The Decadal Survey in Astronomy and Astrophysics 2020
(Astro2020)

Scope

Reflecting previous astronomy and astrophysics decadal surveys and developments since the last survey, the scope of the study will include the entire breadth of research in the field. In particular, it will include:

- Ground- and space-based observational, theoretical, computational, laboratory astrophysics (as supported by the NASA Astrophysics Division and the NSF), and archival activities and capabilities;
- Solar astronomy, but any prioritization in this area will be limited to ground-based activities. Any findings and recommendations made that relate to ground-based activities (e.g. ground-based solar observatories) will be directed to the NSF and shall include consideration of findings and recommendations in the National Academies report, *Solar and Space Physics: A Science for a Technological Society* (2012).
- Gravitational-wave observations used to inform or as they relate to the full breadth of astronomy and astrophysics. If the committee feels it is appropriate, the report may comment on areas of technology investment in ground-based gravitational-wave observations that would give the best scientific returns. However, activity recommendations shall be limited to those that fall within the areas of implementation by the NSF and by the NASA Astrophysics Division.
- Multi-messenger astronomy and astrophysics investigations that may be conducted using the wide variety of messengers including the full breadth of electromagnetic observations, gravitational-waves, and particles from astronomical sources. Many projects with science topics aligned with the DOE Office of High Energy Physics may also contribute to multi-messenger astrophysics. However, specific multi-messenger activity recommendations shall be limited to those that fall within the areas of implementation by the NSF and by the NASA Astrophysics Division.
- The science of exoplanets, including the search for life in the universe. Any findings and recommendations shall include consideration of the outputs of the National Academies committees that are developing science strategies in exoplanet science (“Exoplanet Science Strategy”) and astrobiology (“Astrobiology Science Strategy for the Search for Life in the Universe”), the reports of which are expected to be released in 2018, as well as areas of potential collaboration between and within agencies and non-federal entities.
The scope of the study will exclude project or activity recommendations in the following areas:

- Fundamental physics, such as studying the physics of particles and fields, other than through naturally occurring observables.
- Direct detection or accelerator-based dark matter particle searches that are traditionally considered and carried out by the NSF and DOE particle physics communities.
- Microgravity research.
- Construction of projects whose agency-supported implementation is already in progress, specifically JWST, DKIST, LSST, and DESI.

The committee will consider the status and evolution of ongoing programs (“programs of record”) of the agencies, including the balance of activities and investments of all relevant and appropriate sizes and types, research programs (including individual investigator programs), ongoing support of operational missions and facilities, and the balance that would best address the committee’s recommended science priorities and comprehensive strategy.

In order to ensure consistency with other advice developed by the National Academies for NASA, the following additional scope guidance is provided:

- The study will assess whether NASA’s plans for WFIRST, Athena, and LISA play an appropriate role in the research strategy for the next decade. The study may include findings and recommendations regarding those plans, as appropriate, including substantive changes in NASA’s plans. Recommendations may include, but are not limited to, actions ranging from increased investments (upscales) to reduced investments (descopes) and termination. It is not necessary to rank WFIRST, Athena, and LISA among other recommended activities for space.