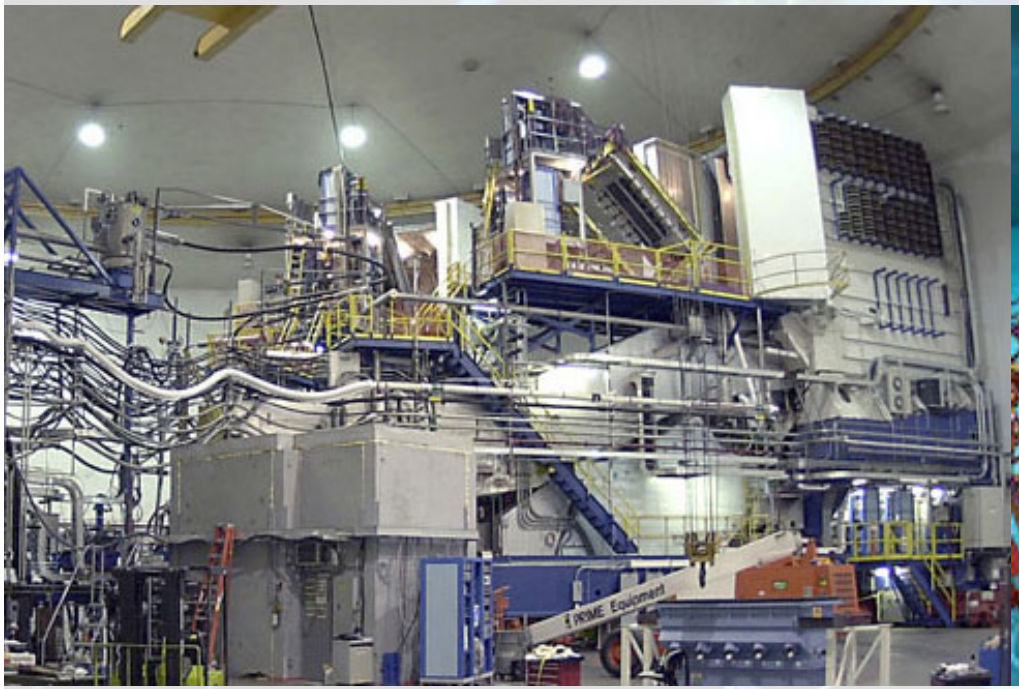
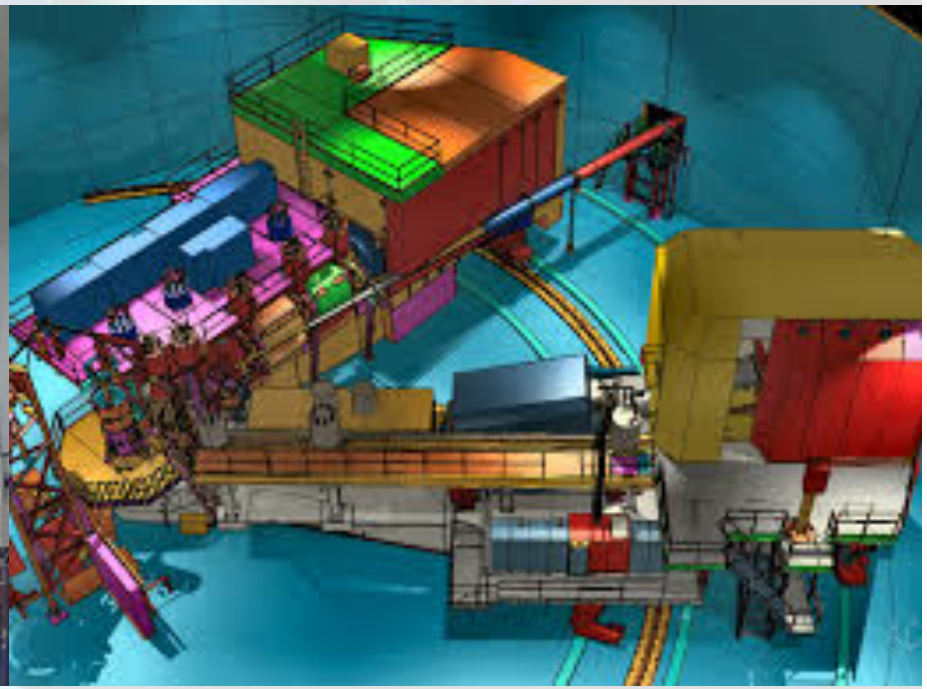
Hall A/C Update

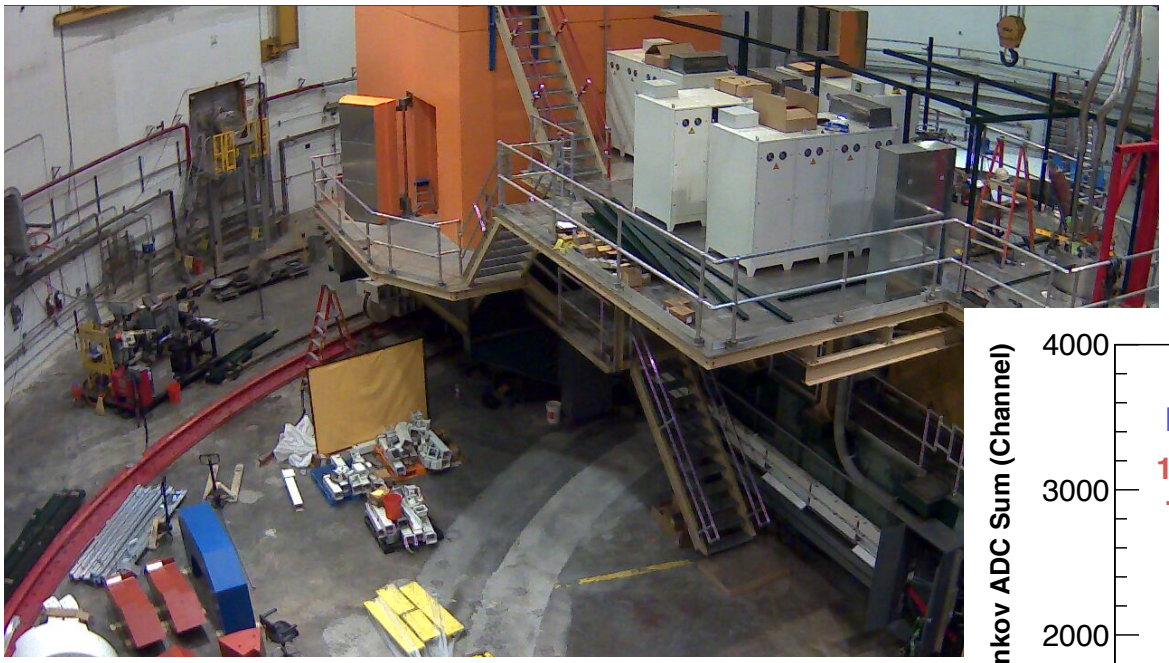
Thia Keppel

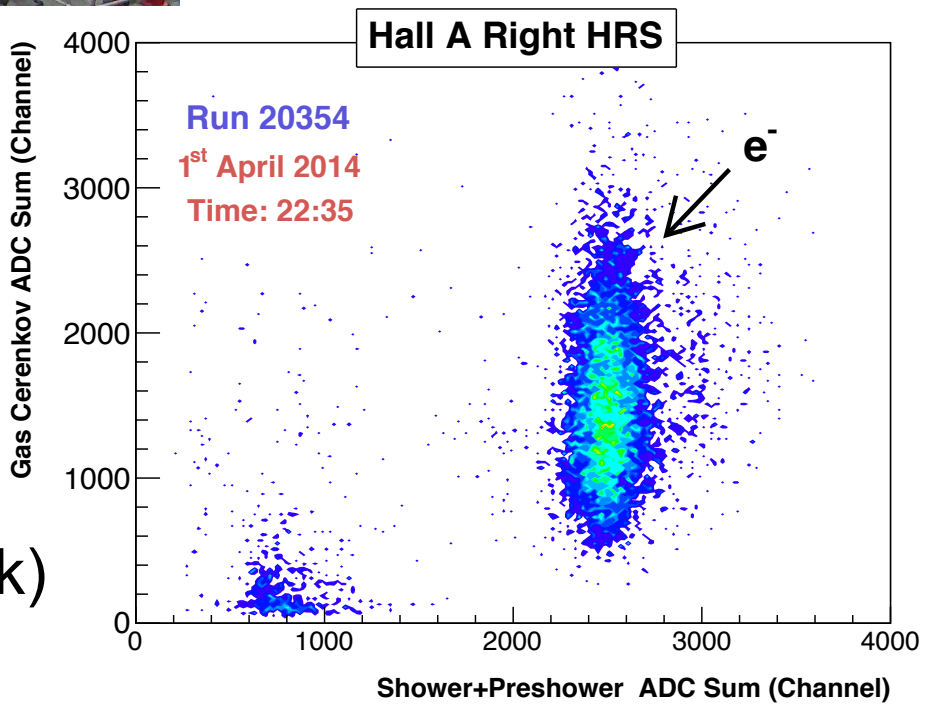




What's been happening?

- SHMS construction in Hall C (see Howard's talk)





Beam in Hall A (see Kalyan's talk)

SHMS Magnet Steel

- Most magnet steel delivered
- Assembly of magnet yokes starting soon (without SC coils)

Cryogenics

Major connections to SHMS transfer line made

HMS magnets filled with LHe.

HMS power supply checkout in progress .

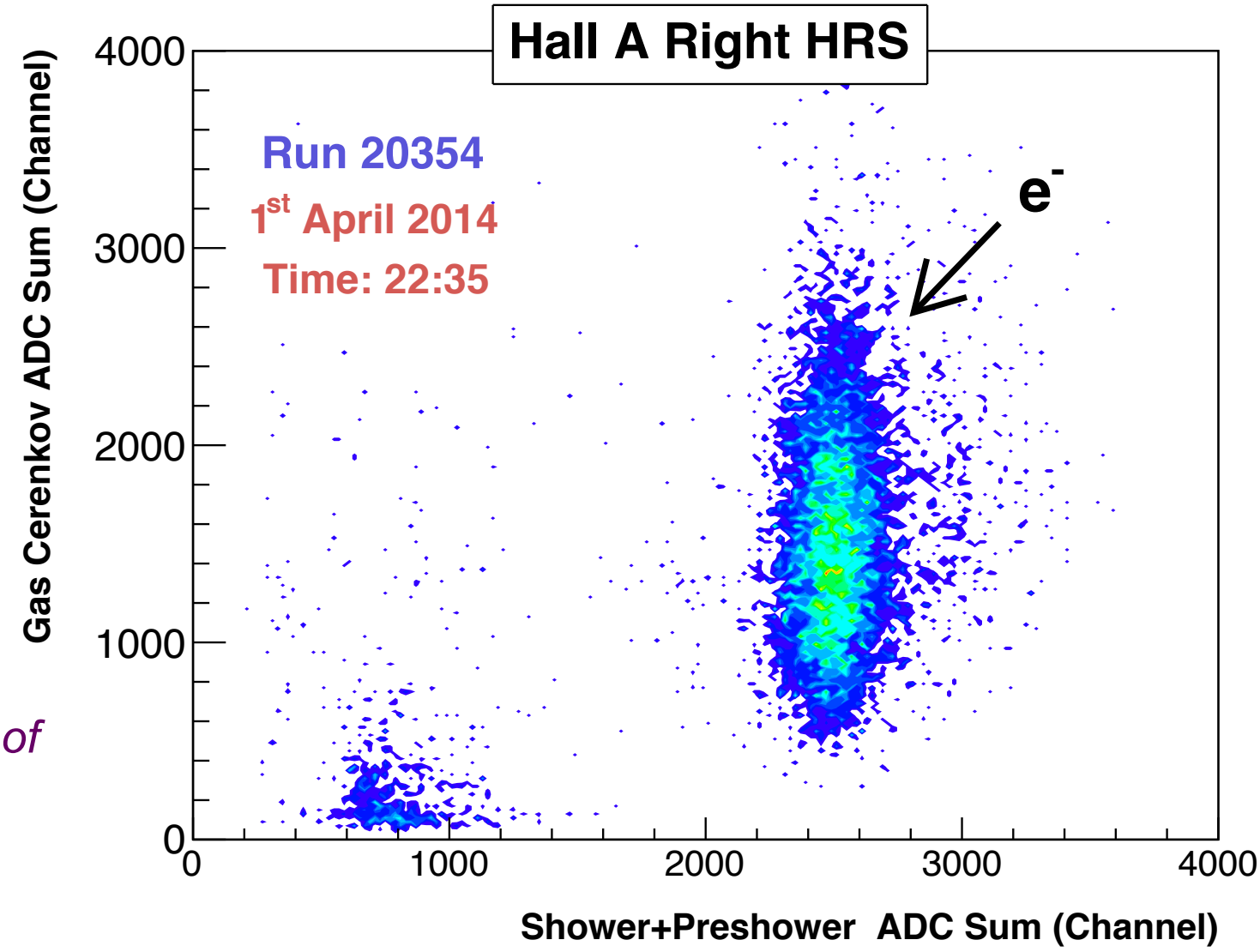
HMS dipole and Q1 to be used

First Light (electronics hut)

Goodbye to the SOS

With patching of ruts left from the rails, all traces of the Short Orbit Spectrometer are gone from the hall.

Electrons in Right HRS spectrometer at 2.0 GeV/c on carbon target *and set beam energy of 6.1 GeV!*



On JLab home page, also made DOE Office of Science "Headlines"

Hall A Base Equipment Checkout

LEFT-TO-RIGHT INCREASING PERCEIVED LEVEL OF DEMAND

	BPM and Beamline Transport including polarimeters	Raster	Beam Charge Measurement (Unser + BCM calibration)	Beam Energy Measurment (Full Arc)	HRS Spectrometer, Detector Checkout	Cryotarget Checkout	Moller Polarimetry	Beam Charge Measurement ("Ag" calo only) - not likely to use	Beam Energy Measurment (Spectrometers)	Compton Polarimetry**	Beam Energy Measurment (Single Hall Spin Dance)	First Run Physics (GMp and/or DVCS)
Point of Contact	Yves	Bob	Javier	Doug	Bogdan, John	Jian-ping	Javier	Doug	Doug, Bogdan	Sirish	Doug	Bogdan, Alexandre
BEAM PARAMETER												
Current Range	~5 - Imax uA	any	0 - Imax**** uA	~5uA*	2 - 10 or more uAmps	5, 20 - 80 or more uAmps	0.2-1uA CW	< 5uA	10 or more uAmps*	1-80 uA	> 5uA*/***	5, 20 - 50 or more uAmps
Duty Factor	pulsed/CW	CW	CW	CW**	CW	CW	pulsed/CW	CW	CW	pulsed/CW	CW	CW
Energy Range	any	any	any	any	any	6 - 11 GeV	1.1, 4.4/6.6, 11 GeV*	power limited, up to ~2 GeV only	1 - 4.4 GeV	2.2 - 11*	any	6 - 11 GeV
Polarization	N/A	N/A	N/A	N/A	N/A	N/A	polarized	N/A	N/A	polarized	polarized	50, 70 - 100%
Spot size	N/A	N/A	N/A	N/A	N/A	raster required	N/A	N/A	N/A	80 um @ CIP	N/A	N/A

blue = initial checkout on l utili





* energy lock required
** pulsed or CW for non-invasive, CW for invasive (high precision)
*** relative Compton polarimetry required at the ~1% level, Moller in addition preferred
**** lower max currents translate to increased systematic uncertainty

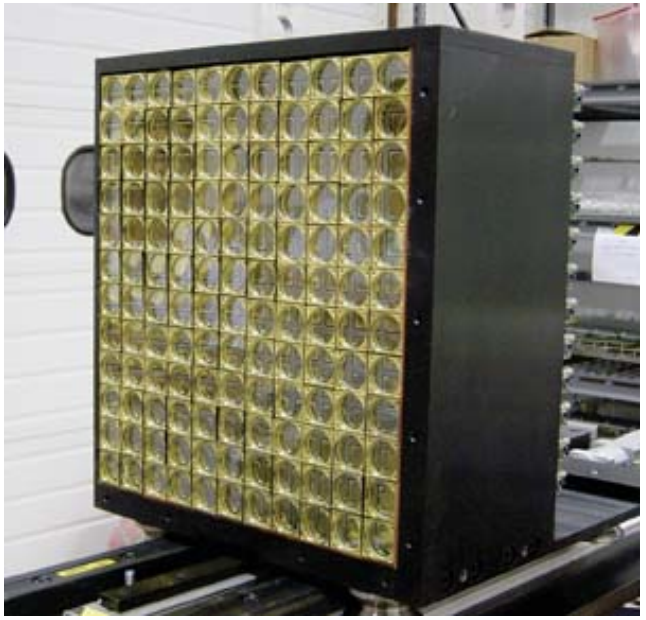
** Compton polarimetery ALSO requires (i) Comp ne orbit lock, and (ii) beam (halo) background <1000 Hz/uA in photon detector

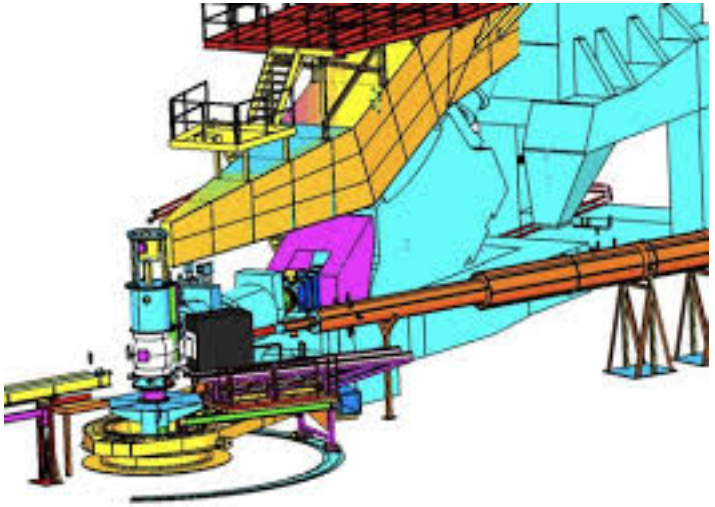
- Hall not always priority, beam delivery not constant
- Didn't achieve high current CW
- Short run
- HRS magnet troubles

- Beamline upgrade successful
- HRS Detector checkout successful
- Spectrometer optics checks
- Moller commissioned
- Cryotarget functional
- Trigger, DAQ, software up and running

Preparing for Fall 2014 Run (~mid October)

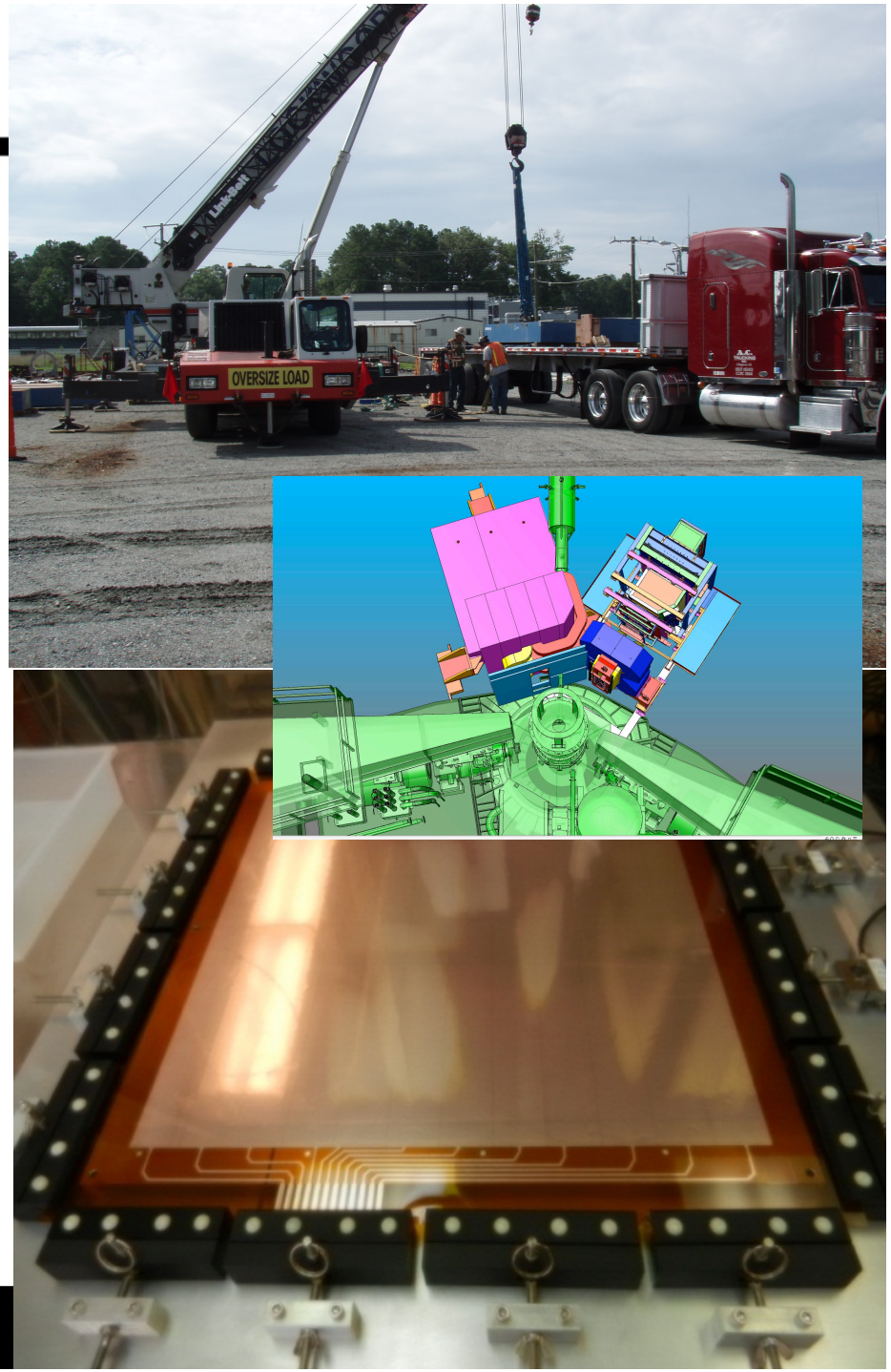
- DVCS / G_M^p Experiments
  - Successful trigger review
  - Preparing to (re)install in hall
  - New jib crane, cable runs
  - Readiness paperwork to start
  - Up to 4 pass beam, ~8 weeks
- Collaborations ready



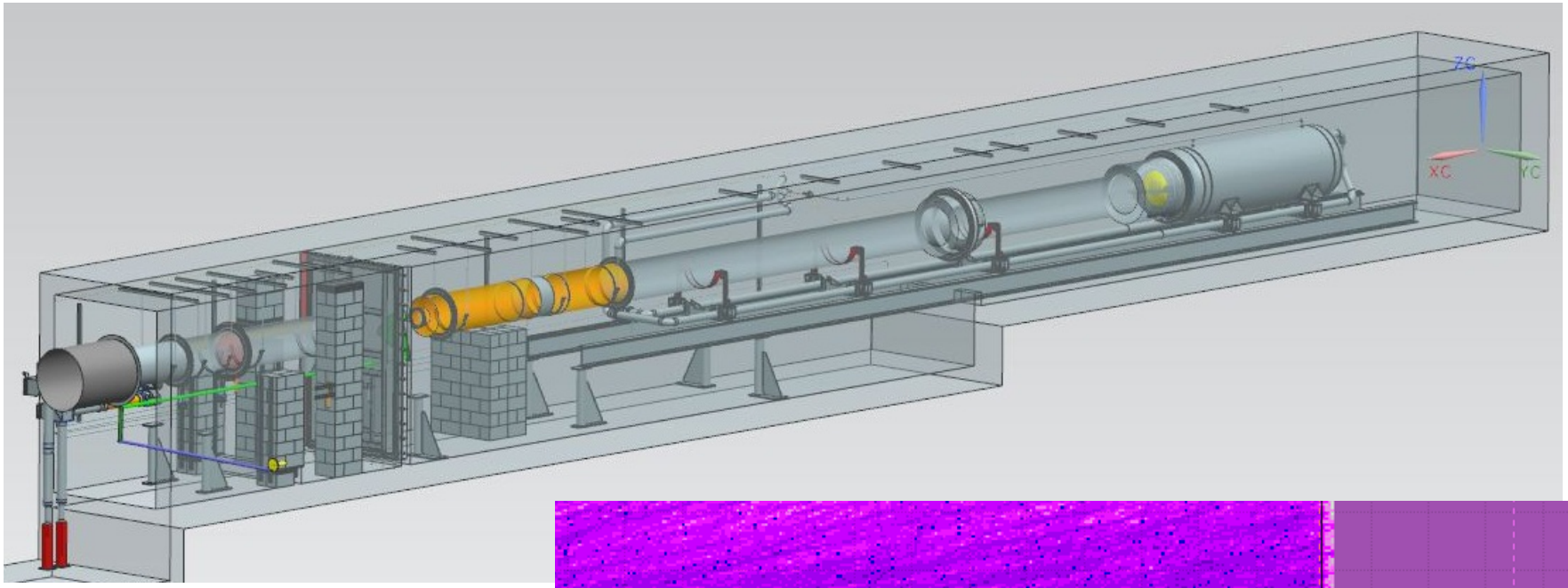


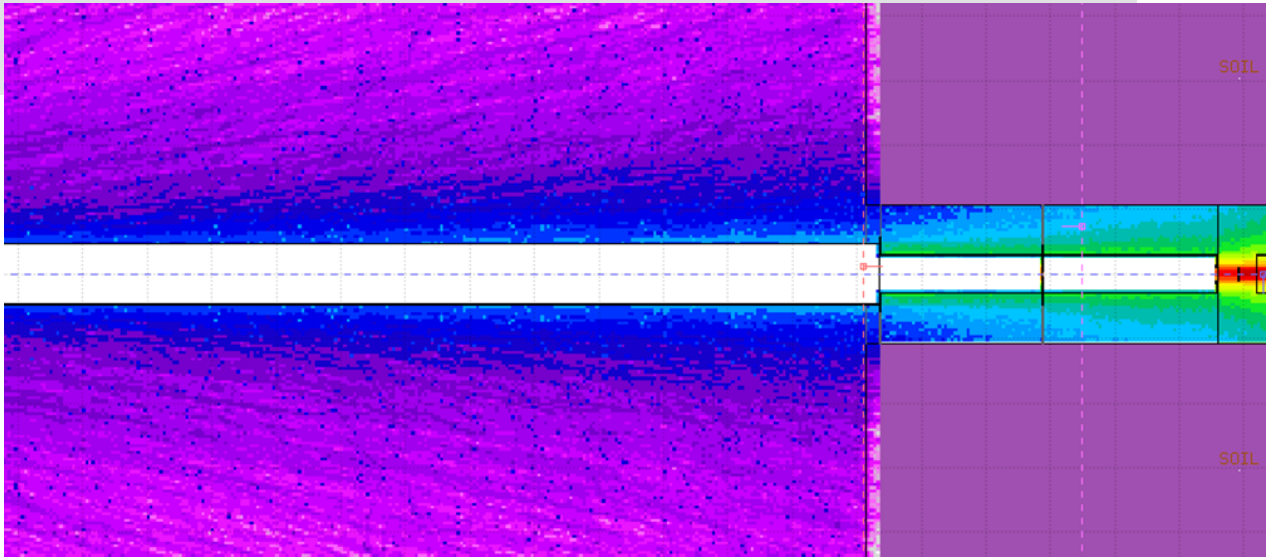
SBS Construction

- Project started October 2013
- First Annual Review November, 2013, next scheduled for November 2014
  - Some recommendations, but overall positive and on track
- Spectrometer work at Jlab
  - Power Supply to ship in June
  - 48D48 magnet steel on site, modified and painted
  - Working on support, stand, vacuum, beamline
- GEM construction at UVA
- Coordinate detector – *new!*
- HCAL Hadron calorimeter (CMU)
  - Scintillator, steel ordered
  - DAQ/tracking/electronics….
  - Test lab

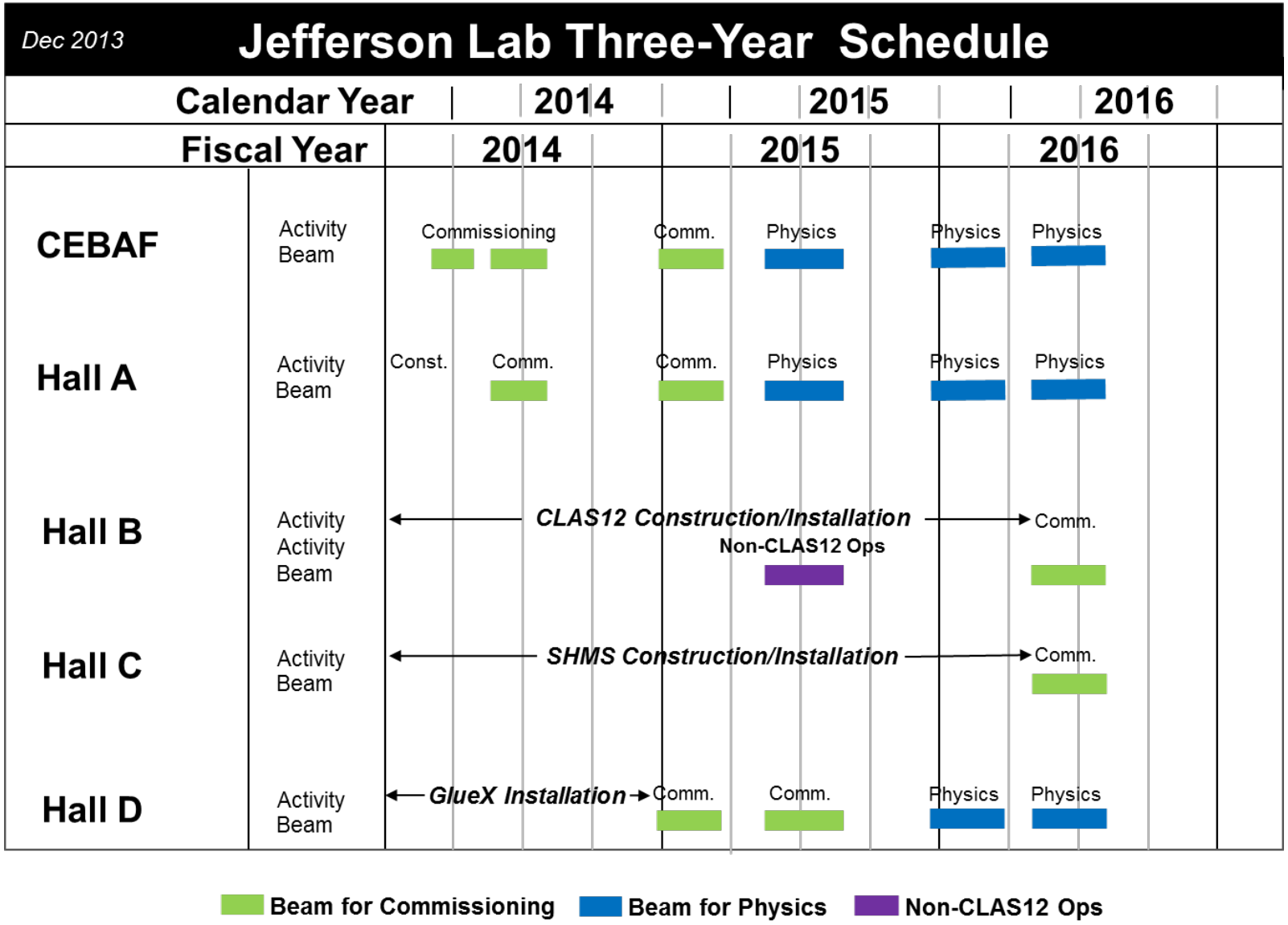


Hall A (and C) Beam Dump Upgrades





Three year plan



Approved and Conditional 12 GeV Hall C Experiments

Number	Experiment	Grade	Approved Days	Cond. Days	Non-standard Equipment
E12-06-101	Pion Form Factor	A	52		
E12-06-104	SIDIS R	A-	40		
E12-06-105	x>1	A-	32		
E12-06-121	He3 g_2	A-	29		Polarized He3 target
E12-07-105	(e,e'π) Exclusive Factorizaton	A-	36		
E12-09-011	(e,e'K) Exclusive Factorization	B+	40		
E12-09-017	SIDIS P_t	A-	32		
E12-09-002	Charge Symmetry Violation	A-	22		
E12-10-002	F2 @ large x	B+	13		
E12-10-003	d(e,e'p)	B+	21		
E12-10-008	EMC	A-	23		
E12-06-107	Color Transparency	B+	26		
E12-06-110	He3 A1n	A	36		Polarized He3 target
E12-11-002	He4(e,e'pol(p))	B+	37		FPP in HMS
E12-11-009	Neutron Form Factor	B+	50		Magnet + Neutron polarimeter
E12-11-107	EMC d(e,e' backward p)	B+	40		LAD (Hall B TOF bars)
E12-13-007	SIDIS Pi0	A-	26		Neutral Partical Spect.
E12-13-010	DVCS + Exclusive Pi0	A	53		Neutral Partical Spect.
C12-13-011	Deuteron Tensor SF b1	A-		30	Polarized ND3
			608	30	

Total Days	638	7.3 Years @ 25 Weeks/year

High Impact Experiments (PAC41)

Hall C Early running plans – Year 1

- 2016:
- Precommissioning – detector checkout
- ~25 PAC days – Commissioning "Experiment"
  - 9 days of E12-06-107 search for color transparency
  - A(e,e'p) only – "easy" coincidence measurement
  - E12-10-002 $F_2^{p,d}$ structure functions at large x
  - Momentum scans help understand acceptance
  - 2 days E12-10-108 EMC Effect
  - Integrate light nuclei with F_2 run,
  - Point target helps acceptance studies.
  - 3 days of E12-10-003 d(e,e'p)
  - If time available
  - Push to lower cross sections

Early running plan – Years 2-3

- 2017:
- E12-09-017 P_t dependence of basic SIDIS cross sections
- Push particle ID capabilities of SHMS
- E12-09-002 Precise $\pi^+\pi^-$ ratios in SIDIS – Charge Symmetry Detector efficiencies
- E12-09-011 L/T separated p(e,e′K^+) factorization test
- Easiest L/T separation

- 2018:
- Choose a “High Impact Experiment”?
- E12-06-101 Pion Form Factor (needs well understood SHMS)
- E12-06-105 x>1
- E12-06-110 A_1^n (needs high L ^{3}He)

Hall A Projected Experiment Schedule as of 12/2013

~no change

…available on Hall A wiki

	Spring	Fall	Spring	Fall	Spring	Fall	Spring
2014	DVCS –I/ GMp checkout	DVCS - I/ GMp					
2015			DVCS - I/ GMp	^{3}H/^{3}He -2 (A_1^n)			
2016					(A_1^n) (APEX) (PREX) (CREX)	PREX (APEX) (CREX) (DVCS-II)	
2017							APEX (DVCS-II) (SBS)

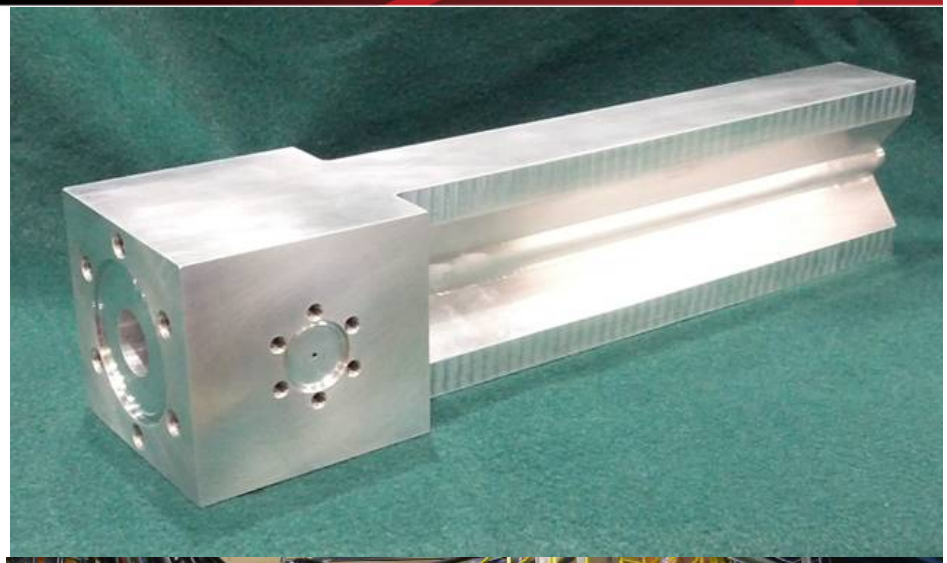
SBS

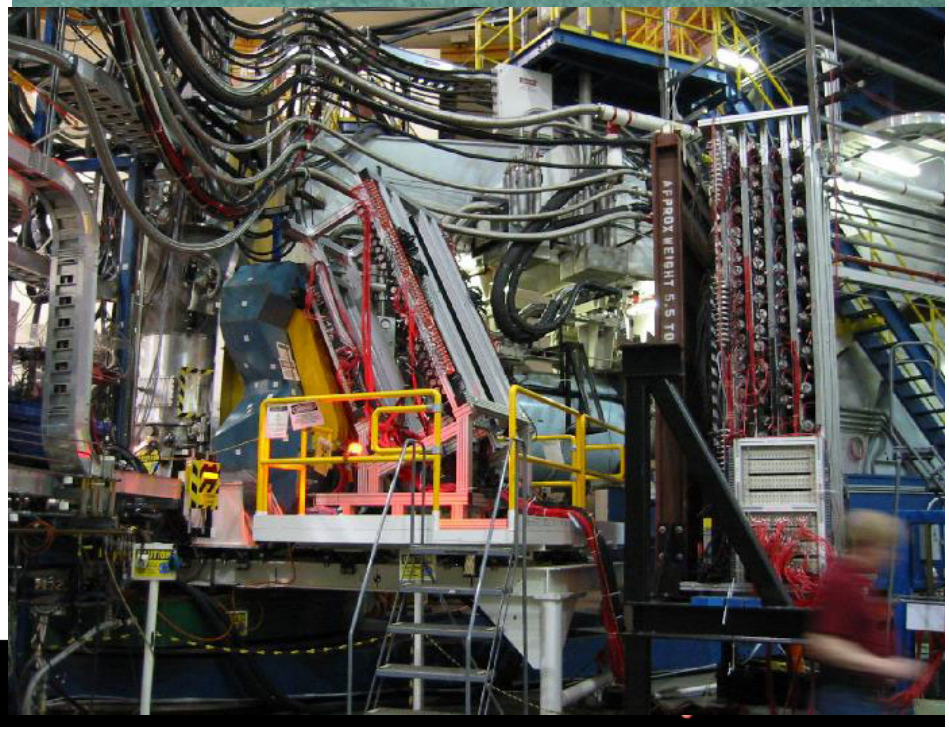
MOLLER, SOLID…?….

Experiments in parentheses represent potential schedule changes/ options – High Impact Experiments

Tritium Experiment Preparations

- BigBite under construction in test lab
  - Active collaboration
  - Design for modified Cerenkov
- Preparing for (target) readiness review
  - Visit from Savannah River experts May 18





….other…

- PREX/CREX
  - Pb targets purchased
  - Shielding designs
  - Polarimetry

also NOT a comprehensive list

- New septum magnet purchased by APEX collaboration
- Polarized ^{3}He target improvements and continued development
  - Convection, new lasers, metal windows, double cell…
- MOLLER Experiment internal experiment design and costing update in preparation for possible DOE *science* review late summer 2014
- SoLID Experiment submitted draft CDR to Physics Division as first step for late summer (?) Director's Review
  - Working with Cornell to move solenoid in 2016
  - Hall A E&D coordinating to make June planning trip

New Proposals to PAC42! 7 in A, 4 in C, 4 LOIs

12-14-003	C	Precision Measurements and Studies of a Possible Nuclear Dependence of R
12-14-004	C	Wide-angle Compton Scattering at 8 and 10 GeV Photon Energies
12-14-006	C	Wide Angle Exclusive Photoproduction of pi-zero Mesons
12-14-007	C	Initial State Helicity Correlation in Wide Angle Compton Scattering
12-14-009	A	The EMC PVDIS Experiment: A Constraint on Isovector Dependent Nuclear Modification Effects Using Parity-Violating Deep Inelastic Scattering
12-14-010	A	Measurements of Semi-Inclusive DIS Double-Spin Asymmetries on a Longitudinally Polarized 3He Target
12-14-011	A	Ratio of the electric form factor in the mirror nuclei 3He and 3H
12-14-012	A	Dihadron Electroproduction in DIS with Transversely Polarized 3He Target at 11 and 8.8 GeV
12-14-013	A	Measurement of Tagged Deep Inelastic Scattering (TDIS)
12-14-014	A	Proton and Neutron Momentum Distributions in A = 3 Asymmetric Nuclei
12-14-015	A	Measurement of the Spectral Function of 40Ar through the (e,e2p) reaction
LOI12-14-001	C	Letter of Intent: Search for Exotic Gluonic States in the Nucleus
LOI12-14-002	C	Tensor Asymmetry Azz in the x>1 Region
LOI12-14-005	C	Investigating neutral meson-nuclei bound states with coherent electroproduction of · and Æ mesons off of He4 in Hall-C
LOI12-14-006	A or C	Dark matter search in a Beam-Dump eXperiment (BDX) at Jefferson Lab
E12-11-108/E12-10-006	A	Target Single Spin Asymmetry Measurements in the Inclusive Deep-Inelastic $\vec{N}(e,e^\prime)$ Reaction on Transversely Polarized Proton and Neutron (^{3}He) Targets using the SoLID Spectrometer

We've had administrative changes…

- Jefferson Lab reduction of force and restructuring
- Hall A and C science staff are combined
  - Organizing into expertize groups that combine staff from both Halls (for instance polarimetry, detectors, beamline,…)
  - Offices all in C wing now
- New dual-hall spectrometer support group
- Engineering and technical staff remain Hall-specific

Detector construction data preservation

Wealth of information has been (presumably) generated during the construction of the SHMS, SBS, *all* detectors.

- Paper, electronic logbooks
- Q/A, test information
- Maps/element locations, serial numbers
- Spreadsheets
- Photographs
- Design reports, proposals

Needed for

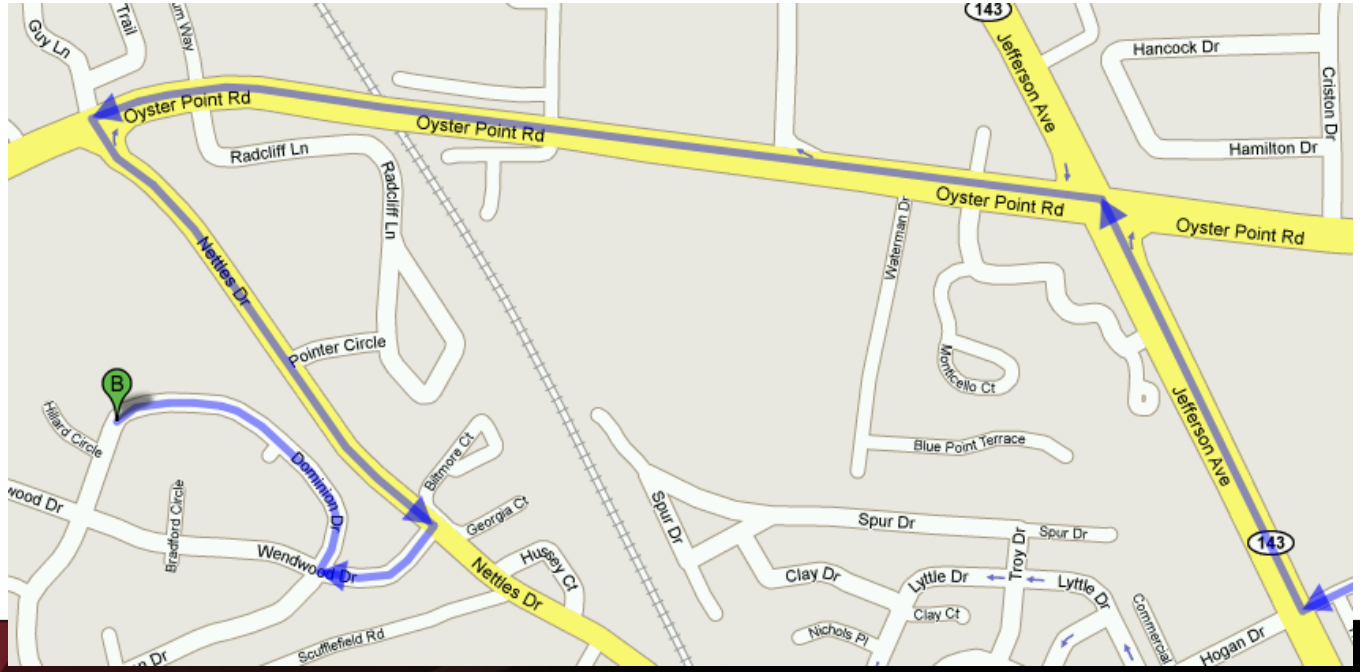
- Detector commissioning
- Data analysis
- Generation of user manuals, tech reports, NIM papers

Information should be archived at JLab. For now:

- Preserve records
- Send electronic records to SAW

Hall A/C Party

- 7PM Friday - Family and friends welcome
- 327 Dominion Drive, Newport News
  - Home of Brian and Bonni Beutner (Neighbors)
- Food provided, beer and wine welcome
- Steve - 757-593-6656, Bonni – 757-342-7852



Hall C after 12 GeV Upgrade

- Beam Energy: 2 – 11 GeV/c
- Super High Momentum Spectrometer (SHMS)
  - –Horizontal Bender, 3 Quads, Dipole
  - –P → 11 GeV/c
  - –dP/P 0.5 – 1.0x10^{-3}
  - –Acceptance: 4msr, 30%
  - –5.5° < θ < 40°
  - –Good e^-/π^- $e^+/\pi^+/K^+$/p PID
- High Momentum Spectrometer (HMS)
  - –P → 7.5 GeV/c
  - –dP/P 0.5 – 1.0x10^{-3}
  - –Acceptance: 6.5msr, 18%
  - –10.5° < θ < 90°
  - –Good e^-/π^- $e^+/\pi^+/K^+$/p PID
- Minimum opening angle: 17°

- Well shielded detector huts
- 2 beamline polarimeters
- Ideal facility for:
  - –Rosenbluth (L/T) separations
  - –Exclusive reactions
  - –Low cross sections (neutrino level)