HEP Portfolio Review

Instructions for Proposers

Dear Colleague,

The DOE Office of High Energy Physics (HEP) has requested that HEPAP conduct an independent peer review of currently operating experiments supported by HEP. This review will focus on the scientific impact and productivity of HEP-supported contributions to these experiments within the context of the overall HEP portfolio. Your experiment has been identified as one of the currently operating, HEP-supported experiments that will be subject to this review. This letter outlines the required elements for proposals and supporting materials to be submitted in response to this review.

All experiments in the HEP portfolio are expected to support and advance the P5 science drivers. Each experiment should demonstrate, in the context of this review, how its science can contribute to the strategic plan contained in the P5 report. Experiments will submit proposals that will be assessed according to the criteria spelled out in the charge to HEPAP (**see attached**). HEP will use the results of this review process to help optimize the science impact and productivity of its experimental research portfolio.

Note that the LHC experiments are not being directly evaluated on the P5 criterion listed in the charge to HEPAP: *Present and anticipated future impact on the P5 science drivers.* This is because HEPAP has already recommended the LHC program as a high priority within the P5 plan and we see no need to revisit that assessment. However, many of the instructions below (which are common to all experiments) refer to the P5 drivers, and you may include expected P5 science impacts as part of your proposal narrative within the page limits discussed. Reviewers may consider this information as part of their assessment of the other review criteria.

The proposal should address the following topics. Note these are closely related to, but not exactly the same as, the evaluation criteria:

- Overall scientific merit, including that of the experiment itself, and its unique capabilities and relevance to the P5 science drivers as part of the overall HEP portfolio;
- Promise of future science impact and productivity during this timeframe, including key science results expected, based on nominal experimental operations and demonstrated detector performance and capabilities;
- Impact of past scientific results as evidenced by refereed publications, citations, etc.; and how these results relate to the projected precision of expected future science results;
- Accessibility, usability, and utility of the data, both for the experiment itself and as a member of the broader HEP community, including working groups that combine and analyze data from multiple experiments; and quality and completeness of the data management plan including archiving and distribution;
- Productivity and vitality of the science team, including continuity and expertise in the operation, calibration, and validation of instrumental data; scientific research productivity; and mentoring and training of younger scientists.

The proposal should focus on the achievements, goals and capabilities of only the HEP-supported US research groups. It shall contain the following sections:

1. Science Goals and Science Implementation Plan (up to 25 pages)
    a. Brief summary of key science accomplishments to-date, focusing on past 4 years. Indicate how these results have contributed to P5 drivers. Also include summaries of number of postdocs, grad students, undergraduates trained.
    b. Top science or technology goals[1] (in priority order, no more than 5) for the next 4 years. These can be expected science results (individual measurements or groups/classes of similar analyses), or technical milestones. Be quantitative about the expected precision of measurements. Clearly state any assumptions about running time, detector configuration, or data quality. Proposers should specifically address how these achievements build upon past results; and how they will contribute to near- or long-term advancement of the P5 drivers.
    c. Detailed description of the resources and capabilities needed to achieve the top science or technology goals described in (b). Details of personnel effort required should be provided in Appendix B. If non-DOE resources are needed to achieve the goals this should be noted. Detail should be sufficient so that reviewers can assess whether the plan is complete and realistic.
    d. Summary of other important science results, **not** included in (b) above, expected in the next 4 years. These can be expressed as qualitative advances in specific science or technology subtopics, or quantitative improvements. Discuss how these results relate to the P5 drivers, and/or support the top goals identified above.
2. Technical Information (up to 5 pages)
    a. Brief discussion of current overall technical status of the experiment
    b. Experiment run plan for FY2019 – FY 2022
    c. Brief description of any upgrades or improvements planned to be implemented to the current experimental configuration in the next 4 years, including any relevant technology R&D
    d. List specific US responsibilities[2] for experiment operations or upgrades. Discuss the roles of US groups in the context of the overall experiment (e.g., "US groups are xx% of the collaboration and built the following detector subsystems…"), including any unique US capabilities
3. Data Management Plan (following standard DOE/SC requirements [See DE-FOA-0001664, Section IV.C.2, Appendix 6], up to 2 pages)
4. Appendices
    a. Tables of current total DOE-supported effort (in FTEs) devoted to (i) Operations; (ii) Physics Analysis; and [if appropriate] (iii) Upgrades; separated by job type (eg Faculty, Sr Staff, postdoc, etc) and type of institution (lab, university). **See examples below.**

[1] "Technology goals" here refers to the results of R&D that can provide critical technical advances needed to achieve P5 science goals (e.g., successful experience in fabricating and operating liquid argon TPCs)
[2] For the purposes of this section, "US" refers only to DOE-funded HEP groups. If both DOE and NSF support an experiment please describe only the roles and responsibilities which fall to DOE-supported groups.

b. Effort Spreadsheets (format to be provided separately). Supports the detailed implementation plan described under 1(c). This can include effort provided from both Operations and Research budgets as needed, and should generally be a subset of the overall DOE-supported effort described in Appendix A. Identify key tasks, and institutions or research groups (not individuals) that have key responsibilities.
c. Acronym List
d. Bibliography

The scientific and the technical sections combined should not exceed 30 pages (including figures, figure captions, tables, and other graphics). Not included in the page limit are the Data Management Plan and Appendices. Letters of endorsement, support, or collaboration are not needed and should not be included.

Proposals are due to the DOE Office of High Energy Physics no later than 5 pm ET January 2, 2018. Late submissions will not be accepted. Submissions, including all appendices, should be sent electronically to:

SC-HEPPortfolioReview@science.doe.gov

It is expected that proponents will be asked to make brief presentations to the review panel in support of their proposal and to answer questions from the panel. You will receive separate notification of the scheduled time and place for such presentations. The Chair of the review panel may also request limited additional supporting material at his or her discretion, in order to help the panel better understand details of the subject experiment. Such requests will be transmitted in a timely fashion.

Any questions regarding proposal content or this review process should be addressed to Dr. Glen Crawford, 1-301-903-4829, glen.crawford@science.doe.gov. Questions about proposal formatting or submissions should be send to the proposal submission address above.

The participation of the U.S. HEP scientific collaborations managing the currently operating experiments is critical in this important process, and we very much appreciate your timely input.

Sincerely

Glen Crawford

Director, Research and Technology Development

DOE Office of High Energy Physics

APPENDIX A

EXAMPLES:

Tables of total direct DOE-supported effort by job type in FY 2017 (FTEs).

MONGO COLLABORATION DOE LAB EFFORT	OPERATIONS	PHYSICS RESEARCH	UPGRADES	TOTAL LAB FTES
SCIENTIST	10.0	5.2	6.3	21.5
POSTDOC/TERM PHD	6.6	11.8	4.6	23.0
GRAD STUDENT	--	2.0	--	2.0
ENGINEER/COMPUTING PROFESSIONAL	4.0	--	2.5	6.5
ADMIN/TECHNICIAN	3.5	--	1.5	5.0
TOTAL	24.1	19.0	14.9	50.0

MONGO COLLABORATION DOE UNIVERSITY EFFORT	OPERATIONS	PHYSICS RESEARCH	UPGRADES	TOTAL UNIV FTES
FACULTY	1.5	12.4	6.6	20.5
POSTDOC	7.8	9.9	3.3	21.0
GRAD STUDENT	2.0	24.5	1.5	28.0
UNDERGRADUATE	--	1.0	3.0	4.0
RESEARCH SCIENTIST	2.0	--	1.5	3.5
ENGINEER/COMPUTING PROFESSIONAL	1.0	--	2.0	3.0
ADMIN/TECHNICIAN	--	--	--	--
TOTAL	14.3	47.8	17.9	80.0

NOTES:

1. Numbers are entered for illustrative purposes, replace with data for your experiment.
2. Report ONLY direct DOE HEP-supported effort. FTEs or fractions thereof supported from other sources (NSF, university support, LDRD etc.) should NOT be included.
3. “Upgrades” include both DOE O413.3 projects as well as smaller-scale activities aimed at enhancing the current experimental apparatus (as opposed to maintenance and repair).
4. This is expected to be a “best-effort” estimate, not a detailed accounting. Precision <0.1 FTE is not required nor desirable.
5. FTE data should be reported where it is expended, regardless of the DOE budget reporting label (e.g., Postdocs are typically paid 100% under Research budgets but may expend effort on Ops or Upgrades. Report where they spend their effort)
6. For the purposes of this table, University Faculty spending 100% (50%) of their research time on the listed science collaboration are considered 1.0 (0.5) FTE.

APPENDIX B

HEP Portfolio Review Evaluation Criteria

Science Merit and Productivity (including training and mentoring of junior researchers)

- What is the scientific scope and impact of the top research and technology goals?
- How might the results of the proposed work impact the direction, progress, and thinking in relevant scientific fields of research?
- What is the likelihood of achieving valuable results?
- How does the merit of the proposed research, both in terms of scientific and/or technical merit and originality, compare with other efforts within the same research area for the overall HEP field?
- How productive has the experiment been in terms of science or technology results?
- How effective has the experiment been in terms of training and mentoring students and junior researchers?
- Will the proposed research plan deliver significant productivity in terms of science/technology results and student training?

Present and Anticipated Future Impact on the P5 Science Drivers

- How have recent results from this experiment contributed to one or more of the P5 science drivers?
- How do the proposed research/R&D goals of this experiment contribute to the P5 science drivers ?
- How significant are the current or anticipated science and technology results of this experiment in the context of the P5 plan?
- What are the unique contributions of this experiment to advancing the P5 science drivers?
- What are the key competitive advantages of this experiment relative to other experiments with similar research goals?
- Does the scope of the full proposed program provide important additional benefits to implementing the P5 plan beyond the top research and technology goals?
- How likely is the proposed research to impact the future direction of the overall HEP program?

Efficiency and Impact of DOE-supported contributions to the physics analysis efforts

- Are the proposed staffing levels well-matched to the proposed work, for each of the top science and technology goals?
- Is the balance of effort by job type (e.g., faculty/staff, postdocs, graduate students) appropriate and well-matched to the proposed work, for each of the top science and technology goals?
- Does the proposed work take advantage of unique or leading facilities, personnel and capabilities at DOE-supported institutions?
- Are DOE-supported groups efficiently deployed to maximize their impact on the physics analysis effort?
- Do the DOE-supported groups have appropriate leadership roles in the physics analysis effort?
- Do the DOE-supported groups have critical impacts on the top science and technology goals?

APPENDIX C

HEP Portfolio Review Additional Information

Portfolio Review Process Timetable *(as of January 22, 2018)*

Charge Issued	October 13, 2017
Call for Proposals Issued	November 7, 2017
HEPAP Meeting	November 30 - December 1, 2017
LHC Proposals Due	February 1, 2018
LHC Subpanel Meets	February 26-27, 2018 and March 26-27, 2018
Report Writing	March 2018
Report Delivered to HEPAP	April 2018 (HEPAP Meeting to-be-scheduled)