

MPSAC Subcommittee on MPS Facilities & Major Research Infrastructure Charge Addendum #1

Background

In preparation for this and all future requests for input, the MPSAC, through its Subcommittee on MPS Facilities, should establish a general understanding of the opportunity space for investment in next-generation facilities. To this end, the Subcommittee may wish to familiarize themselves with a number of past and future community prioritization efforts that have specific relevance to future mid-scale and large facilities. These include, but are not limited to, the 2020 Astronomy and Astrophysics Decadal Survey, the high energy physics community's next Snowmass/P5 strategic plan, and an upcoming National Academies study on the long-term directions for high magnetic field science and technology development. Other communities in astronomy, physics, materials research, chemistry, and the mathematical sciences will present additional reports in the coming years that address midscale facility opportunities as well as the wealth of data that come from facilities at all scales. Taken as a whole, these studies will set forth a list of scientifically important projects and activities, including potential new world-leading facilities.

These next-generation facilities will be both exciting in their promise and challenging in their realization. The Subcommittee should therefore also aim to develop a high-level understanding of the salient challenges on the horizon, most notably with respect to the impacts of resource limitation across the full facility life cycle of current and future facilities. Topics of interest may include barriers to maintaining a robust development pipeline for new facilities, limitations on support available through the Major Research Equipment and Facilities Construction account, escalating operations and maintenance costs, and the relative costs and savings associated with facility divestment.

Interim Report Request

The request of the MPSAC for this interim Subcommittee report is twofold:

1. After its Subcommittee's due consideration of the motivations and impacts of facility investments, **provide a summary for MPSAC consideration articulating the importance of major and mid-scale facilities to NSF's scientific leadership and MPS's role in ensuring that its scientific research infrastructure enables the current and future cutting-edge science of the Directorate.**
2. Pursuing these investments will require the support and buy-in of a diverse set of stakeholders, including NSF senior leadership beyond MPS, Congress, and the Administration. Therefore, the report should **provide advice on how to best "make the case" for this next generation of MPS's Major Facilities and**

related investments as a critical part of the support MPS provides for the scientific disciplines in its broad portfolio.

The brief report to the MPSAC, including the summary as well as the Subcommittee's advice and feedback, would be most useful on the timescale of Q3 of CY2021, in order to provide the foundation for further discussions, both with the MPSAC as well as within the NSF, regarding upcoming investment opportunities.