



News from the Lab

Patrizia Rossi

Deputy Associate Director Experimental Physics Division

JLUO April APS Satellite Meeting

April 4, 2024

JLab's Science and Technology Mission



Physics at CEBAF

- Vibrant physics research program at the **luminosity frontier** aiming at high precision pictures of the quarks and gluons dynamics in the non-perturbative regime
- 12 GeV scientific program in full swing
 - MOLLER Project progressing well
 - Kaon Long Facility in progress
 - SoLID from proposal to project
- Developing CEBAF upgrade paths including positrons and energy doubling

Electron-Ion Collider

- Partnering with BNL in the management, design, and construction of the Electron-Ion Collider Project
- Leadership in EIC scientific program
- Leadership of the Generic EIC-related Detector R&D Program

Computational & Data Science

- Hub for the new scientific user facility specializing in advanced infrastructure for data-intensive science (HPDF)
- Beginning HPDF activities in partnership with LBNL

Applied Research & Technology

- R&D in accelerator, detectors and applications in nuclear imaging and medicine
- Advanced detector development (MPGD)

JLab Nuclear Physics Future Aligned with the FY23 LRP

- Nuclear Physics future
 - Run the 12 GeV program (1st Recommendation in FY23 LRP)
 - Execute SoLID (4th recommendation)
 - Contribute to EIC (3rd recommendation)
 - Plan for e+ and 22 GeV (in the text)
 - Build an EIC research program
 - Advanced detector development (MPGD Center)

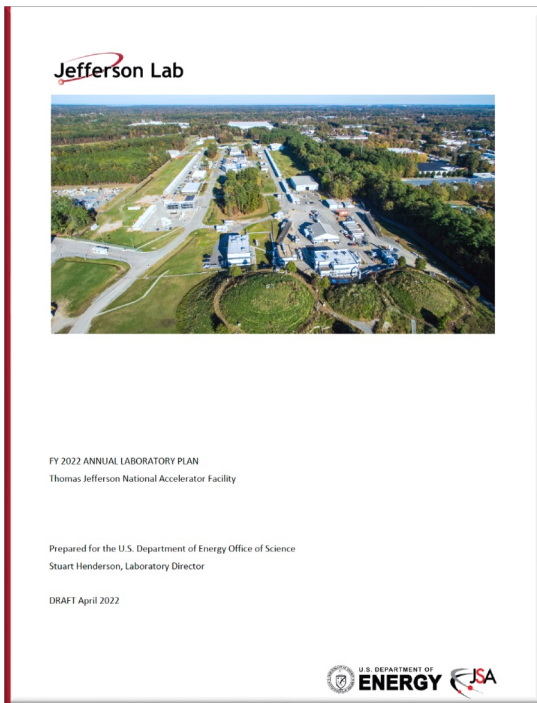
I: The highest priority of the nuclear science community is to capitalize on the extraordinary opportunities for scientific discovery made possible by the substantial and sustained investments of the United States. We must draw on the talents of all in the nation to achieve this goal.

III: We recommend the expeditious completion of the EIC as the highest priority for facility construction.

IV: We recommend capitalizing on the unique ways in which nuclear physics can advance discovery science and applications for society by investing in additional projects and new strategic opportunities.

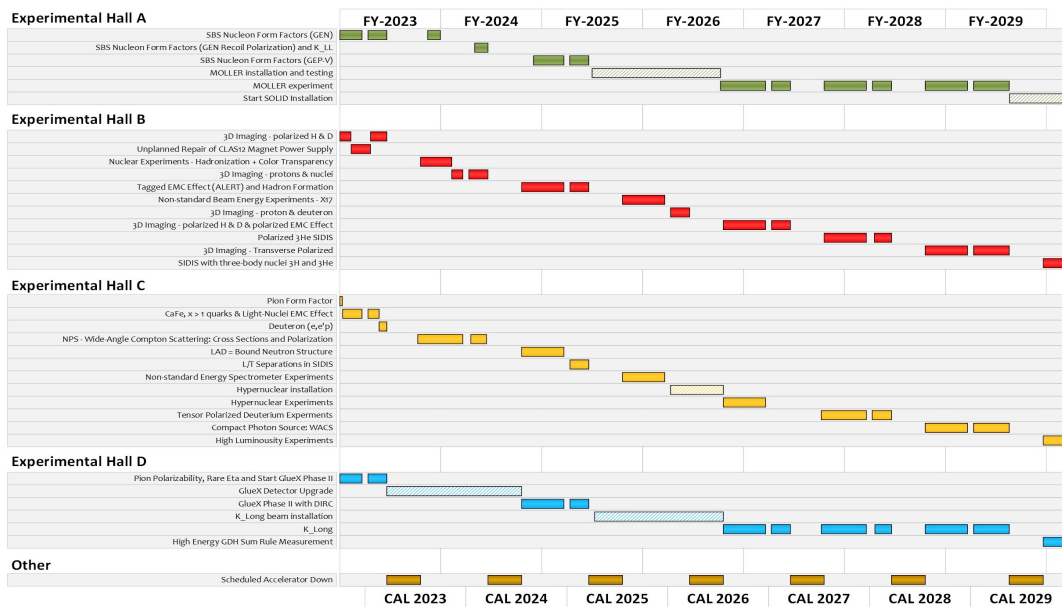
Upgrades to CEBAF mentioned in document text.

Annual Laboratory Plan



- A **strategic planning** activity spanning 10 years
 - Define an exciting, yet realistic, long-range vision for the future of the lab and the S&T conducted on behalf of the Department.
- Provides the **starting point** for a discussion between the DOE leadership and the lab about future directions, strengths and weaknesses, immediate and long-range challenges, and resource needs.
- JLab Nuclear Physics Future Aligned with the FY23 LRP

Extended Experimental Schedule – less certain! In planning



NP Experiment Scheduling Committee

<https://www.jlab.org/physics/experiments/NPEScommittee>

Deputy Director for Research	David Dean
Physics Division AD	Thia Keppel
Physics Division Deputy AD	Patrizia Rossi
Physics Operations Director (chair)	Douglas Higinbotham
Halls A & C Leader	Mark Jones
Hall B Leader	Patrick Achenbach
Hall D Leader	Eugene Chudakov
Accelerator Division Deputy AD	Mike Spata
Director of Accelerator Operations	Eduard Pozdeyev
Center for Injector Studies Leader	Joe Grames

Developed assuming optimal weeks of operation (34)

- **FY24:** substantial budget reduction, funded only 27 weeks of Operation.
 - However, we will continue the spring run as planned through May 20 (30 weeks). The lab had to evaluate what to sacrifice to make this happen and get DOE approval.
 - The start of the fall run after the summer SAD will be delayed, it will not be on Sep 1st, likely later than October 1st (date TBD).
- **FY25:** most likely 27 weeks of Operation

Scheduling and Accelerator Status

Date	Weekday	(Gev/pass)	Operations Status	Hall A Experiment	Hall A GeV/NA/Pe/Meiz	Hall B Experiment	Hall B GeV/NA/Pe/Meiz	Hall C Experiment	Hall C GeV/NA/Pe/Meiz	Hall D Experiment
4/1/24	Monday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
4/2/24	Tuesday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
4/3/24	Wednesday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
4/4/24	Thursday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
4/5/24	Friday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	Pass change		OFF
4/6/24	Saturday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/7/24	Sunday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/8/24	Monday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/9/24	Tuesday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/10/24	Wednesday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/11/24	Thursday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/12/24	Friday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/13/24	Saturday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/14/24	Sunday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/15/24	Monday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/16/24	Tuesday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/17/24	Wednesday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/18/24	Thursday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/19/24	Friday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/20/24	Saturday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/21/24	Sunday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/22/24	Monday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/23/24	Tuesday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/24/24	Wednesday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/25/24	Thursday	2.1	Physics	E12-17-004	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/26/24	Friday	2.1	Physics	Commissioning	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/27/24	Saturday	2.1	Physics	Commissioning	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/28/24	Sunday	2.1	Physics	Commissioning	4.3/40/p/500	Run Group E	10.5/2000/500	NPS Group	8.4/50/p/500	OFF
4/29/24	Monday	2.1	Physics	Pass change		Run Group E	10.5/2000/500			OFF
4/30/24	Tuesday	2.1	Physics	E12-20-008	6.4/10/p/500	Run Group E	10.5/2000/500			OFF
5/1/24	Wednesday	2.1	Physics	E12-20-008	6.4/10/p/500	Run Group E	10.5/2000/500			OFF
5/2/24	Thursday	2.1	Physics	E12-20-008	6.4/10/p/500	Run Group E	10.5/2000/500			OFF
5/3/24	Friday	2.1	Physics	E12-20-008	6.4/10/p/500	Run Group E	10.5/2000/500			OFF
5/4/24	Saturday	2.1	Physics	Install		Run Group E	10.5/2000/500	Pass change		OFF
5/5/24	Sunday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/6/24	Monday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/7/24	Tuesday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/8/24	Wednesday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/9/24	Thursday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/10/24	Friday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/11/24	Saturday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/12/24	Sunday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/13/24	Monday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/14/24	Tuesday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/15/24	Wednesday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/16/24	Thursday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/17/24	Friday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/18/24	Saturday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/19/24	Sunday	2.1	Physics	Install		Run Group E	10.5/2000/500	NPS Group	6.3/50/p/500	OFF
5/20/24	Monday									
9/1/24										

END of RUN as planned
NO more valid

Two accelerator "down" last Month

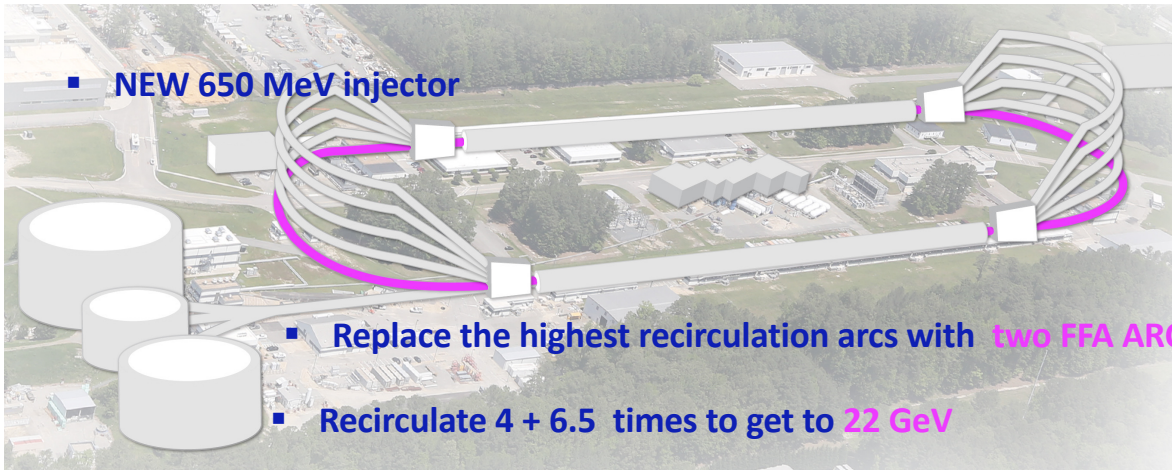
- On March 16 while reconfiguring run from Hall D to Hall B there was a beam strike event. The beam hit the vacuum chamber and had vacuum leak event.
- CEBAF has been down from March 21 to April 1 (beam for physics on April 3) due to the North LINAC spreader magnet vacuum event. The spreader magnet with the new vacuum chamber has been replaced. Investigation uncovered a malfunction at injector, Pockels Cell shutter had a mechanical malfunction.

JLab Program Advisory Committee

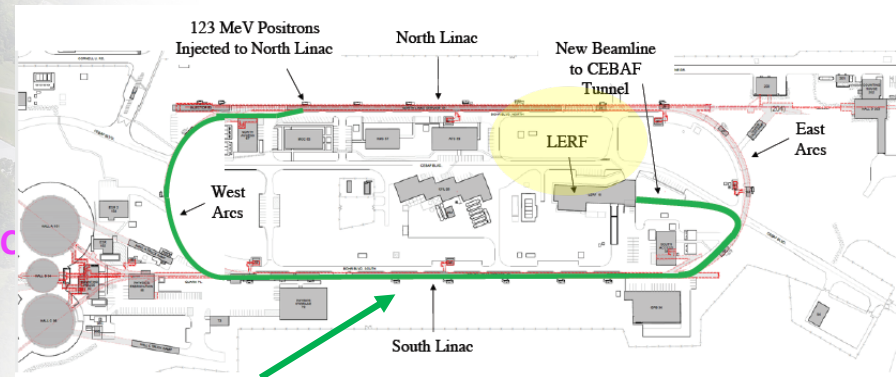
- PAC52 will be held during the week of July 8-12, 2024
- The deadline for submission of proposals and updates is 9:00 a.m. EDT (Eastern Daylight Time) on Monday, May 1st, 2024.
- Hall Experiments not reviewed by the PAC in over three years and not on the upcoming Jefferson Lab schedule can undergo **Jeopardy review**. This year's focus is on Hall B's run groups **A, B, C, G, H, and I**. Run groups I, C, B, and A, having received some beam time, should present results, while G and H should provide updates on new targets and scientific progress.
- Committee Member Changes:
 - New Incoming Chair (one year overlap, Markus Diehl still Chair) Pasquale DiNezza (INFN)
 - Also Krešimir Kumerički (University of Zagreb), Cynthia Hadjidakis (Université Paris-Saclay/CNRS)



CEBAF Upgrades: 22 GeV & Positron @ 12 GeV



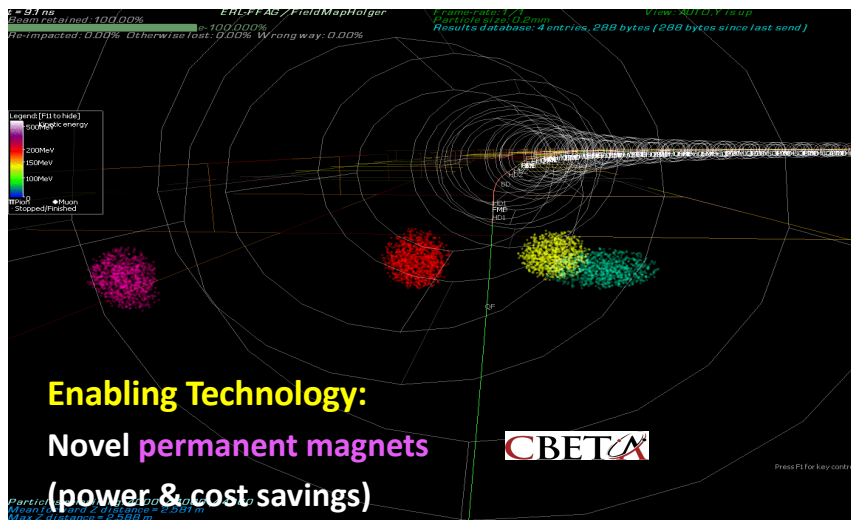
Electron/positron injector vault



• ‘Green beamline’: cost-effective option for staging positron and energy upgrades:

- 123 MeV e⁺ for 12 GeV CEBAF
- 650 MeV e⁻ for 22 GeV CEBAF

- Dedicated R&D programs to:
 - add a positron source capable to produce 100 nA polarized and 1 μA unpolarized positron beams.
 - Test FFA magnet prototype at CEBAF



CEBAF Upgrades

CEBAF @ 22 GeV

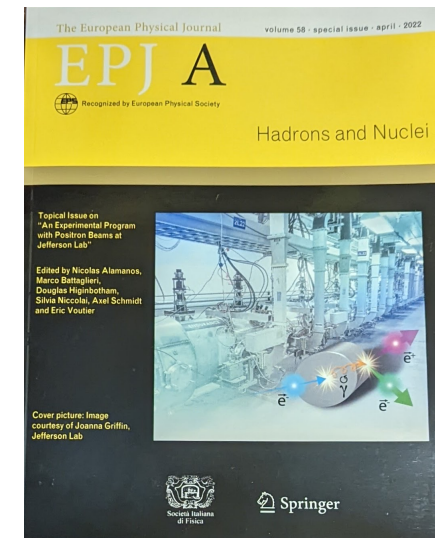
Cornell University
Accepted for publication in EPJA
We gratefully acknowledge member institutions

arXiv > nucl-ex > arXiv:2306.09360
2306.09360 [nucl-ex] 444 authors

Nuclear Experiment
[Submitted on 13 Jun 2023 (v1), last revised 24 Aug 2023 (this version, v2)]
Strong Interaction Physics at the Luminosity Frontier with 22 GeV Electrons at Jefferson Lab

A. Accardi, P. Achenbach, D. Adhikari, A. Afanasev, C.S. Akondi, N. Akopov, M. Albaladejo, H. Albataineh, M. Albrecht, B. Almeida-Zamora, M. Amarian, D. Androic, W. Armstrong, D.S. Armstrong, M. Arratia, J. Arrington, A. Asaturyan, A. Austregesilo, H. Avagyan, T. Averett, C. Ayerbe Gayoso, A. Bacchetta, A.B. Balantekin, N. Baltzell, L. Barion, P. C. Barry, A. Bashir, M. Battaglieri, V. Bellini, I. Belov, O. Benhar, B. Benkel, F. Benmokhtar, W. Bentz, V. Bertone, H. Bhatt, A. Bianconi, L. Bibrzycki, R. Bijker, D. Binosi, D. Biswas, M. Boer, W. Boeglin, S.A. Bogacz, M. Boggione, M. Bondi, E.E. Boos, P. Bosted, G. Bozzi, E.J. Brash, R. A. Briceño, P.D. Brindza, W.J. Briscoe, S.J. Brodsky, W.K. Brooks, V.D. Burkert, A. Camsonne, T. Cao, L.S. Cardman, D.S. Carman, M. Carpinelli, G.D. Cates, J. Caylor, A. Celentano, F.G. Celiberto, M. Cerutti, Lei Chang, P. Chatagnon, C. Chen, J-P Chen, T. Chetry, A. Christopher, E. Christy, E. Chudakov, E. Cisbani, I. C. Cloët, J.J. Cobos-Martinez, E. O. Cohen, P. Colangelo, P.L. Cole, M. Constantinou, M. Contalbrigo, G. Costantini, W. Cosyn, C. Cotton, A. Courtoy, S. Covrig Dusa, V. Crede, Z.-F. Cui, A. D'Angelo, M. Döring, M. M. Dalton, I. Danilkin, M. Davydov, D. Day, F. De Fazio, M. De Napoli, R. De Vita, D.J. Dean, M. Defurne et al. (344 additional authors not shown)

CEBAF @ 12 GeV
With a Positron Beam



- Programs developed through a series of workshops
- Continue to refine the science case. Next workshops
 - Positrons in Paris (France) October 2024
 - 22 GeV at LNF-INFN (Italy) December 2024
- Study Group established to develop and submit to DOE a pre-CDR well before the next LRP science, technical design, cost and timeline

JLab leads The High Performance Data Facility!

- In partnership with LBNL
- HPDF: A \$300-500M world-leading, state-of-the-art high-performance data facility.
- Purpose-built to provide researchers with the tools needed for big data
- Enables the Department of Energy's Integrated Research Infrastructure program: seamless integration of scientific facilities, computational resources, and data science capabilities
- Enabled by \$50M commitment from the Commonwealth of Virginia



Safety

- Two significant near-miss events (no injuries) in May/June 2023
 - A worker did not perform zero-voltage verification and began work on a live 480V circuit
 - A worker did not LOTO an RF power source; delivered power to an open waveguide
- Meanwhile, DOE-SC guidance issued (May 2023) to ensure after-hours high-risk/high-consequence work is carried out only with full resources and capabilities and with DOE approval
- Actions:
 - Initiated Lab-wide LOTO pause/restart; proceeded through restart process to verify work planning and control, appropriate supervision and PPE, and observed adherence to procedure
 - Suspended all high-hazard work at Jefferson Lab June 16; restarted such work on a case-by-case basis
 - Suspended planned work outside of normal 6am-6pm schedule; performed case-by-case evaluation of planned off-hours tasks; initiated revised process with more limited scope
 - Pulled forward transition to **electronic permit administration (ePAS) system** for work planning and control and hazard identification; **went “live” on January 8, 2024.**
- Substantial delay introduced in the execution of our experimental program
- ePAS is now fully rolled out and users should consider some training if they want to build things at the laboratory

Annual CEBAF User Facility Questionnaire_1

This is a DRAFT of the [CEBAF User Facility Questionnaire](#) to be taken after the current run and annually thereafter. The results would be forwarded to the JLUO board and lab leadership for discussion.

We really want your feedback, please respond!

Tell us about how you used CEBAF during the most recent run

- Did you take any shifts onsite during the recent run? (yes/no)
- Were you involved in hardware preparation or maintenance onsite? (yes/no)
- Were you the spokesperson or co-spokesperson for an experiment during the recent run? (yes/no)
- Are you currently a student or postdoctoral researcher? (yes/no)
- In which hall(s) did your experiment(s) run? (Select all that apply.)
- Please specify whether you were a remote or in-person user during the most recent experimental run
(This question may be omitted if the survey audience is limited to those who physically visited the lab – could use badge swipes to select this group.)

Annual CEBAF User Facility Questionnaire_2

For each of the statements below, indicate your level of agreement using the following scale. If you have no opinion, please select "no opinion."

no opinion

1 = strongly disagree

2 = disagree

3 = neither agree nor disagree

4 = agree

5 = strongly agree

- I feel adequately trained to safely conduct experiment operations onsite at Jefferson Lab.
- It is easy for users to access required safety training courses, exams, and certifications.
- Site access or security policies do not negatively impact my ability to conduct research, collaborate with researchers, and engage in the training mission of the lab.
- There were sufficient support resources (technical support, radiation control, information technology support) to facilitate efficient experimental operations and make optimal use of the available beam time.
- While conducting research onsite, I experienced an inclusive and fair work environment where my ideas and viewpoints were welcome and respected.
- At Jefferson Lab there exists a productive research culture that prioritizes producing high-impact scientific results, promotes training of new scientists, and values scientific integrity.

Annual CEBAF User Facility Questionnaire_3

The following statements concern more specific aspects of operations and scheduling. If you have no knowledge or no opinion, please select "no opinion."

- I am satisfied with the fraction of the year that the facility operated.
- There were/are sufficient computing resources and computing support available to support the storage, calibration, reconstruction, analysis, and publication of acquired data.
- The amount of time that it took for my experiment to be scheduled once it was approved by the PAC was acceptable.
- The experimental scheduling process, including experimental readiness review and its outcomes are transparent to users.
- The uptime of the beam and its quality (i.e., physical parameters of the beam) during the scheduled running was acceptable and did not compromise the planned scientific impact of the experiment.
- There were no last-minute modifications to the schedule or experiment configuration that negatively affected the outcome of the experiment.
- Overall, the PAC and laboratory staff make decisions concerning experimental operations that maximize the net scientific impact of results coming from CEBAF.

The following are optional, free response questions.

- Please provide comments for statements above that you disagree with. What would you like the facility to do differently? If you have any comments that weren't addressed by the statements above, please discuss below.
- Please describe any unique CEBAF technical expertise or capabilities that are important to you as a user now and/or in the future.

If Universities want to participate, please reach out Lorelei (lorelei@jlab.org) ASAP



VIRGINIA IS FOR
SCIENCE LOVERS

OPEN HOUSE

SATURDAY, JUNE 8

9 A.M. - 3 P.M.

