

**From:** Dermer, Charles  
**Sent:** Thursday, July 10, 2003 10:16 AM  
**To:** 'akinney@hq.nasa.gov'  
**Cc:** 'rocky@fnal.gov'; 'paul.hertz@nasa.gov'; Kurfess, Jim; Dermer, Charles  
**Subject:** A&P Theory Funding

July 10, 2003

Dr. Anne Kinney  
Director, Astronomy and Physics Division  
NASA Headquarters  
Code S  
Washington, DC 20546

Dear Dr. Kinney:

Discussions over the two days at the recent NASA SEUS and OS meetings suggest the following comments, which are based upon reports presented at the meeting and the recent decision to terminate the SPIDR mission.

In several of the presentations, including Dr. Flanagan's on the APWG and Dr. Gehrz's on the NAAAC, it was pointed out that although increased support for astrophysical theory research has been advocated by the Astronomy and Astrophysics Decadal Survey chaired by Professors McKee and Taylor, by the NRC Physics of the Universe Report chaired by Professor Turner, and by the 2001 NASA Senior Review of the Space Science Research and Analysis Programs, this has not in fact occurred. Indeed, the R&A budget declined as a fraction of the Code S budget. According to your charts, this trend is slated to continue from FY '03 to FY '06. The APWG Draft Letter points out that the Astrophysics Theory Program "has declined significantly, although some theoretical work will be supported in the Beyond Einstein Foundation Science line." The NAAAC report lists theory (along with laboratory astrophysics and SETI) as "Falling Through the Cracks." According to my notes and recollection of the December 2002 SEUS meeting, which is supported by the Meeting Report, the lack of a stronger emphasis on theory and numerical simulation modeling was the lone criticism made by Dr. P. Looney (OSTP) in his otherwise positive evaluation of the Beyond Einstein Roadmap.

In a related development, the termination of SPIDR, which was selected for a SMEX mission following a downselection in June 2002, turns out to have squandered some of the A&P operating budget. According to the briefing on SPIDR by Dr. Hertz, the proposed SPIDR science goals could no longer be achieved due to an error by a factor of 25 in sensitivity calculations.

I do not believe that such a large error could have escaped the notice of a competent theoretical astrophysicist or, for that matter, any astronomer with a strong physics background. More likely, there was no opportunity for a proper feasibility study between the Stage 1 selection (August 2000) and the downselection. Such studies would call for a reserve of scientists, now in short supply due to inadequate funding over the past decade, who have capabilities to analyze telescope performance and to make signal and background calculations

for various astrophysical and instrumental systems. Establishing a cadre of scientists with these talents will be especially important to assess scientific feasibility of LISA, Con-X, the Einstein probes, and the Vision missions.

To avoid a repeat of the SPIDR event and to answer potential criticism related to mission termination both from the press and government oversight boards and review panels, I would suggest an augmentation of the budget for the ATP program, and an astrophysics theory and analysis program office to assist in program review. This course of action would not only satisfy the recommendations of the reports mentioned above, but would provide an additional level of oversight that could lead to cost savings, and will lead to improved understanding of NASA mission performance and science goals. Some of the money previously allocated for the SPIDR mission could support costs of theory and analysis work for NASA missions, recognizing that the explorer money should be retained for explorer-related research.

The lack of a reserve of astrophysical theorists has eroded NASA's core competency to analyze achievable science goals for different mission design concepts, and to identify science drivers that could lead to new avenues for technology development. A new initiative will be required to improve the number and quality of astrophysical theorists that concern themselves with technical mission requirements. A theory and analysis office could also play a useful role to assess technology issues between Code R and Code S.

In the present environment, theorists may feel obliged to overstate science drivers and to minimize technical risk. A project that supports civil service and contract scientists to perform scientific feasibility studies in light of mission specifications could in fact pay for itself, as recent events illustrate.

As a member of the SEUS advisory subcommittee, I feel obliged to make these observations, seek out feedback and further discussion, and suggest concrete policies that can prevent repetitions of the SPIDR termination and FAME cancellation. I would be pleased to meet with you to discuss this and related issues in detail, and to assist you in any way I can.

Respectfully submitted,

[s] Charles Dermer

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cc: Dr. E. Kolb, Fermilab (chair, SEUS)  
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