. Compton polarimeter
3. Energy measurement upgrade

SBS Project

SuperBigbite Spectrometer



to Hall A

11 GeV

FY 2013

FY 2014

FY 2015

FY 2016

FY 2017

commissioning beam

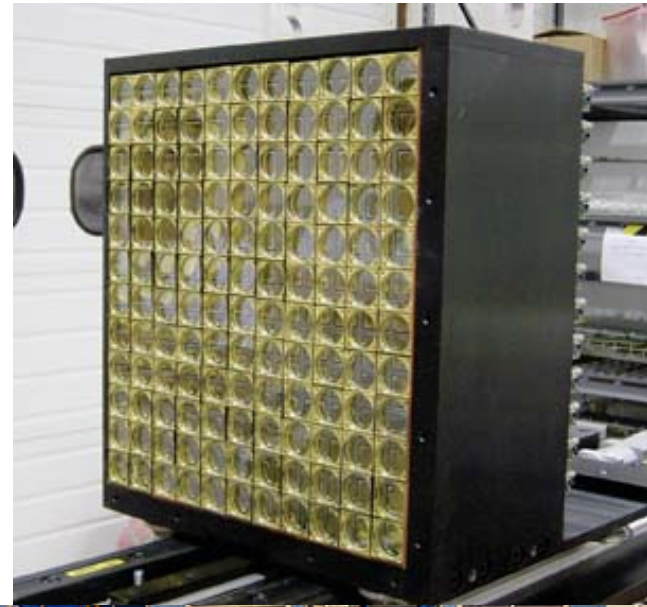


Jefferson Lab

DVCS / G_M^p Experiments in Hall A I

Fall 2014:

- Only L-HRS working, $E_b = 7.3$ GeV
 - R-HRS quad removed
- New EDTM system in L-HRS
- Light collection in gas Cerenkov improved with WLS paint on PMTs
 - > 50% improvement in p-e yield (NIM **A** 782 (2015) 87)
- Møller polarimeter commissioning
- DVCS electronics/trigger commissioning
- DVCS calorimeter calibration
- ~3 days of data taking for DVCS
- Optics data and 1 elastic point at $Q^2 = 7.7$ GeV² for G_M^p (but large or unmeasured systematic uncertainties)

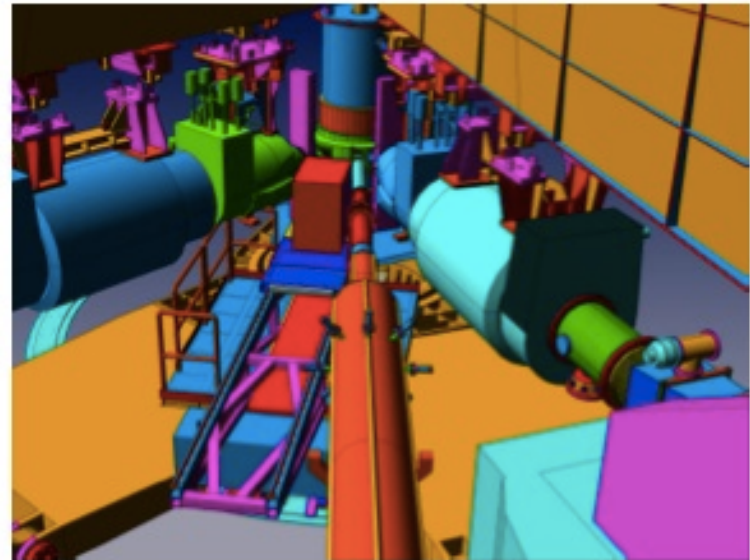
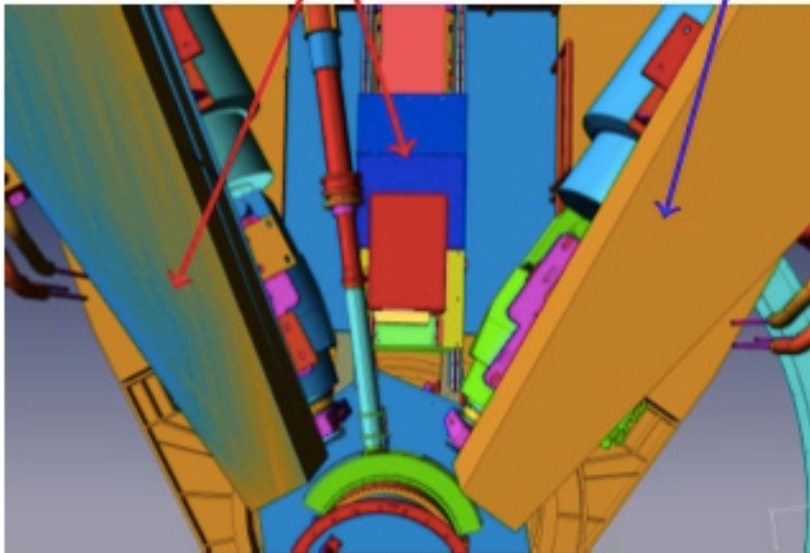


DVCS / G_M^p Experiments in Hall A II

Spring 2015:

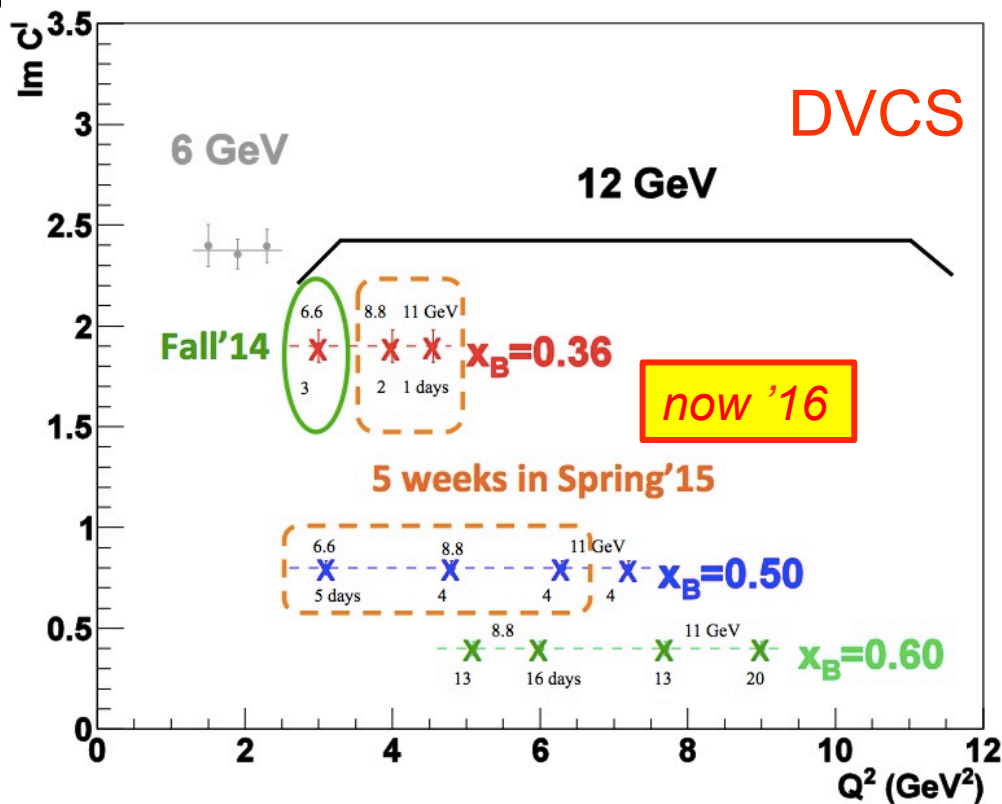
- $E = 9.6$ GeV, then $E = 2.2$ GeV (no physics)
- HRS optics calibrations (R-HRS now with SOS quad)
- New raster system commissioning
- BPM & BCM calibrations
- Beam energy measurement
- Compton polarimeter commissioning
- Target boiling studies

DVCS: $ep \rightarrow e'\gamma p$ G_M^p : $ep \rightarrow e'p$



Experimental configuration in Hall A (Fall'14 – Spring'15)

DVCS and G_M^p : Concurrent Experiments in Hall A at 11 GeV



High impact experiment for 3D nucleon imaging

Deeply Virtual Compton Scattering (DVCS) provides access to Generalized Parton Distributions (GPDs)

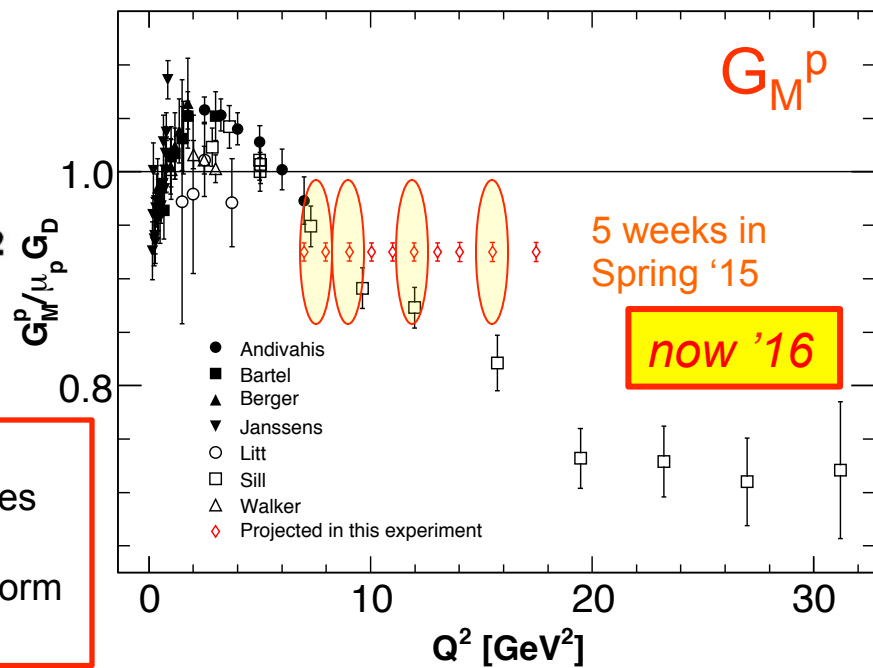
Will provide highest available Q^2 measurement of the DVCS cross section

Demonstration of scaling critical to full JLab 12 GeV GPD program

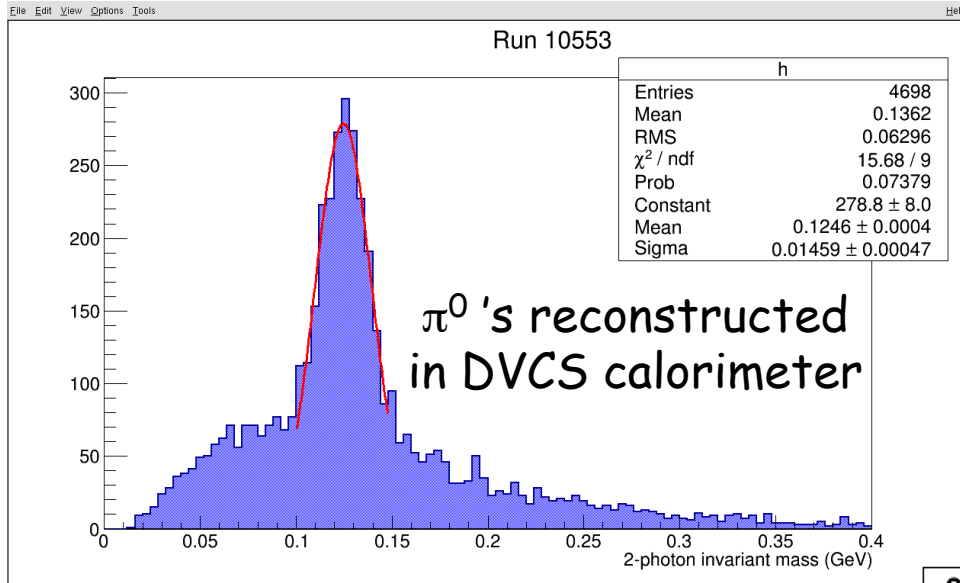
7 graduate thesis students on site taking data (MIT, Ohio, Orsay, Catholic, William and Mary, ODU, Hampton)

High Q^2 Form Factors

Reducing G_M^p uncertainties will enable Super BigBite high impact program of Form Factor Measurements



DVCS: online results from Fall'14 run



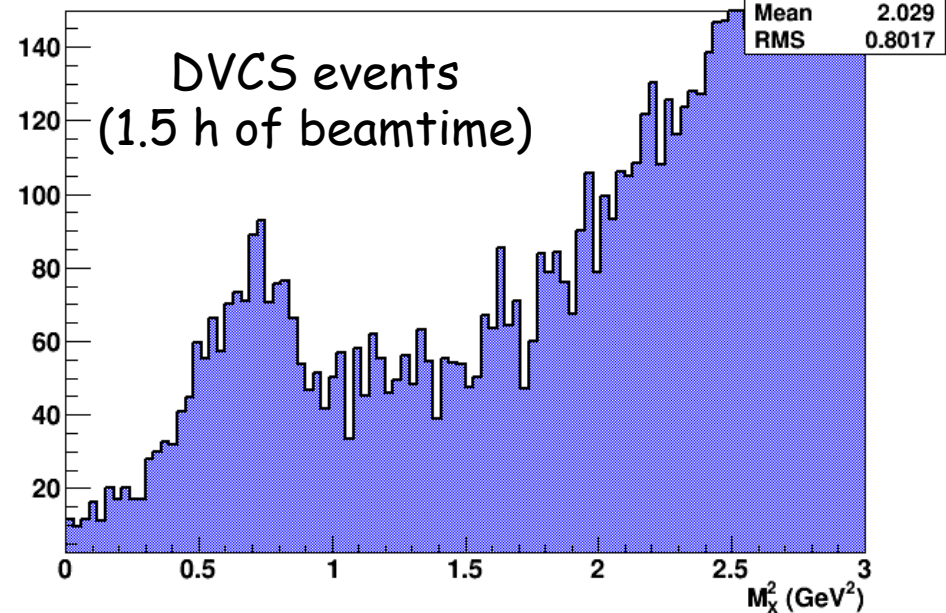
Beamline commissioning:

- ✓ Moller measurement (88% polarization)
- ✓ BPM calibration (+ harps operational)
- ✓ BCM calibration
- ✓ New raster
- ✓ Beam dump

DVCS experiment commissioning:

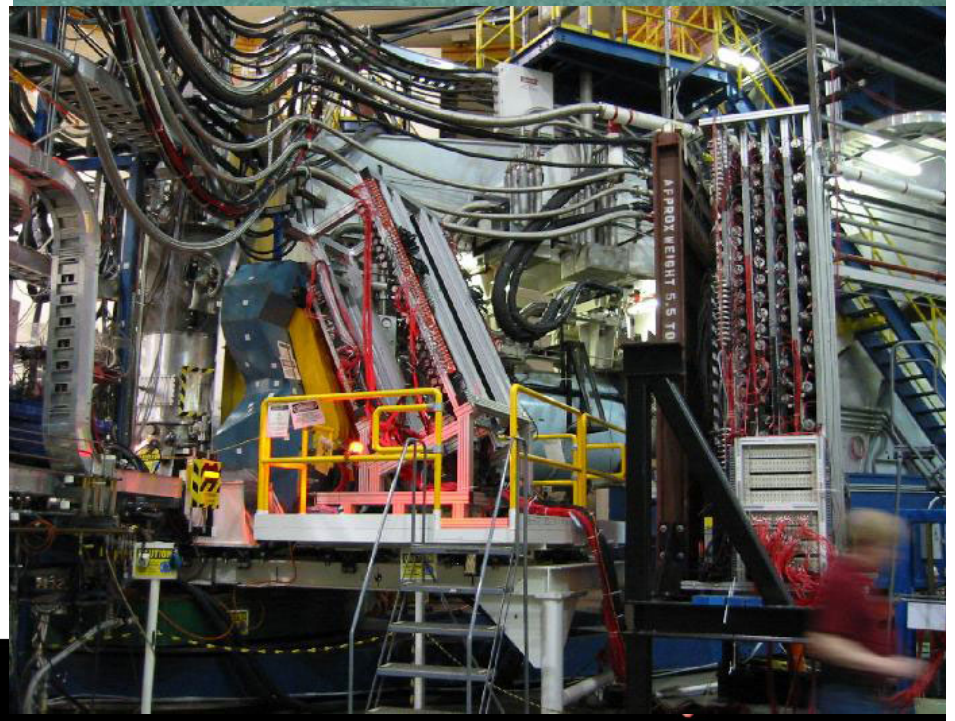
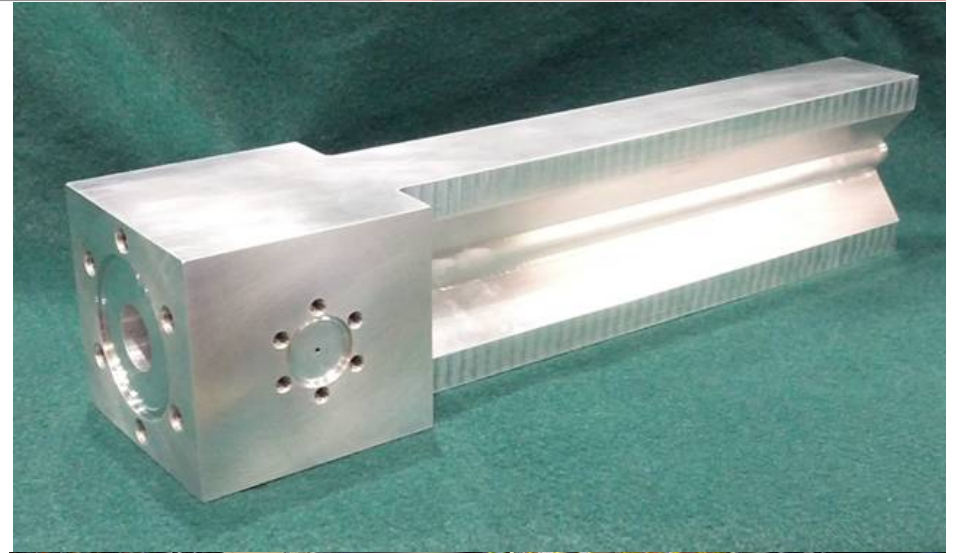
- ✓ Coincidence ($e + \gamma$) trigger
- ✓ 1 GHz sampling electronics
- ✓ $ep \rightarrow ep$ calorimeter elastic calibration
- ✓ Completed the 1st DVCS kinematic setting

$e p \rightarrow e \gamma X$ missing mass squared



Tritium Experiment Preparations

- Two new experiments were approved by PAC 42, now 4 total
- Preparing for common run group
- Preparing for (target) safety/design review early September 2015
- BigBite under (re-)construction in test lab
 - Active collaboration, 6+ students on site
 - Design for modified Cerenkov
 - Plan to add SBS GEM plane

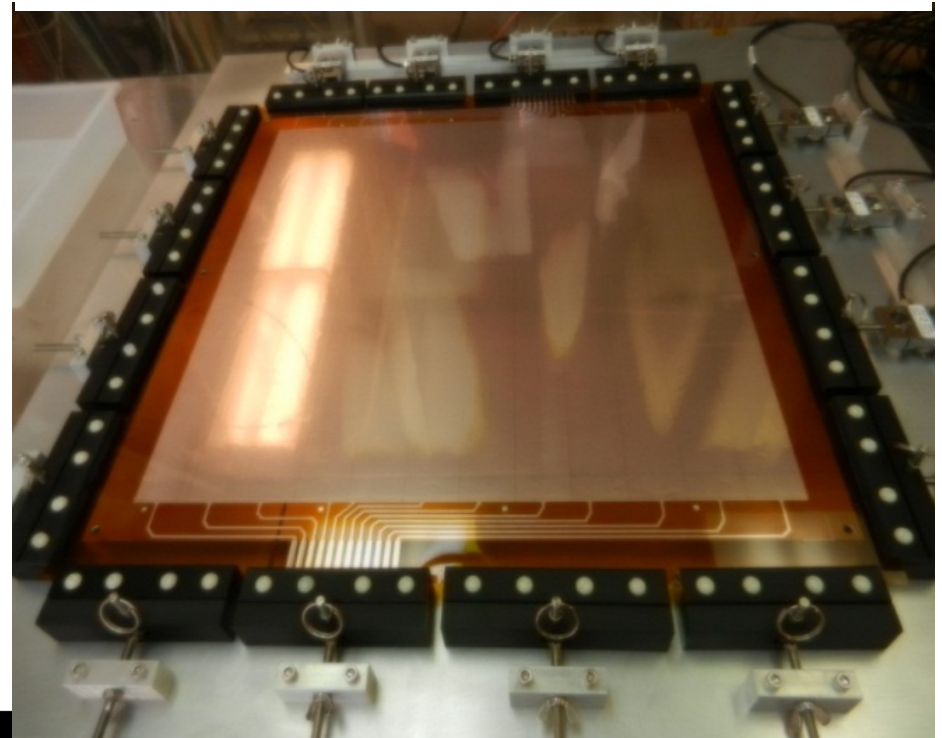
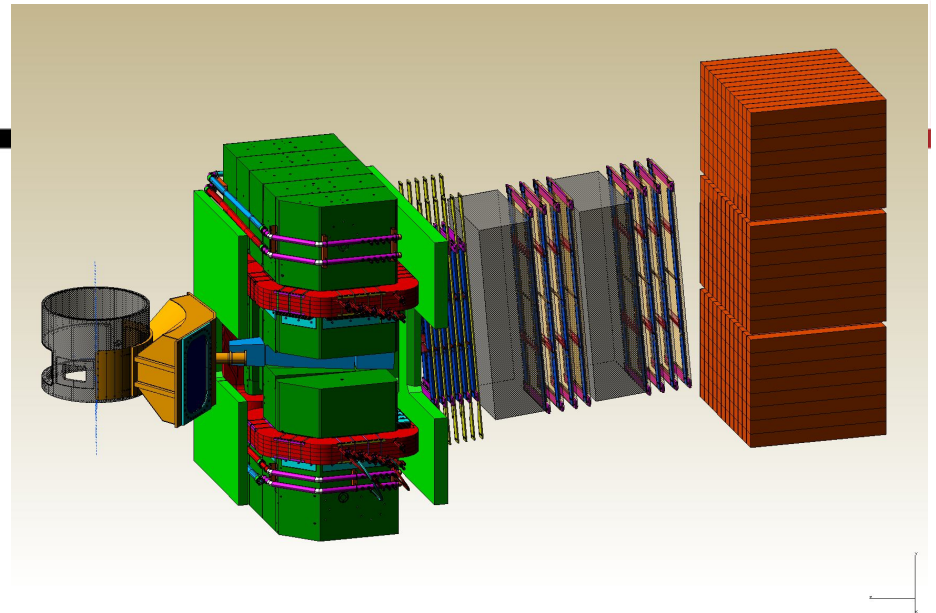


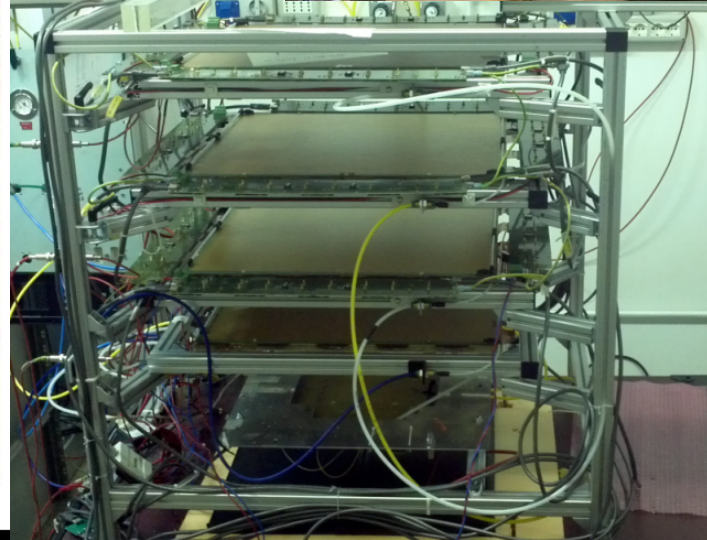
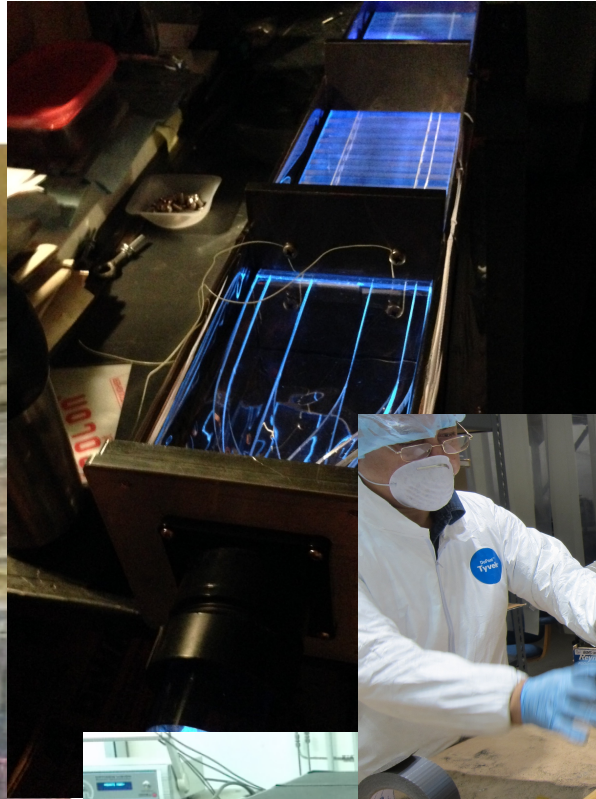
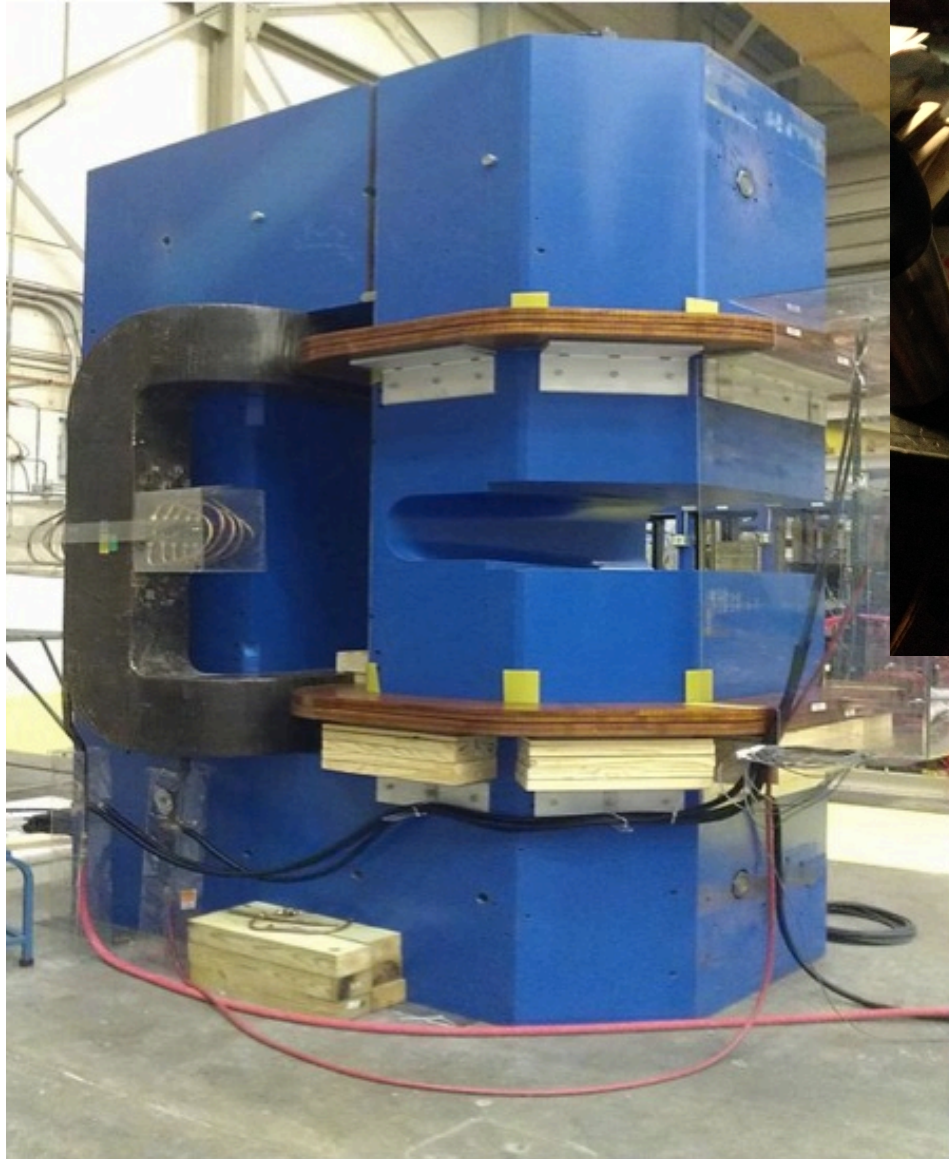
Beyond ^3H

- Polarized ^3He target improvements and continued development
 - Convection, new lasers, metal windows, ...
- PREX/CREX
 - Combined target chamber, *one installation plan*
 - Shielding designs underway
 - Computation fluid dynamics for target design
 - Polarimetry
 - Compton (photon) ran in Spring 2015 Run
 - Upgrading Compton electron detectors
 - New superconducting magnet purchased for Moller, install this Summer
 - Parity quality beam group established
 - New instrumentation to be installed in this summer (upgraded cavity monitors, halo monitor)
- APEX
 - New septum magnet purchased by collaboration now in test lab
 - Shielding designs underway
 - Beam line design underway
 - Computation fluid dynamic

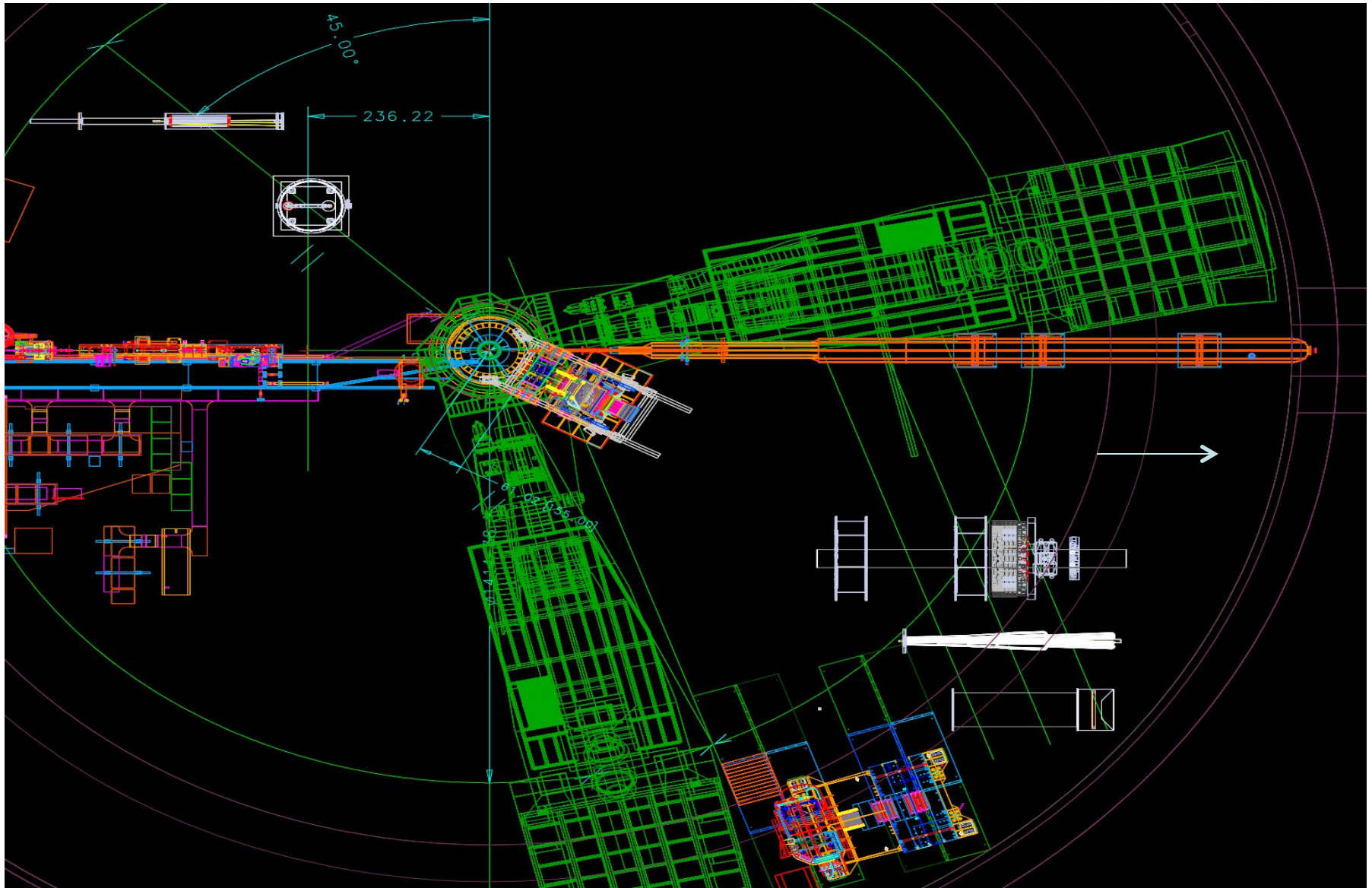
SBS Construction

- Project started FY13
 - Successfully passed two annual reviews
 - Overall very positive, project on track
- Spectrometer, ECAL work at JLab
 - Power Supply in hall
 - 48D48 magnet modified, assembled, tested in test lab
 - Working on carriage, vacuum, beamline
 - Thermal annealing of ECAL
- GEM construction at UVA, INFN
- Coordinate detector at Idaho State
- HCAL Hadron calorimeter at CMU



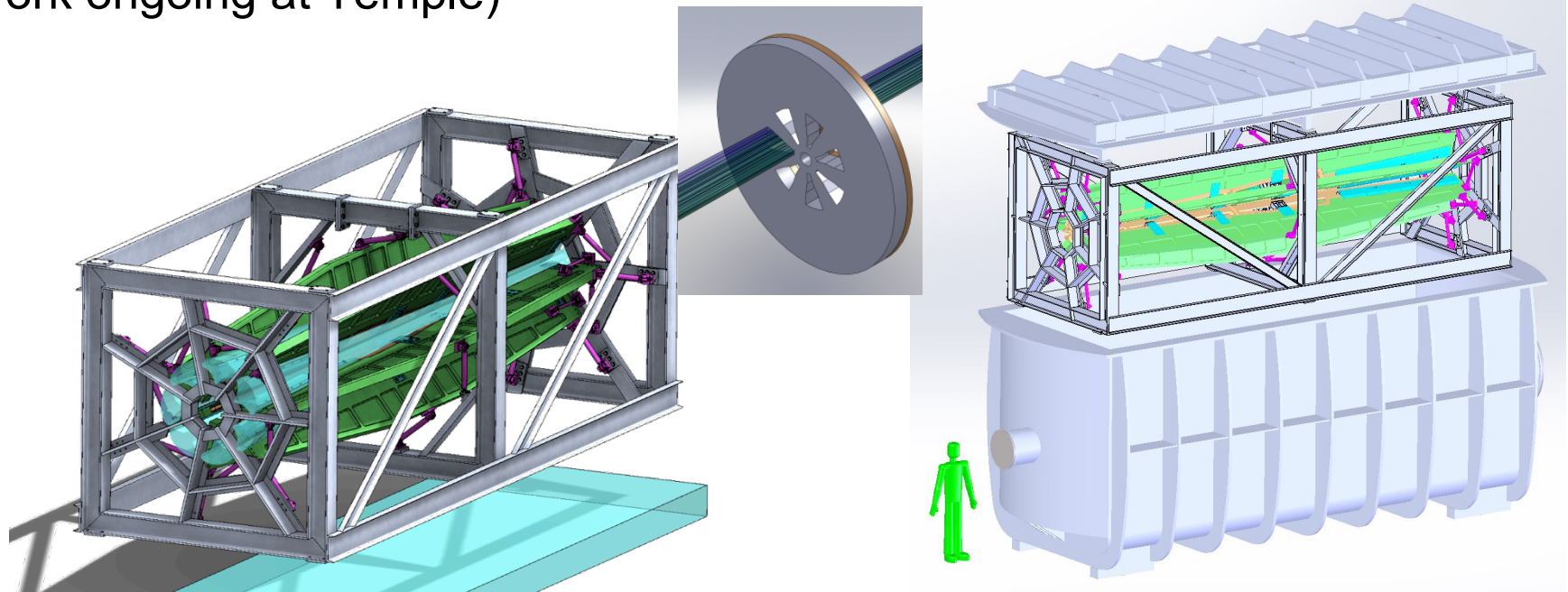


Starting to plan for future installations – example: Hall A with HRS-R, SBS, MOLLER (in 4 sections) removed from beamline, BigBite and HRS-L functional



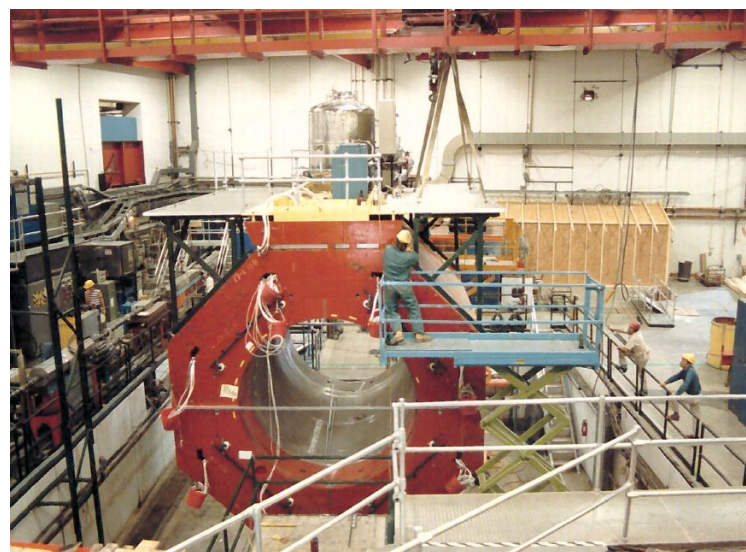
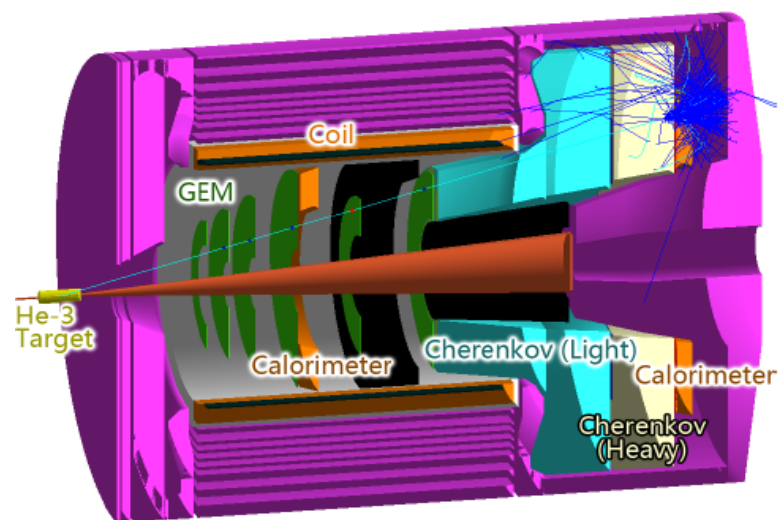
MOLLER

- Successful Science Review September 2014
 - Looking towards technical feasibility reviews: lab ~Sept/Oct and DOE late in 2015???
- Supporting ongoing magnet and collimator pre-R&D development work at MIT
- Upgrading Moller polarimeter (new magnet purchased, design and target work ongoing at Temple)




SoLID

- Director's Review February 23,24, 2015
- Overall positive, but many helpful recommendations
 - Collaboration revising pre-CDR document accordingly
 - Goal to resubmit late 2015
- Evaluating key pre-R&D areas
- Working with Cornell to move solenoid
 - ~Start removal summer 2016
 - Hall A E&D involved in disassembly



Hall A Projected Experiment Schedule, updated 2/2015
 - available on Hall A wiki

	Spring	Fall	Spring	Fall	Spring	Fall
CY 2015	DVCS - I/ GMp					
CY 2016			DVCS - I/ GMp	³ H/ ³ He group (1+1+2)		
CY 2017					³ H/ ³ He group (1+1+2)	<i>APEX</i> <i>PREX12</i> <i>CREX</i> <i>A₁ⁿ</i> <i>Ar(e,e'p)</i> <i>DVCS-II</i>

CY 2018

SBS start?

- Experiments listed in italics represent potential schedule options, *in no order*
- Red indicates PAC41 High Impact Experiments including SBS G_e^p
- Purple indicates new experiments approved by PAC42

Thank You!



HRS commissioning

- ✓ Detector checkout completed (efficiency, calibrations...)
- ✓ Optics calibrations
- ✓ DAQ commissioning (DVCS & GMp co-existing DAQs)

