U.S. DEPARTMENT OF ENERGY | Office of Science

Office of High Energy Physics (HEP) Program →AAAC Annual Report Discussion

AAAC meeting

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AAAC Report (March 2018) – Findings, Recommendations & Discussion

Finding: Astronomical surveys and major astrophysical simulations (for example, but not limited to, cosmological simulations) have broader and greater impact if in addition to the generation of high quality data sets and clear presentation of their results, the data and derived data products are made public along with appropriate tools to access the data products. When the software used to generate the data and data products is also publicly available, it is more straightforward for other researchers to produce new scientific results with the dataset, as well as to reproduce and verify previously-reported scientific results.

Finding: Public data releases, including data access tools, software used to generate the data and data products, and documentation of the data, software, and access tools, are quite costly and deserve curation in order to realize the potential of increased long-term impact of such availability of the data sets and related materials.

Recommendation: All current and planned surveys should publicly release their data with suitable access tools and documentation. This is consistent with the AAAC Principles of Access recommended by the AAAC in their 2013-2014 annual report. In addition, the surveys should release the source code used to create the data products. Surveys supported in part or entirely by the federal government through its agencies should work to include funding enabling adequate public access to the data, software, and data products produced through these surveys.

HEP Notes: The current/planned surveys that DOE/HEP is supporting (eBOSS, FGST, DES, DESI, LSST) all plan to release their data publically.

→We would like to understand the recommendation in more detail.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Recommendation: The three agencies should coordinate, and where possible standardize, the guidelines and expectations for the releases of data sets, data products, data access tools, and related software used to produce future surveys, astrophysical simulations, and missions. The goal of this coordination should be to help researchers efficiently provide access to the data they produce through tools useful for the broad scientific community with minimal duplication of effort between agencies and stakeholder groups. Release and documentation of the software used to generate and analyze the data will enhance the quality of current and future science by enabling more cost effective reproducibility and extension of the scientific results from the initial studies.

HEP Notes: The agencies have a Tri-Agency Group (TAG) to investigate the needs and costs of joint processing of the data (LSST, Euclid, WFIRST). There is a study going on to assess the details which will help to support planning the program activities going forward.

→We would like to understand the recommendation in more detail.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Finding: The tri-agency and tri-project groups have conducted useful investigations to explore coordination between science teams planning to use LSST and Euclid to further the study of dark energy.

Recommendation: We recommend that the three agencies either broaden the current discussions or create parallel discussions to consider broadly the costs and benefits of coordination on the science areas of interest to both the Euclid and LSST communities. We recognize that if a decision is made to plan for coordination between LSST and Euclid during construction of LSST and to execute such a plan during LSST operations, the budgets for both the construction and operation of LSST would likely need an augmentation.

HEP Notes: Participation by DOE in LSST is to get at the dark energy science. DOE is happy to include other topics in the Tri-Agency Group when NSF and NASA ready. As noted, there's a detailed study going on now to investigate costs, which will help to support planning the program activities going forward.

→We would like to understand the recommendation in more detail.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Finding: The AAAC appreciates that the agencies are attempting to preserve a balanced portfolio in the face of significant budget pressure and realize the goal of keeping projects currently under construction on schedule and on budget.

Recommendation: The agencies should continue to prioritize a balanced portfolio, and in particular maintain a viable research and analysis program, using existing mechanisms familiar to the community such as the portfolio reviews and pacing of the early funding and review milestones for new projects. The agencies should communicate clearly with the community as these processes evolve to match the pressures on their programs.

HEP Notes: A balanced portfolio that continually produces world-leading science aligned with our mission goals is important for DOE/HEP and informs our program planning. There are a number of mechanisms for community input and advice including HEPAP and AAAC and their subpanel studies (e.g. HEPAP's 2014 P5 strategic plan and the 2018 Portfolio Review), the NRC's Decadal Survey, and specialized workshops and community studies.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Finding: The portfolio reviews and other processes for the assessment of current missions, projects, and facilities, are important tools for the agencies to maintain a balanced portfolio between new projects, operation funding for current facilities, missions and experiments, and research funding for science analysis and technology research and development. The AAAC is supportive of the agencies using the portfolio reviews to help maintain a balanced program.

Recommendation: The agencies should continue to communicate with each other about current and future portfolio reviews and consider how joint projects between agencies are meeting the priorities of all stakeholders.

HEP Notes: DOE/HEP keeps NSF, NASA as well as international partners apprised of upcoming reviews and studies. We work with the experiments and our partners to keep them apprised of results and to minimize impacts.

- DOE/HEP charged HEPAP to carry out a Portfolio Review subpanel study of currently operating experiments; the report was approved in May 2018.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Finding: The AAAC applauds the NSF and NASA for having supported the first steps into the exciting new field of multi-messenger astronomy. These initial results for multi-messenger astronomy are impressive achievements and are important examples of science benefiting from interagency coordination, combining LIGO, the Fermi satellite, IceCube, and many other space and ground-based facilities observing across the electromagnetic spectrum. Multi-messenger astronomy is clearly a well-stated priority of the NSF and is explicitly (NASA's support of space missions enabling this science as part of their science mission) and implicitly (DOE's partnership with NSF in projects and facilities that support the NSF's goals for this science) enabled by the other agencies.

Finding: The AAAC recognizes that NASA's space mission portfolio has great potential for supporting the emergent area of multi-messenger astronomy that has been opened by the NSF supported observations of gravitational waves and high energy particles, including neutrinos. The AAAC further recognizes that existing agency partnerships (e.g. between DOE and NSF for LSST) have the potential of further supporting the development of multi-messenger astronomy and astrophysics.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Recommendation: The AAAC supports an intensification by NSF and NASA of existing collaborations that support multi-messenger astronomy, inspiring a new generation of engineers and scientists to work in this emerging area.

Recommendation: The AAAC recommends that all three agencies, in recognition of the compelling science opportunities provided by the emerging field of multi-messenger astronomy, do their best to support the capabilities, facilities, missions, and programs on which progress in this area depends. For the NSF, multi-messenger astronomy is a well-recognized high priority. We recommend that DOE and NASA stay in close communication with NSF to avoid inadvertently hindering, through actions affecting their own programs or missions, this high priority of their partner agency.

HEP Notes: The program is carrying out experiments & projects to address the P5 science goals in support of the DOE mission. Many of these (e.g. FGST, HAWC, VERITAS, DES, DESI, LSST) have broader science goals than those aligned with the HEP program. HEP is happy to enable these by our participation in project fabrication and operation. We remain in close contact with the other agencies regarding these activities.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Finding: The AAAC is gratified to see continued, significant progress toward the highest priority decadal ground-based facility, LSST, which is advancing toward the start of survey science operations in 2022.

Recommendation: The AAAC urges NSF and DOE to put in place a long-term operations plan and research plan that will, while maintaining a balanced overall portfolio, ensure that the US science community can capitalize on the substantial investment in LSST.

HEP Notes: The program is responsible for the 3-billion pixel camera project and will also partner with NSF in supporting the LSST operations. A joint review of the operations proposal was held in December 2017.

The program is supporting activities for LSST Dark Energy Science Collaboration (DESC) in order to address science aligned with the P5 goals. The DESC operations plan had its 2nd peer review in May 2018.

HEP support for scientist participation (for university grants and lab programs) in camera fabrication and commissioning, LSST operations, and the DESC is determined by peer review.

AAAC Report (March 2018) – Findings, Recommendations & Discussion

Finding: The CMB-S4 Concept Definition Task-force (CDT) carried out tremendous effort to present the science and technical requirements for CMB-S4, along with a well-thought-out concept for the CMB-S4 survey, pulling together work from the entire CMB-S4 community.

Recommendation: The AAAC commends to DOE and NSF the report of the CMB-S4 CDT, which we find clearly communicates the results of the CDT's efforts to respond to the charge they were given. We are confident that it will meet the needs of the agencies to inform funding and programmatic decisions in the near term regarding CMB-S4.

HEP Notes: We found the study and report very helpful. It will provide important input to inform program planning towards CMB-S4.

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Finding: The AAAC is concerned that the proposed FY 2019 budget for DOE High Energy Physics falls at the lower boundary of the scenarios considered by P5. We note that it would be a challenge at this level of appropriations for DOE to continue planning for the existing Major Items of Equipment in development (Dark Energy Spectroscopic Instrument, LSSTCam, SuperCDMS-SNOLAB and LZ) while maintaining an adequate grants program.

HEP Notes: The MIE and operations budgets for the projects is planned to be fully supported in the President's Request. As a mission agency, research support (at labs and university grants) is prioritized for efforts to carry out the projects and experiments in our program within budget constraints.

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