

Hall A Update

Thia Keppel



Hall A Projected Experiment Schedule, 10/2017 (last SoLID meeting)

	Spring	Fall	Spring	Fall	Spring	Summer	Spring
CY 2017	Ar(e,e'p)	$^3\text{H}/^3\text{He}$ group*					
CY 2018			$^3\text{H}/^3\text{He}$ group	$^3\text{H}/^3\text{He}$ group			
CY 2019					<u>TBD:</u> APEX PREX ₂ CREX	- ??? -	<u>TBD:</u> APEX PREX ₂ CREX

Added run period

- additional experiment approved
- *Fall 2017 run shortened to ~2 weeks

Schedule uncertain

SBS 2019? 2020?
MOLLER, SoLID →

Experiments in red represent PAC42 "high impact" experiments

Hall A Projected Experiment Schedule, current

(see https://www.jlab.org/exp_prog/experiment_schedule/2017/20170914.1_ExpSch.pdf through 12/19)

	Spring	Fall	Spring	Fall	Spring	Summer	Fall
CY 2017	Ar(e,e'p)	$^3\text{H}/^3\text{He}$ group*					
CY 2018			$^3\text{H}/^3\text{He}$ group	$^3\text{H}/^3\text{He}$ group			
CY 2019					APEX	PREX ₂	CREX

SBS 2020

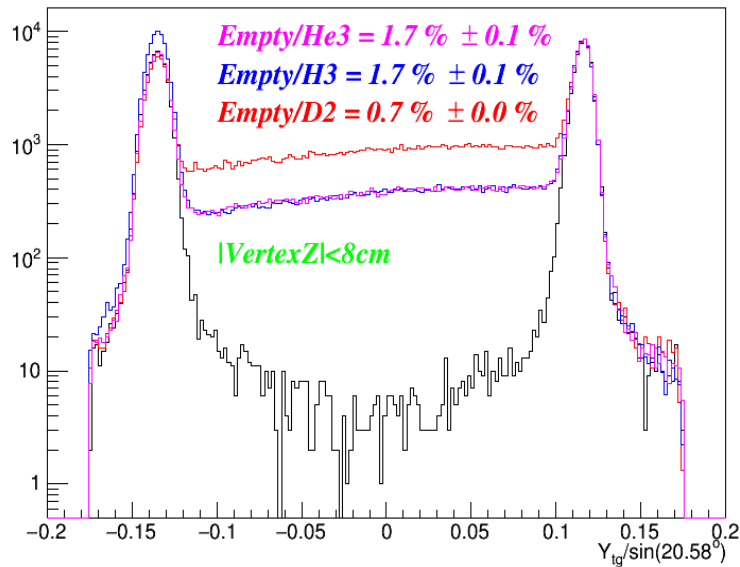
MOLLER, SoLID to follow

*Very brief physics run (~couple days only)

Experiments in red represent PAC "high impact" experiments

Tritium Experiment Run Group

- ***Five*** experiments approved by PAC 42, ***3*** “high impact”
- (Many!) graduate students
- ***First run successful***
 - ✓ Completed MARATHON experiment
 - ✓ Completed exclusive SRC experiment



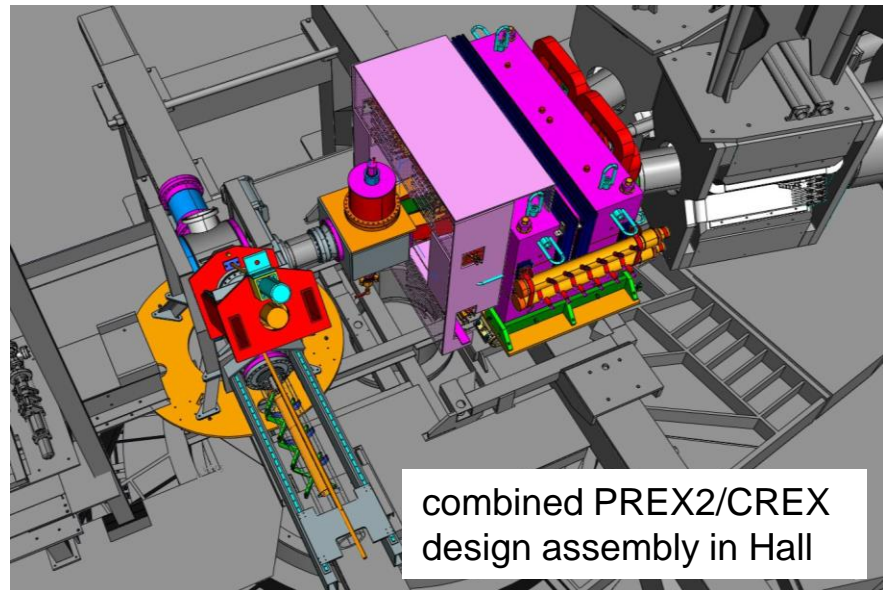
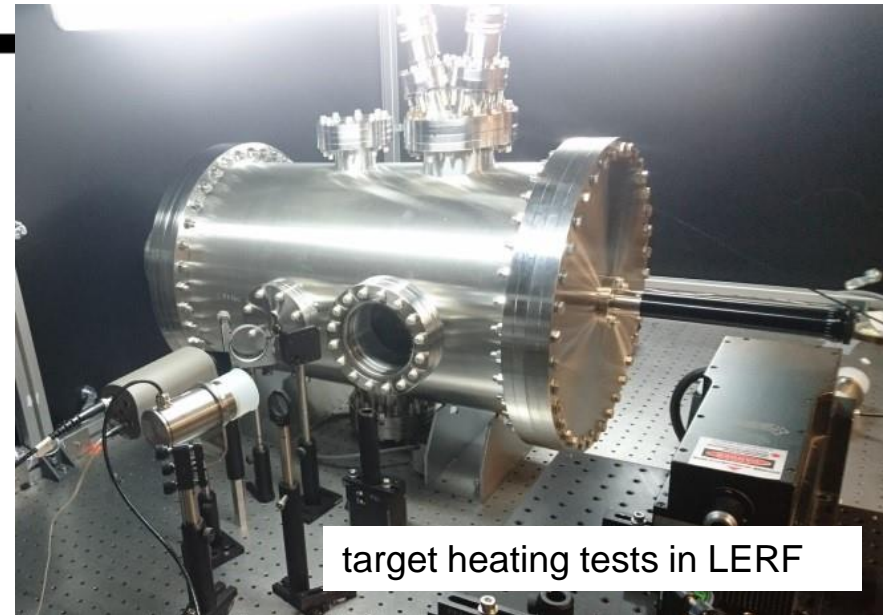
2019 Run Preparations

APEX

- The septum magnet is in the Hall, ready to install vacuum channels and field test.
- Nearly all equipment on site
- Target construction underway
- *Looking towards February 2019 run (but only 2.2 GeV)*

PREX2/CREX

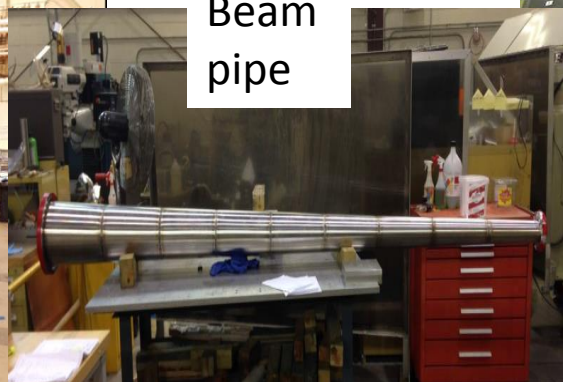
- Combined target chamber, new target position
- Will require beam dump modifications, substantial shielding (in design)
- Design and engineering for all components
- Computation fluid dynamics for target design, target heating tests
- Polarimetry – Moller now removed from Hall for upgrades
- Regular parity quality beam meetings
- *Looking towards Summer 2019 run*



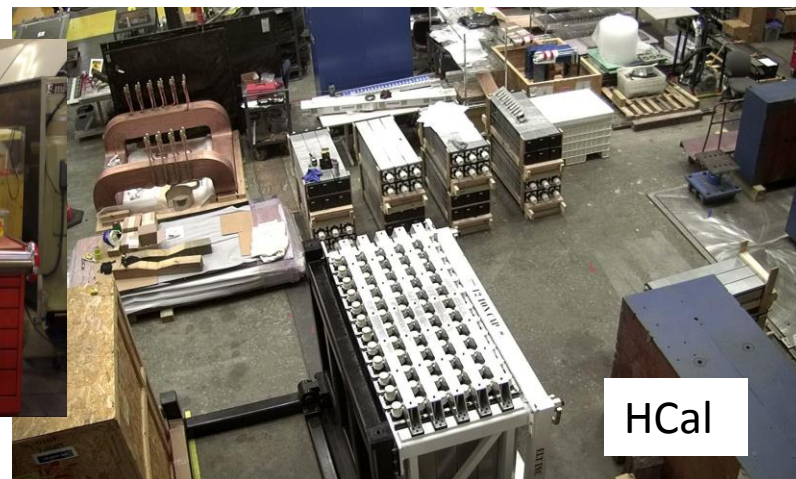
2020(!): All Major SBS Components Now at JLab – *time to integrate, test!*



Counterweight on floor plates



Beam
pipe



HCal

..*and more!*



Coordinate Detector



GEM BT Modules



GRINCH

JLab SBS Activities

- *Currently:*
 - Supporting HCal, GEM, CDet tests and development
 - Investigating HCal floor plates, movement
 - Testing beamline assembly
 - ECal stand and heating/cooling engineering
- DAQ development
- Project Management
 - Quarterly Reporting to DOE/NP on progress on dependencies.
- Developing high power cryotarget (MOLLER, SoLID and GEp)
- BigBite
 - Assembly and Integration
 - GRINCH support
- *And more...*

But Wait...
**THERE'S
MORE!**

Polarized ^3He Target Development

- **Improvements and continued development**

- Two capital equipment projects

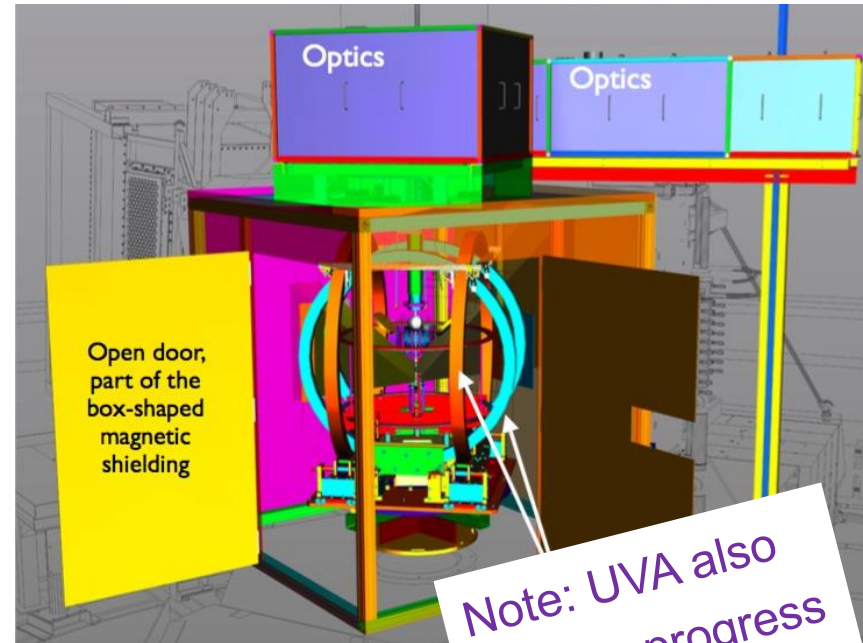
- Phase I upgrade of existing target

- Implementable in either Hall
 - 40 cm convection cell

Phase I to be installed in Hall C for A1n/d2n run Fall 2019

- Phase II (SBS GEn type) design frozen as of Summer 2016

- Convection cell
 - Dual pumping
 - 60 cm
 - Metal end windows for high current



Note: UVA also making progress on cell development!



Near term schedule take-aways for SoLID....

- The Hall team is very busy this year, and in the time leading up to SBS installation...
 - Small bandwidth for future-related engineering and design tasks
 - This summer will be last calm(ish) time for technical team before aggressive (de)installation cycle has priority
 - Lab physics staff heavily involved in running experiments

Planning for Sustainable Long-term CEBAF Operation

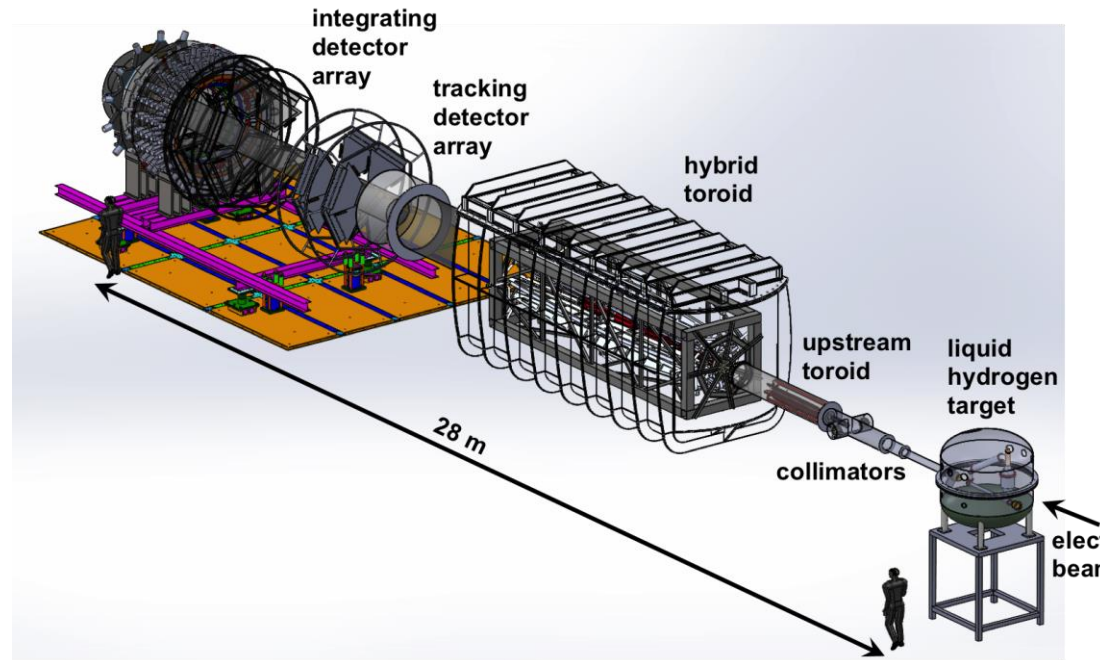
- While 12 GeV Upgrade Project provides important capabilities for the future, many components and systems are “original equipment”
 - Some are difficult to maintain, require adequate spare parts, will reach obsolescence
- We have developed a “CEBAF Performance Plan” to improve reliability and energy reach in the accelerator
 - Planning like a Project, with A. Freyberger as Project Director, R. Michaud as Manager
- We are funding a significant investment in CEBAF performance in FY18, and are planning for the FY19-21 timeframe
 - Scale of investment is ~\$5M assuming flat funding in FY18
 - Focus on critical spares, spare klystrons, obsolescence and energy reach
 - Enabled in part by remaining 12 GeV Project contingency
- We received funding in FY17 for a new 2K cold-box to remedy CHL1 severe long-term vulnerability
- ESR2: taking a double-pronged approach:
 - Preparing an SLI request for ESR-2
 - Considering what cryogenics we could provide in various ESR and CHL configurations, and what target power(s) can be sustained
 - Dave Kashy is the Physics Cryogenic Coordinator

Slide from R. McKeown, MOLLER
collaboration meeting January 2018

✓ Underway

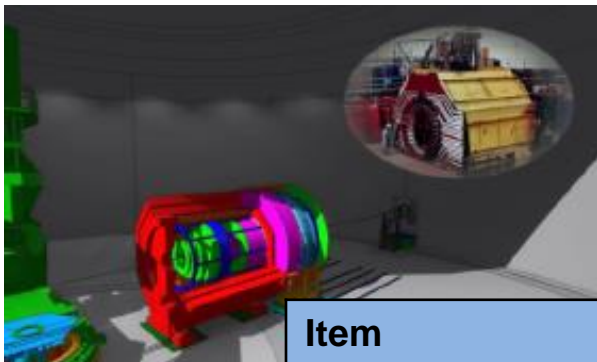
MOLLER Status/Timeline

- 2014: DOE Science Review, Strong Endorsement
- December 2016: Director's Technical Cost and Schedule Review
 - "scientific case ... remains as strong as ever", "...Committee finds that the substantial progress since the last Director's Review suggests that the experiment is ready to move to the next stage"*
- **CD-0 achieved on Dec. 21, 2016 with caveat that project is "paused"**
- Work proceeding to address recommendations from 12/16 Director's Review
- Pre-R&D continues to refine design choices and reduce risk
 - Project management organization
 - Spectrometer magnet and collimator systems conceptual design, coil prototyping
 - Radiation shielding optimization
 - Continued detector development
 - Parity quality beam working group with parasitic studies
 - High power target development



SoLID Timeline Overview

Proposed QCD & Fundamental Symmetries MIE



Unique Capability:

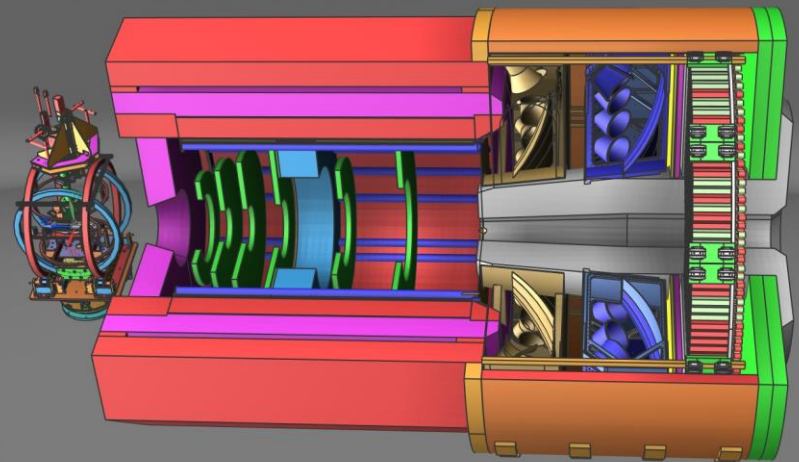
- ✓ High luminosity (10^{37-39})
- ✓ Large acceptance detector with full ϕ coverage

Item	Date
Director's Review	February 2015
SoLID User Meeting with DOE/NP	November 2015
Director's Review Recommendations affecting science reach; progress: simulations of core measurements, DAQ rate capability, detector/magnet integration	February 2016
CLEO-II Magnet Disassembly at CESR	Summer 2016
Follow-Up Director's Review	Late 2016
Draft MIE Submission – proposed	February 2017
DOE/NP-led Science Review – proposed	Spring 2017
Annual Budget Briefing – proposed budget profile	February 2018
MIE Start - proposed	FY2020



SoLID at JLab

- Engineering and design (see Robin's talk)
- Magnet testing (P. Brindza et al)
 - Looking towards cold test
 - Will begin purchasing instrumentation and controls (reduce highest schedule risk)
- Data acquisition (see Alex's talk)
 - Also high rate GEM test stand (TDIS+, E. Jastrzembski)
- Slow controls (see Brad's talk)
- Software development (see Ole's talk)
- Polarized ^3He target development
- Polarimetry
- Regular parity quality beam meetings
- Magnetic field analysis (Jay)
- Project planning



Overall, the Hall Outlook is Highly Positive!



- The accelerator is running 4 Halls at 5 pass.
 - 5(.5) pass beam – at high(ish) current in A/C – delivered to 4 Halls
- We have electrons on a tritium target!
- We are preparing for APEX/PREX2/CREX running
- SBS – all experiments and equipment - are on track
- MOLLER and SoLID also progressing

Thanks

