The Future of the Continuous Electron Beam Accelerator Facility

CEBAF 2037



Or Hen – MIT

CLAS Collaboration Kickoff Meeting for CEBAF 2037 (Nov. 16th 2026)

Outline:

- CEBAF 2037 and how we're approaching it
- MIT Kickoff Meeting
- Next steps in the process

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WHAT IS CEBAF 2037?

A community planning effort, charged by Jefferson Lab, to define the science CEBAF should deliver in the decades ahead, and what the accelerator and halls will need to achieve it.

Charge from Eric Brown, Deputy Laboratory Director for Science and Technology, October 2026

WHAT IS CEBAF 2037?

THE GOAL

A compelling, community-owned science vision spanning the next decade and well into the EIC era.

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THE OUTPUT

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THE TIMELINE

Kickoff December 2026.
Emerging science program by summer 2027.
White paper by March 2028.

Charge from Eric Brown, Deputy Laboratory Director for Science and Technology, October 2026

JLab's charge

Bold and credible

Ambitious science, realistic about what CEBAF can deliver today or with the upgrades the science requires.

Realistic boundaries

Two working budget scenarios: flat plus inflation, and flat plus inflation with about $100M of added investment.

Complementary to the EIC

Physics that CEBAF's energy, intensity, polarization and duty factor make uniquely possible.

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Open and community-owned

Input at every stage, a prominent role for early-career scientists, and results shared publicly.

Charge from Eric Brown, Deputy Laboratory Director for Science and Technology, October 2026

Four principles drive our planning

Science first

Questions come before measurements, programs or upgrades.

Community leadership

Built on community input. Leadership grows as the science takes shape.

With the EIC

CEBAF and the EIC as complementary parts of one scientific program.

Alongside the PAC

Does not replace the PAC recommendations. We expect its findings to be an important reference for the Laboratory and the PAC.

Engagement is key for building leadership

The organizing structure grows alongside the science. Those who contribute substance, in the discussions and the workshops, will shape the effort and help lead it.

DEC 2026 KICKOFF

Discussion leaders

Frame the questions and facilitate; not set priorities

2027

Working groups and conveners

Invited for expertise in the themes that emerge

AS IT GROWS

Organizing committee

Drawn from those who lead and contribute + international stackholders + experts from outside the JLab communittee

OVER TIME

Broad representation

Across research areas, institutions, career stages and countries

Suggestions for conveners and contributors, including self-nominations, are welcome at every stage.

EARLY-CAREER SCIENTISTS: CEBAF 2037 and beyond is your program!

You will propose the experiments, build the instruments and carry out the science. The charge asks that you have a prominent role in shaping the vision: in the workshops, the working groups and the white paper itself.

Lead

Provide planning input, engage in discussions, present in open-min sessions , and put yourself forward for workshop roles.

Attend

Travel support available for in-person kickoff attendance: students, postdocs, untenured faculty and equivalent career stages. Supported by MIT and Jefferson Lab.

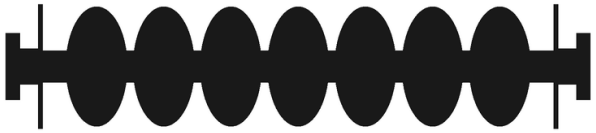
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MIT KICK-OFF MEETING

The Future of the Continuous Electron Beam Accelerator Facility

CEBAF 2037



10–11 DECEMBER 2026

https://indico.jlab.org/event/1108/

Starting from community input

47

responses to the call for science themes

20+

institutions in North America and Europe

~100

suggested scientific themes

Submissions spanned hadron mass and gluonic structure, 3D imaging, hadronization, spectroscopy, nuclei, fundamental symmetries, and new beams and capabilities.

We read every one, and together they shaped the questions and the agenda.

Five fundamental questions

MASS	How does the strong force give hadrons their mass and other properties?
STRUCTURE	How are quarks and gluons organized inside hadrons?
NUCLEI	How does the strong force shape atomic nuclei?
FORMATION	How do quarks and gluons form the particles we observe?
BSM	Can precision studies of matter reveal new fundamental physics?

Preliminary

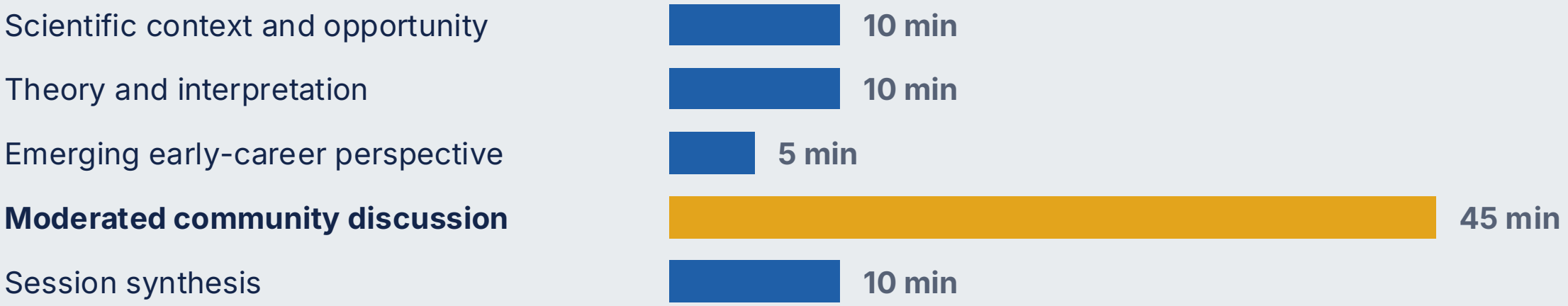
Kickoff is organized around scientific goals, not measurements or upgrades.
A starting point, not a final framework.

Drawn from comunity research directions

Research direction	Questions
Gluonic structure, threshold J/ψ, gravitational form factors	Mass · Structure · Nuclei
Pion and kaon structure	Mass · Structure · Formation
DVCS, DDVCS, TCS, exclusive meson production	Structure · Mass
SIDIS, TMDs, transversity, spin-orbit correlations	Structure · Formation
Elastic and transition form factors, polarizabilities	Mass · Structure · Nuclei · BSM
Spectroscopy, excited and exotic hadrons	Formation · Mass
Hadronization, fragmentation, baryon-number transport	Formation · Structure · Nuclei
SRC, EMC effect, tagged DIS	Nuclei · Structure
Color transparency, hypernuclei, in-medium hadronization	Nuclei · Formation
Parity violation, electroweak tests, dark sector	BSM · Nuclei
Two-photon exchange, positron-enabled measurements	Structure · BSM · Mass

Illustrative, not exclusive · Lattice QCD, EFT, phenomenology and reaction theory serve all questions

Each Question will be the focus of a 80-minute discussion-focused session



GUIDING QUESTIONS

Why does it matter? · What would be a major advance? · How do we get there? · What are the challenges? · Why CEBAF?

Discussion leaders frame and facilitate; they do not advocate for programs or set priorities

Kickoff Day 1 · Nucleons and hadrons

9:00–9:30	Morning coffee
9:30–10:10	Opening: CEBAF 2037 charge and objectives; CEBAF status and near-term plans; process and relationship to the existing program
10:10–11:30	**Mass · How does the strong force give hadrons their mass and other properties?**
11:50–1:10	**Structure · How are quarks and gluons organized inside hadrons?**
1:10–2:20	Lunch
2:20–3:40	**Formation · How do quarks and gluons form the particles we observe?**
4:00–4:45	Open mic: missing questions, emerging opportunities, alternative perspectives
4:45–5:30	Connecting the science: shared questions, theory challenges, CEBAF–EIC connections
5:30–5:45	Day 1 synthesis and open questions

Preliminary

Kickoff Day 2 · Nuclei and fundamental symmetries

9:00–9:15	Day 1 recap and introduction
9:15–10:35	**Nuclei · How does the strong force shape atomic nuclei?**
10:50–12:10	**BSM · Can precision studies of matter reveal new fundamental physics?**
12:10–1:30	Lunch
1:30–2:00	Open mic, science: additional input, missing opportunities, connections across themes
2:00–2:40	Open mic, technical: potential upgrades to enable next-generation science at CEBAF
2:40–3:15	From questions to workshops: synthesis, emerging themes, the 2027 workshop pathway
3:15–3:30	Closing discussion and next steps

Preliminary

What we aim to leave MIT with

1. Refined scientific questions, informed by broad community discussion.
2. A map of promising opportunities and challenges: key measurements, theory needs and connections across research areas.
3. A path to focused workshops in 2027, with emerging themes and opportunities for continued involvement.

The kickoff will not set final priorities or choose specific accelerator or detector upgrades. Those decisions belong to later stages.

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Next steps: from kickoff to white paper

DEC 10–11, 2026

Kickoff at MIT

Refine the questions; map opportunities and challenges

Q1 2027

Science workshops

Physics opportunities, key measurements and theory needs

Q2 2027

Technical workshops

Accelerator, detectors, computing; feasibility and resources within funding scenarios

SUMMER 2027

Emerging program

Discussed with the community and reviewed by the Lab (e.g. CEBAF Advisory Committee)

MARCH 2028

White paper

Community supported document, shared with key stakeholders

Workshop reports and community input review and prioritization will follow a transparent process led by the Lab, involving the community and engaging stakeholders and relevant committees (e.g. CEBAF advisory committee). Outputs will be shared publicly as the work proceeds.

How to get involved

Register

In person or remote. After the announcement, updates go only to registered participants.

Travel support

For early-career scientists attending in person. Apply by [date].

Speak up

Use the open mics. Suggest conveners and contributors, including yourself.

Talk with us

We are glad to meet with CLAS12 working groups.

Registration: [link] · Travel support: [link]

A few personal thoughts on CLAS

- A strong starting point: a mature program and a clear scientific vision
- A concrete path forward that builds on existing capabilities with targeted upgrades
- The opportunity is larger than any one collaboration
- Open the door: bring new people to help and bring intellectual leadership

CEBAF 2037

Questions and discussion

The future of CEBAF is best defined by the community that uses it.

Or Hen · Fernanda G. Garcia · Doug Higinbotham

https://indico.jlab.org/event/1108/