

A.4.5 Solar Physics Research, Analysis, and Suborbital Program

1. Scope of Program

Proposers interested in submitting in response to this program element should also read Section A.4.0 of this Appendix for an overview of The Sun-Earth Connection science theme of the NASA Office of Space Science.

The Solar Physics program has as its objective the comprehensive study of all solar regimes and source regions of the solar wind; these regimes are defined as the solar interior, the quiet solar atmosphere, solar activity, and the solar corona. Proposals focused on extended analysis of data demonstrably in the public domain from solar space science missions are encouraged, as are proposals that aid the planning of possible future solar flight programs, especially the:

- Mechanisms of Solar Variability - Phase Zero (MSV-0) program that was started in FY 1994 (contact the Discipline Scientist below for further information); and the
- High Energy Solar Spectroscopic Imager (HESSI), to be launched in 2000 and operated under an open data policy (for further information see the World Wide Web site at <<http://hesperia.gsfc.nasa.gov/hessi/>>).

Note that it is anticipated that preparations for other future solar missions, such as the cooperative Japanese Solar-B mission and Solar Terrestrial Relations Observatory (STEREO) will be addressed in separate program announcements; therefore, proposals dealing with these missions are not appropriate for this ROSS-98 NRA.

A. Solar Physics Supporting Research and Technology (SR&T) Program

The Solar Physics SR&T program supports investigations involving analyses of existing data that are open in the public domain. Such acceptable SR&T investigations include the development of theoretical models and numerical simulation techniques pertinent to solar physics, and, in special cases, the development or coordination of solar ground-based observing capabilities that support NASA Solar Physics flight programs. This Solar Physics SR&T program also supports the exploration and demonstration of new instrument concepts pertinent to discipline goals, but it does not support the development of space flight instruments per se.

For purposes of the management of program balance, the NASA Solar Physics program element is organized into a matrix of five techniques, viz.,

- Ground- and Space-based Observations,
- Theory,
- Data Analysis, and
- Ancillary Laboratory Research (*e.g.*, derivation of atomic constants or photometric calibrations),

and the four solar research regimes noted above. Investigations in all matrix categories are invited. Proposals that seek to develop laboratory concepts for new instruments for future suborbital or orbital flight opportunities are especially welcome. Although no priorities are imposed on these categories, an ideal program is envisaged as a balance among them, consistent with the quality of submitted proposals and their relevance to the current Solar Physics flight programs. To aid in the identification of peer reviewers, it is essential that the electronically submitted *Cover Sheet* for Solar Physics proposals include a single choice of discipline descriptor (*e.g.*, Theory/Corona; Ground-based Observations/Solar Interior; *etc.*) as the "Technique/Research Area" designation that will appear on the Web site format (see Section C.5.3 of Appendix C for directions).

As part of a mission-oriented agency, the Sun-Earth Connection theme seeks to fund those efforts that directly impact NASA missions or interpretation of their data. Solar research topics likely to contribute to the characterization and/or prediction of radiation exposure to astronauts are appropriate for this NRA. However, other investigations, even if of considerable merit, will not be given high priority for funding through this NRA if they are judged to be more appropriate for submission to other Federal agencies.

No elements of this NRA are intended to support development of instruments for the Solar-B phase (the second element) of MSV. To carry on the tradition of educational outreach that has been established in Solar Physics, opportunity is offered by the Education/Public Outreach component of this NRA (Section A.5.1).

Note that Solar Physics will review, select, and directly fund only complete investigations proposed by a single PI. Funding of Co-I's from other institutions to an investigation must be accomplished by the PI institution of that investigation.

The Solar Physics SR&T program has had several comprehensive reviews since 1988, resulting in a distribution of one-, two-, and three-year grants. Therefore, only a portion of the program is available for competition each year. Total program funds in FY 1998 of \$6.2 M supported approximately 75 grants, of which 25 are expiring.

B. Suborbital Program in Solar Physics.

The suborbital solar rocket program is expected to continue to lead the way in the development of instrument concepts for future solar missions. Proposals will also be considered, however, that address the approaching solar activity cycle maximum using a variety of methods for providing low-cost access to space. These include standard and long-duration balloons, sounding rockets, Spartan and other Shuttle-based carriers, and sounding rocket-class payloads flown as secondary payloads or on other flights of opportunity.

Approximately \$1.7 M will be available for selection through this ROSS-98 NRA of three to five suborbital investigations of up to three years duration each beginning in FY 1999.

2. Programmatic Information

The schedules for submission of the Notice of Intent and proposal are given in Table 1 of the cover letter of this NRA. The World Wide Web site for submitting both the NOI and the *Cover Page/Proposal Summary* (see Appendix C.5.3) is

<<http://props.oss.hq.nasa.gov>>; proposers without access to the Web or who experience difficulty in using this site may contact Ms. Debra Tripp (E-mail: deb.tripp@hq.nasa.gov) for assistance. Hard copies of the proposals are to be delivered to:

ROSS-98 NASA Research Announcement
Solar Physics Research, Analysis, and Suborbital Program
Jorge Scientific Corporation
Suite 700
400 Virginia Avenue, SW
Washington, DC 20024
Phone number for commercial delivery: (202) 554-2775

Further information about this program element may be obtained from the Discipline Scientist:

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C. Upgrades of Instruments for Ground-Based Context Observations for HESSI

The primary scientific objective of HESSI, scheduled for launch in mid-2000, is to understand particle acceleration and explosive energy release in solar flares. HESSI will provide the hard X-ray imaging spectroscopy, the high-resolution spectroscopy of solar gamma-ray lines, and some imaging of solar gamma-ray lines (see: <http://hesperia.gsfc.nasa.gov/hessi/>).

For interpreting HESSI's observations, knowledge of the physical parameters in the regions of interest is essential. This is to be provided by space and ground-based context observations. Examples of such context ground-based measurements and instruments can be found at: http://solar.physics.montana.edu/max_millennium/

A modest amount (\$300K) of HESSI funds is available for one-year grants for hardware and software upgrades, modifications, etc., to help to ensure that key ground context observations of the needed quality will be available by the time of the HESSI launch. Proposals to this objective should be submitted as part of the SR&T Program competition. Particular attention may be called to such proposals by noting applicability to HESSI support in the Proposal Summary (Abstract) and in the body of the proposal.