Brookhaven National Laboratory

U.S. DEPARTMENT of ENERGY

A brief update on ePIC Common Funds: How to transfer money

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June 10, 2026

@MEXT, Tokyo, Japan

@BrookhavenLab

At the 6th RRB we discussed:

Various categories of scope for the Common Fund (CF)

Point estimate for each category and when they are needed

Size of each category which determines size of contributions

- Small enough to not discourage collaborators but not too small to be inconsequential

How to transfer money ← explored in some detail today

Role & function and setup of a Scrutiny Group (SG)

- M&O process timeline to be coordinated with RRB meetings schedule

Startup of an outreach effort – immediately – before the CF is setup

Reminder: Common Funds for three categories of expenses related to the ePIC Collaboration functions

Category A: For maintenance of jointly-funded sub-detectors , or extraordinary services and operations common to the whole experiment e.g. distributed computing data transfer and specialized software licenses.

- Total point estimate between $3M-$5M (FY25)
- Starts in 2030 and grows to 100% by 2036/7, and stays

Category B: Maintenance of equipment built by a sub-set of collaboration (sub-detectors) which may require specialist expertise

- Tota point estimate $0.6M-$1.8M (FY25)
- Starts in a year after the detector installation is complete, during EIC pre-Ops

Category C: For collaboration support such as – travel for specific collaboration functions, (local) support for visiting scientists including as-needed-time, and a strategy to allow for underprivileged scientists to participate in the EIC science

- Total point estimate $1.6M-$3M (FY25)
- Starts during EIC constructions, starts ~2028 and grows to 100% by 2036 and stays

How to transfer money?

Input from BNL Counsel, SBU VP for BNL affairs & Input from experience from DUNE/U. of Chicago

Four options possible (with different pros and cons)

- Common Fund Managed by BNL for the ePIC Collaboration
- An account held at Stony Brook University for the ePIC Collaboration*
  - SBU Research Foundation
  - SBU Foundation**
- An account could be held at a *future* non-profit “BNL Foundation”
- BSA could step in and hold such an account – have not explored

In all cases, it should be clear that the fund will be controlled by the Collaboration. One of the criteria for choosing the right “home” should also be the feasibility and efficiency managing this.

* Like the Common Fund for DUNE administered by U of Chicago

** Proof of principle exists – Center for Frontiers in Nuclear Science (CFNS) at Stony Brook University

Why Stony Brook University?

Stony Brook, BNL and BSA

Stony Brook University (SBU), Brookhaven National Laboratory (BNL), and Brookhaven Science Associates (BSA) share a close and longstanding partnership that advances scientific research, education, and innovation.

Stony Brook University is a leading public research institution and a key academic partner of BNL.

BSA, a limited-liability company founded by Stony Brook University and Battelle, manages and operates BNL for the Department of Energy, helping to foster collaboration between academia, government, and industry while supporting scientific discovery and workforce development.

Stony Brook University's Nuclear Physics Group is deeply involved in RHIC and EIC and has a strong support of the SBU management.

Alternative I: Common Fund @ BNL

Contributing institutions contribute funding directly to BNL

Unclear what contract mechanism would be used for BNL to receive funds – limited tools available and our GC is looking into this:

- SPP, CRADA, ACT – may have flexibility and all require DOE approvals

Full cost recovery requirements means funds are subjected to BNL overhead, a significant cost

- Could ePIC receive a reduced (minimal) overhead rate?

Procurements of goods and services through BNL – subject to BNL's approved purchasing system requirs

- Adhering to Federal Acquisition Regulation (FAR) – could be time consuming

There may be ways to mitigate some, or all, of the above but further exploration is needed

It is possible that DUNE tried this and failed; and settled for CF residing at U of Chicago

Alternative II: Common Fund @ Stony Brook University

Based on the model at U of Chicago for DUNE collaboration *(see next slide)*

- Can operate more nimbly and efficiently than one at BNL (outside of M&O contract and FAR parameters)
- Subject to its own requirements regarding funding and contracting
  - Minor differences between whether it is held at the **SBU Research Foundation** or **SBU Foundation**
  - An overhead could be expected (~5-10%), compared to 100+% at BNL
- VP for BNL affair's office is willing and able to help

Proof of principle exists: Center for Frontiers in Nuclear Science: funds from Simons Foundation at SBU Foundation. There may be more such examples.

DUNE – U of Chicago example

- DUNE Common Fund was proposed by the DUNE collaboration and endorsed by the DUNE RRB
- The collaboration selects a resource coordinator who is charged with managing the account on behalf of the collaboration.
- The Common Funds account is managed by the University of Chicago
- The University of Chicago agreed not to charge overhead on the funds *as long as* the activity (number of transactions) is low. If the number increases a small management fee could be charged.
- The common fund fees are set and endorsed to by the DUNE RRB.
- The common fund fees are collected by the University from the collaborating institutions.
- Expenditures are discussed by the DUNE collaboration management in consultation with the DUNE Project.
- Once a decision is reached the collaboration Resource Manager instructs the university to pay bills.
- An Example: The collaboration contributed to the purchase of LAR for the ProtoDUNE run. CERN issued a bill, the collaboration management agreed, the resource manager instructed the University to pay.

CFNS at Stony Brook U. example

Simons Foundation helped setup the Center for Frontiers in Nuclear Science in 2017 to support and promote the Electron Ion Collider science.

Center supports early career scientists and EIC related activities: postdocs, visitors, workshops and summer schools to promote the EIC science

- Money comes annually at the SBU Foundation, which charges a 5% overhead
- The Center Director has the authority to sign all expenses via invoices
- International Advisory Committee reviews the Center's activities annually
- An annual report on the activities and finances goes to the Simons Center
- Scope of activities was defined when the Center was setup (very similar to ePIC's need)
- The Center has supported activities at SBU, BNL and around the world including salaries of postdocs, students and supported visitors at BNL/SBU for EIC and related activities, bought misc. hardware for experimental research, for speedy help on technical expert-visits for EIC, paid for outreach and early career social events

SBU VP for BNL Affairs is informed about U of Chicago's help to DUNE and assures me that something similar could be setup if needed for ePIC Collaboration

Alternative III: A non-profit foundation to be setup – “BNL Foundation”

BNL is considering establishing “BNL Foundation” – takes about a year (or less) to setup

BNL foundation could manage the CF similarly to the University

Can likely operate more nimbly and efficiently than BNL outside of the M&O contract and FAR and *could have even fewer or less constraints than a University*

Overhead and administrative rates could be (negotiated) smaller than the University

BNL Foundation (if established) would have a broader scope than just ePIC CF i.e the ePIC CF would be a segregated fund/program within the Foundation

BNL Foundation could be a separate legal entity with its own management not controlled by BNL or by contributing institutions

From our perspective

There clearly are solutions for the Common Fund

Currently, the easiest seem to be through Stony Brook University

- Either Research Foundation or SBU Foundation
- We could look into further details if the RRB suggests this, including possible overheads and timelines

BNL foundation may be equally easy but it does not exist yet – it is only being discussed

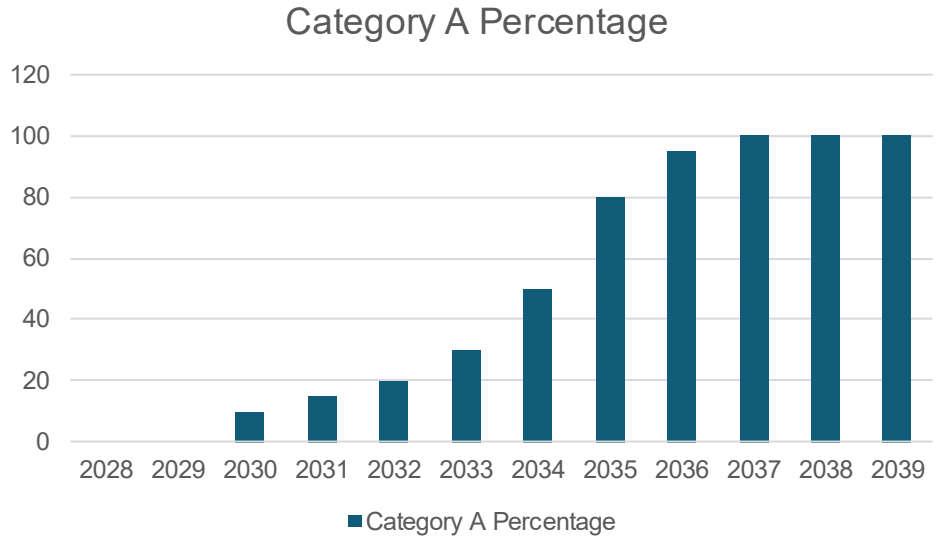
BNL as CF host may mean significantly more overheads and operational constraints

Backups

Subtitle

Appendix B: Category A

Reminder from 4th RRB meeting: ePIC would expect to have reached between ~990-1260 M&O PhD's in the early 2030's (average of 1125 or 1000+).

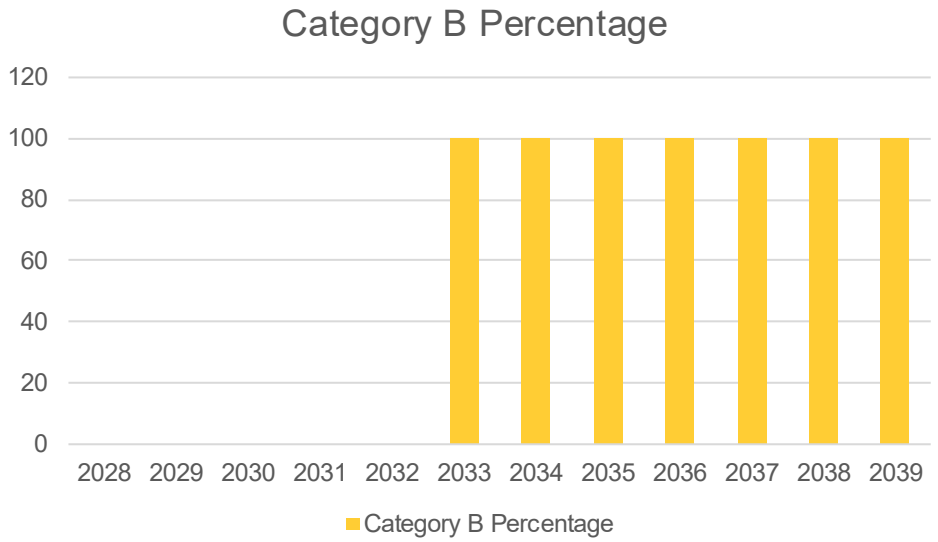


A timeline to achieve full M&O costs in terms of percentages of total M&O costs for Category A items. This timeline is based on a timeline of actuals of the M&O of the CERN-LHC experiments. The projected timeline assumes EIC construction and early in-kind detector arrival to start late 2020s (and after the experimental areas are ready for new installations), EIC pre-operations to start in the early 2030s, completion of the EIC Project and start of EIC science operations in 2035. (We note that the projected preliminary Category A common funds are mostly in the computing area, and that in the present planning analysis and streaming data challenges already start in 2028. Since it is not clear what of those Category A computing costs are directly correlated with the planned data challenge, we assume costs for the latter can still be handled 'informally' as has been the case hitherto for all ePIC-related work.)

Grand Total		**4571***

The point estimate given should be considered rough and preliminary. The detailed numbers indicate a specificity that does not exist at the moment and should be considered with caution. Given the uncertainties at this early stage, we estimate a current range of +/-30% to the total point estimate, or a best guess for a total point estimate range for M&O Category A of $3M to $6M (FY25$).

Appendix B: Category B

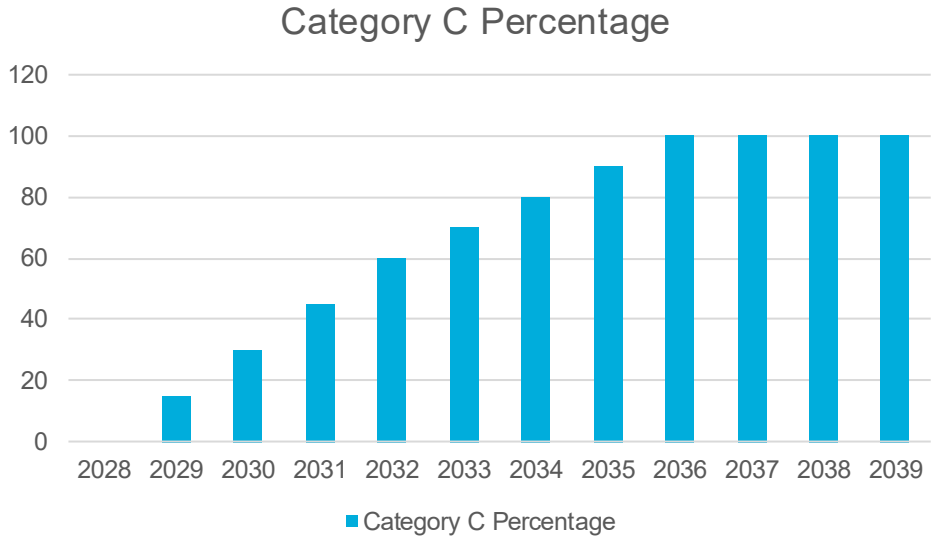


A timeline to achieve full M&O costs in terms of percentages of total M&O costs for Category B items. The category B costs are assumed to be flat after installation. The projected timeline assumes detector installation to be completed by 2032 and EIC pre-operations to start in the early 2030s.

Grand Total		**1218***

The point estimate given should be considered rough and preliminary. The detailed numbers indicate a specificity that does not exist at the moment and should be considered with caution. This is even more true for M&O Category B items that depend on the technology used, are modulated according to the capabilities and possibilities of the labs and can vary enormously from year to year. Fr this reason, we used a larger range of +/-50% to the total point estimate, or a best guess for a total point estimate range for M&O Category B of $0.6M to $1.8M (FY25$).

Appendix B: Category C



A timeline to achieve full M&O costs in terms of percentages of total M&O costs for Category C items. This timeline is assumed to be earlier than that for Category A items as the support of people naturally coincides with the various component arrival, early construction, installation, pre-operations and science operations activities. The ramp-up of Category C item costs is assumed to be faster than those for Categories A and B and follows the planned ramp-up of collaboration labor commitments from a recent ePIC survey. The projected timeline assumes EIC construction and steady detector component arrival to start after 2028 once the experimental areas are cleared for new installations, EIC pre-operations to start in the early 2030s, completion of the EIC Project and start of EIC science operations in 2035.

Grand Total		**2317***

The point estimate given should be considered rough and preliminary. The detailed numbers indicate a specificity that does not exist at the moment and should be considered with caution. For M&O Category C items we estimate a current range of +/-30% to the total point estimate, reflecting M&O category A. Hence, a best guess for a total point estimate range for M&O Category C is $1.6M to $3M (FY25$).