

#### A.1.4 ASTROPHYSICS THEORY

##### 1. Scope of Program

The Astrophysics Theory program is intended to support efforts to develop basic theory needed for NASA's space astrophysics programs. The periods of performance of investigations that may be submitted for this research element range from one to three years, although most proposals that are selected have a duration of three years. Abstracts of currently funded ATP projects can be found online at <http://spacescience.nasa.gov/research.htm> (select "Past Archives and Selections," then the year of award, then ATP in the "Selection" column ).

In addition, proposals submitted for this program must:

- be directly relevant to space astrophysics by facilitating the interpretation of existing data from space astrophysics missions, foreign as well as domestic, or should lead to predictions that can be tested with space astrophysics observations;
  - address theoretical problems in space astrophysics that are either broadly applicable across astrophysics or narrowly focused on a particular subdiscipline of space astrophysics (examples include infrared and radio astrophysics, ultraviolet and visible astrophysics, high energy astrophysics, gravitational wave astrophysics, space tests of the fundamental laws of physics, including relativity, cosmology, and galactic cosmic ray/particle astrophysics);
- and
- consist predominantly of theoretical studies and the development of theoretical models that may also incidentally include data analysis and comparison tests of theory against data from space astrophysics missions.

Conversely, proposals to the Astrophysics Theory program may not:

- consist primarily of data reduction or data analysis (such proposals should be directed to the mission-specific programs, the Astrophysics Data or the Long Term Space Astrophysics programs);
- address theoretical topics that are predominantly unrelated to the needs of NASA's space astrophysics programs (such proposals should be directed to other appropriate Federal agencies);
- deal strictly or predominantly with Solar System objects or solar-terrestrial interaction studies, including solar energetic particles;
- request support for organizing and/or hosting scientific meetings; or
- request support for substantial computing facilities or resources.

Finally, note that to enable the NASA Office of Space Science to properly evaluate the relevance of proposals submitted to its programs, as well as track its progress towards achieving its goals as mandated by the Government Performance Review Act (GPRA), all research supported by NASA's programs must now demonstrate its relationship to NASA Goals and Research Focus Area's (RFA's) as stated in the latest version of its

Strategic Plan (follow links from the Web site <http://spacescience.nasa.gov/>); see also the discussion in Section 1 of the *Summary of Solicitation* of this NRA. Therefore, all proposers to this program element are asked to state their perception of this relevance in terms of the Goals, Science Objectives, and RFA's given in Table 3 found in the *Summary of Solicitation*. In particular, this program element is designed to help fulfill any of the RFA's for all of the Science Objectives for Goal II of both the science theme "Astronomical Search for Origins" and "Structure and Evolution of the Universe." The appropriate place for this statement of relevancy is in the introduction to the proposal's "Scientific/Technical/Management" section (see Section 2.3.5 in the *Guidebook for Proposers*). The index numbers in this table may be used to identify a specific RFA, for example, "Goal I, Sun-Earth Connection Theme, RFA 1(c)" or "Goal II, Astronomical Search for Origins, RFA 3(b)."

## 2. Proposal Category and Research Areas

Two types of proposals will be considered: Proposals from research groups headed by a single Principal Investigator and proposals from single individual researchers. A proposal from a research group must clearly justify the scientific need for and logic of the team effort; that is, a set of unrelated or only loosely related research topics by several investigators does not constitute a valid group effort for the purposes of this program. If a new proposal for this program element is itself based on a previously funded research effort, the proposal must identify that work and clearly summarize all significant results from it.

For the purposes of conducting the review, every proposal for this program must be labeled with one (or more, if appropriate) suggested Topic Categories from the current list below in both its Notice of Intent and in the proposal submission itself (the primary use of these Topic categories is to facilitate the assignment of the proposal to an appropriate review panel; NASA reserves the right to assign a proposal to a different category):

1. *Star Formation and Pre-Main Sequence Stars* (star forming clouds, protoplanetary and debris disks, protostars, T Tauri stars, brown dwarfs, dust and astrochemistry)
2. *Main Sequence Stars*;
3. *Post-Main Sequence Stars and Collapsed Objects* (giants, isolated white dwarfs, isolated neutron stars, central stars of planetary nebulae);
4. *Gamma Ray Bursts*
5. *Binary Systems* (cataclysmic variables, x-ray binaries, and black hole binaries);
6. *Interstellar Medium and Galactic Structure* (supernova remnants, dark clouds, interstellar dust, H II regions, diffuse galactic emission, and planetary nebulae);
7. *Normal Galaxies* (normal galaxies, interacting galaxies, starburst galaxies);
8. *Active Galaxies and Quasars* (Seyfert and radio galaxies, AGN's, and quasars);
9. *Large Scale Cosmic Structures* (clusters of galaxies, galaxy environment and evolution, intracluster medium, diffuse photon backgrounds );

10. *Cosmology* (CMB, gravitational lensing, SZ effect, etc.);
11. *Cosmic Ray/Particle Astrophysics*; and
12. *Gravitational Astrophysics and Fundamental Physics* (gravitational wave astronomy and space tests of the fundamental laws of physics, including relativity).

### 3. Programmatic Considerations

It is anticipated that approximately \$3.0M will be available through this solicitation to fund proposals, of nominally three years duration each, for the funding of new awards for this program element. The typical level of support per year is expected to be in the range of \$50K to \$100K for individuals and up to a maximum of \$300K for research groups.

#### IMPORTANT INFORMATION

- As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) now uses a unified set of instructions for the preparation and submission of proposals given in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement - 2003* (or *NASA Guidebook for Proposers* for short) that may be accessed by opening <http://research.hq.nasa.gov/> and linking through "Helpful References," or by direct access at <http://www.hq.nasa.gov/office/procurement/nraguidebook/> (note that the updated 2003-edition of the *Guidebook* is used for this solicitation).
- Section 6 of this NRA's *Summary of Solicitation* contains the Web address relevant to the electronic submission of a Notice of Intent (NOI) to propose and a proposal's *Cover Page/Proposal Summary/Budget Summary*, as well as the mailing address for the submission of the hard copies of a proposal.

For further information, contact the Program Officer for this program element:

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