

# Hall C: User's Meeting, Jan 07



Stephen Wood, Hall C

- \* Hall C Leader
- \* Budget and Schedule
- \* Shutdown work
- \* Infrastructure improvements
- \* Misc

# Hall C Leadership

- Rolf Ent -> Project Scientific Lead for 12 GeV upgrade
- Search committee formed to find new Hall Leader.
  - Position posted and advertised (Physics Today)
- Steve Wood appointed interim Hall Leader
- Some discussion to rotate Hall Leader between staff. eg 3 year terms

# Hall C Approved Experiment Summary



## Base Equipment Experiments (2.6 experiments, 25 days):

E04-001	Measurements of $F_2$ and $R$ on Nuclear Targets	3 days (0.6)	B+
E05-017	Measurement of Two-Photon Exchange in Unpolarized Elastic e-p Scattering	13 days	A-
E06-009	Measurement of $R = \sigma_L / \sigma_T$ on Deuterium in the Nucleon Resonance Region and Beyond	9 days	A-

## Large Installation Experiments beyond G0 (8 experiments, 204+ days):

E04-108	Measurement of $G_E^p / G_M^p$ to $Q^2 = 9 \text{ GeV}^2$	40 days	A
E04-019	Measurement of the Two-Photon Exchange Contribution in e-p Elastic Scattering Using Recoil Polar.	18 days	A-
E03-109	Spin Asymmetries on the Nucleon Experiment	27 days	A-
E04-113	Semi-Inclusive Spin Asymmetries on the Nucleon	25 days	A-
E05-101	Helicity Correlations in Wide-Angle Compton Scattering	14 days	A-
E05-008	The Qweak Experiment: A Search for Physics at the TeV Scale via a Meas. of the Proton's Weak Charge	35+ days	A
E04-110	The Neutron Electric Form Factor at $Q^2 = 4.3 \text{ GeV}^2$ from the $D(e, e'n)$ Reaction via Recoil Polarimetry	25 days	A-
E05-115	Spectroscopic Investigation of Hypernuclei in ... (II)	20 days	A-

Color coding indicates experiments using similar apparatus



# Short term schedule - 2007

Published schedule – assumes no shutdown for budget reasons:

2007:

Jan -

Mar 25 E06-008/E04-115 G0 Backward Angle 362, 687 MeV (LD2)

Mar 26/7 Facility Development for Qweak

Apr 28 E04-001  $R = \sigma_L/\sigma_T$  in A up to  $Q^2 = 4$

- E06-009  $R = \sigma_L/\sigma_T$  in D up to  $Q^2 = 4$

June 28 E05-017  $2\gamma$  Exchange in ep Rosenbluth Separation

Sep 6 -

Oct 14 E04-019  $2\gamma$  Exchange in ep Polarization Transfer

Nov 17 -

2008 E04-108  $G_e^p/G_M^p$  up to  $Q^2 = 9$  (GeP-III) (Finish early 2008)



# FY07 budget and schedule

Lab operating under FY06 budget levels with assumption that FY07 funding would eventually be passed.  $FY06 < FY05$ . If year continues with trivial continuing resolution, Lab can not maintain staff and operations. While there is some recent optimism ...

Lab priorities are to maintain staff and keep 12 GeV going

- Big cuts in capital equipment funds and operating funds
- Halt 12 GeV PED
- Shutdown beam operations end of March:
  - Resume Oct 15 or later
- If lab gets permission to redirect funds to 12 GeV
  - Further capital and operating funds cuts
- Use downtime for labor intensive maintenance and upgrades
- Some thoughts to warm machine to 300K for maintenance
  - Startup ~ Jan08

# Long term schedule assuming 6 month shutdown

2007	E04-001	$R = \sigma_L/\sigma_T$ in A up to $Q^2 = 4$ (JUPITER)	HMS
(Oct 15)	E06-009	$R = \sigma_L/\sigma_T$ in D up to $Q^2 = 4$	
2008	E05-017	$2\gamma$ Exchange in ep Rosenbluth Separation	BigCal
	E04-019	$2\gamma$ Exchange in ep Polarization Transfer	
	E04-108	$G_E^p/G_M^p$ up to $Q^2 = 9$ (Gep-III)	
	E03-109	Spin Asymmetries on the Nucleon Exp. (SANE)	BETA+PolTar
	E05-101	Helicity Correlations in Wide-Angle Compton	
2009	E05-115	Hypernuclear Spectroscopy (HKS/HES)	
	E05-008	Qweak Experiment – Installation	
2010	E05-008	Qweak Experiment – Phase I	
	E05-008	Qweak Experiment – Phase II	
2011?	E04-110	$G_E^n$ at $Q^2 = 4.3$ (8.0) from the ${}^2\text{H}(e,e'n)$ Reaction	
	E04-113	Semi-Inclusive Spin Asymmetries (semi-SANE)	
2012?		Shutdown for 12 GeV upgrade	

Schedule very packed (particularly 2008). Something probably needs to give to make this really work.

# CEBAF Energy vs Time

- Energy improvements assuming continued operation
- Max E for May-June HMS runs ~5.1-5.2.
- 5.7 GeV by Jan 08
- Plan still holds if operations shutdown in March. May even be accelerated.

Dec '06 Plan

Date	Earliest Installation	In Where	Out Where	Max 5-pass Exp Energy (GeV)
Sep-06				4.7
Jan-07	C50-1	NL05		5.1
Jul-07	Ren	NL04		5.2
Jul-07	C50-2	SL16	SL09	5.4
Nov-07	C50-3	SL09	SL04	5.6
Jan-08	C50-4	NL06	NL11	5.7
Feb-08	C50-5	SL04	SL07	5.8
Jun-08	C50-6	NL11	NL10	5.9
Oct-08	C50-7	SL07		6.0
Feb-09	C50-8	NL10		6.3
Jun-09	C50-9	SL18		6.5

Balanced linacs, **high power RF zones**

Inj = 10% of NL voltage

CMs installed in empty zones to decouple RF power prep from do

Allowance included: 5 MV eng lk, 3 cav temp off

10 MV/y degradation buttered over whole machine

15 -> 10 arc trips/hr conditions

# Long Shutdown Projects

- HMS Gep readiness
- G0 XFER line Acan repair
- Finish HMS controls upgrade
- Remove all or part of G0
  - Mag controls
  - Magnet
  - Detectors/Ferris Wheel
- Remove G0 rails
- Install Qweak rails
- Fix water leaks
- Cable and tray cleanup
- Remove SOS hydraulics
- Small jobs
- Upgrade HMS DAQ rate
- Document legacy systems in CAD
- Start beam line changes for Compton
- Remove SOS and rails entirely



# Readiness Reviews

- Safety/Readiness reviews for large installation experiments
- Thoughts/motivation
  - Review safety preparations, documentation (COO, ESAD...)
  - Is manpower adequate? (for installation, running, analysis)
  - Is there enough time to install? (Current plans -> 5 weeks)
  - Is physics optimized to available beam time
  - Identify how Hall C staff can help/be involved
- GeP-III, Gep-2gamma mini review
  - Minimal installation time if schedule shifts
- SANE/WACS
  - Polarized target
  - Minimal installation time available
  - Higher performance of BigCal, additional detectors

# 2006 Publications

## Published:

- E89-009 Hypernuclear spectroscopy using the  $(e, e'K^+)$  reaction PRC 73, 044607
- E01-004 Determination of the Pion Charge Form Factor at  $Q^2=1.60$  and  $2.45$   $(\text{GeV}/c)^2$  PRL 97, 192001
- E01-006 Proton  $G_E/G_M$  from beam-target asymmetry PRC 74, 035201
- E93-038 The ratio of proton electromagnetic form factors via recoil polarimetry at  $Q^2=1.13(\text{GeV}/c)^2$  NPA 764, 261
- E93-038 Measurements of the neutron electric to magnetic form factor ratio  $G_{En}/G_{Mn}$  via the  ${}^2\text{H}(e, e'n){}^1\text{H}$  reaction to  $Q^2=1.45$   $(\text{GeV}/c)^2$  PRC 73, 025205
- E89-008 Low-Q scaling, duality and the EMC effect PRC 73, 035205  
Radio frequency picosecond phototube NIM A566, 321

## Submitted:

- E01-006 Proton Spin Structure in the Resonance Region nucl-ex/0608003
- E93-021 Determination of the Pion Charge Form Factor for  $Q^2=0.60-1.60$   $(\text{GeV}/c)^2$  nucl-ex/0607007
- E99-118 Longitudinal Separations of Structure Functions at Low  $Q^2$  for Hydrogen and Deuterium nucl-ex/0611023
- E00-108 Onset of Quark-Hadron Duality in Pion Electoproduction PRL 98, 022001

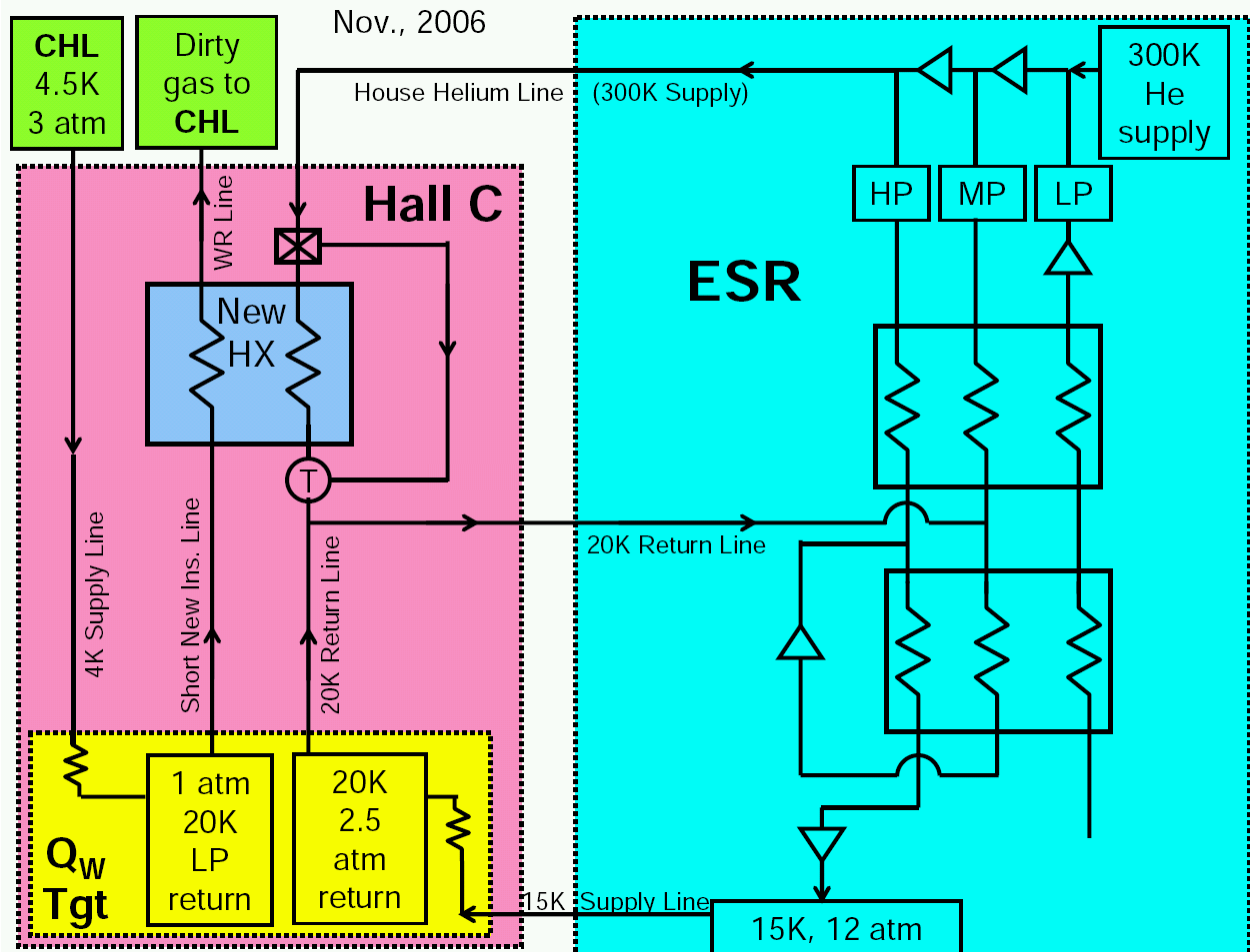
# Hall C Infrastructure improvements

- Overhaul of HMS hodoscopes
  - Replaced all tubes+bases
  - Checked light guide joints
- New magnet power supplies ordered. For specific experiments, but will increase flexibility for other uses:
  - HKS Splitter PS.
    - 150V, 1125A
    - Delivery 1-2 months
  - Qweak main magnet PS.
    - 170V, 9600A
    - Delivery to Bates in  $\sim 1$  month for testing

# Infrastructure -Portable Heat Exchanger

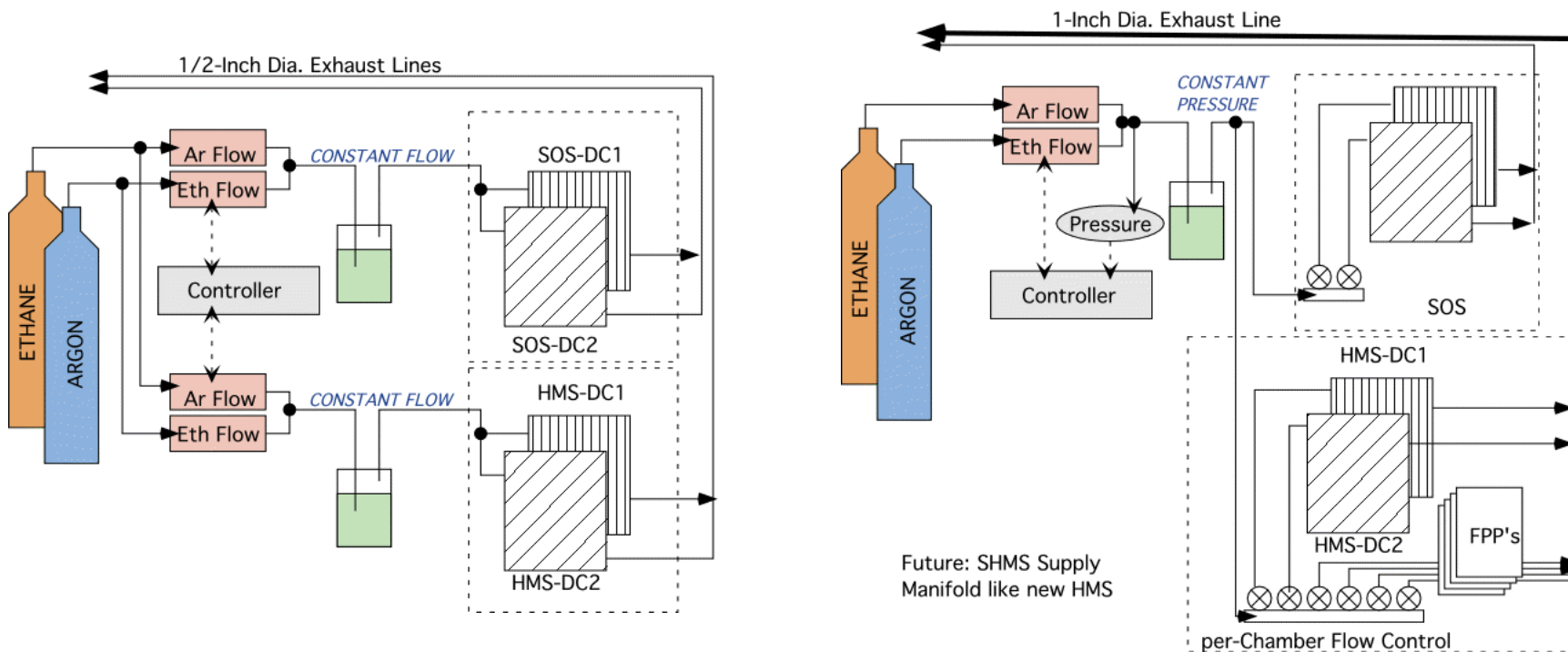
- High power target experiments need extra cooling from CHL
- Return gas warmed to 300K with heat exchanger (vaporizer)
  - Wastes power
  - HX Ices up

- New portable heat exchanger under construction (1yr)
- Recover wasted cooling power to ESR
- Saves \$, increases uptime, easier high power target running
- Qweak, Prex, Happex 3



# Infrastructure - Hall C Gas System Upgrade

- New mixing valve and controller
- Increases flow capacity: HMS, FPP (in HMS), SHMS, SOS
- Pressure regulated flow to hall.
- Independent flow rate control for each detector volume
- Upgraded exhaust line



# Misc

- Discussion tomorrow: Upcoming experiment needs
- Hall C Steering committee 2007: Garth Huber (chair, Regina), Sam Danagulian (NCA&T) , Haiyan Gao (Duke), Julie Roche (OU).
- Thesis database. Needs updating.  
[http://www1.jlab.org/ul/generic\\_reports/thesis.cfm](http://www1.jlab.org/ul/generic_reports/thesis.cfm)
- Neat web stuff:
  - Hall C Calendar: Google public calendar
    - “Hall C Calendar” link in hclog.
    - Search in “Hall C” in google public calendar
  - Hclog Mobile Edition:
    - Read logbook on web enabled phones
    - <http://hallcweb.jlab.org/hclog/hclog.php>
    - Contact me if not Sprint
- Party Friday at traditional location

