



UNIVERSITY OF CALIFORNIA OBSERVATORIES/LICK OBSERVATORY
DEPARTMENT OF ASTRONOMY AND ASTROPHYSICS

SANTA CRUZ, CALIFORNIA 95064

September 17, 2007

Dr. Tony Chan, Assistant Director
Mathematical and Physical Sciences, NSF

Dr. Robin Staffin, Associate Director
Office of High Energy Physics, Office of Science, DOE

Re: Transmittal of Dark Matter Scientific Assessment Group Report

Dear Dr. Chan and Dr. Staffin:

The Astronomy and Astrophysics Advisory Committee (AAAC) - along with the High Energy Physics Advisory Panel (HEPAP) - chartered a subcommittee in 2006, the Dark Matter Scientific Assessment Group (DMSAG) to advise NSF and DOE on how to move forward on a coordinated program of dark matter direct detection research. The DMSAG has completed its report and it has been accepted by the AAAC who have voted to transmit it to NSF and DOE for your consideration. The report is attached.

The AAAC is very impressed with the quality and depth of the report. It clearly reflects a very substantial and thoughtful effort by the DMSAG. We are particularly impressed by the effort the committee put into explaining the background and motivation for the study of dark matter, elucidating the role of direct detection in establishing the nature of dark matter, soliciting input from the broad community interested in dark matter and its direct detection, and providing clear recommendations on how to proceed over the next few years. The report provides a particularly valuable set of findings, recommendations and priorities. We have sent a letter to the DMSAG Chair and the task force members thanking the task force for their report and for their considerable investment of time and intellectual effort.

The report notes "that the next few years will be a time of great opportunity as new and relatively inexpensive techniques are rapidly developed." The report also notes, very usefully for planning, that the changes expected over the next few years will soon require another review: "We believe that many of the questions associated with the longer-term direction of the experimental efforts will be resolved during the next few years, provided that the current support continues and our recommendations are implemented, and that a program review in or around 2009 will be necessary."

While it is always a challenge for committees to prioritize amongst programs, we appreciated that the DMSAG did so. They stated: "Equal priorities between (A) and (B):

A) Continuing the on-going CDMS and ADMX experiments and the initial construction of SuperCDMS in Soudan with two super-towers.

B) Funding the expansion of the noble liquids with priorities i), ii) and iii):

- i) The expansion of the liquid Xenon experimental efforts to their next level.
- ii) The U.S. participation in the WARP detector development.
- iii) The next stage of the CLEAN Argon/Neon detector development.

They further added: "The development of superheated liquid detectors and detectors capable of determining WIMP direction. Although these ideas have great promise, they still have significant R&D questions remaining to be answered."

The AAAC recommends that the agencies use the report to provide guidance on their deliberations on dark matter direct detection issues and opportunities. In addition, the AAAC specifically notes the value of utilizing the report recommendations as guidance for establishing a framework for funding opportunities, and as guidance for peer-review committees when evaluating proposals for studying dark matter direct detection.

The AAAC would appreciate a discussion at its next meeting on possible ways in which the agencies plan to respond to the DMSAG recommendations, both near-term and in the longer-term, particularly because of competition in Europe and elsewhere.

As noted in the letter to DMSAG Chair Sobel, the DMSAG has, along with the Dark Energy Task Force (DETF) and Task Force on CMB Research (TFCR), demonstrated the great value that accrues from having interagency task forces chartered under the auspices of the AAAC with your support. The AAAC appreciates the substantial investment of effort by the agencies in these studies, and welcomes their interest in responding in a coordinated way to the reports. We look forward to further discussion of future efforts on dark matter direction detection.

Sincerely yours, on behalf of the Committee,



Garth D. Illingworth,
Chair, Astronomy and Astrophysics Advisory Committee

Cc:

NSF: Joseph Dehmer, Wayne Van Citters, Jonathan Kotcher, Eileen Friel, Dana Lehr

DOE: Kathleen Turner, Randy Johnson, Glen Crawford, P.K. Williams, Dennis Kovar,
Gene Henry, Jehanne Simon-Gillo

OMB: Joel Parriott, Michael Holland

OSTP: Kathryn Beers

DMSAG Chair: Henry Sobel

AAAC: Neta Bahcall, John Carlstrom,
Bruce Carney, Scott Dodelson,
Wendy Freedman, Katherine Freese,
Daniel Lester, Rene Ong,
Sterl Phinney, Marcia Reike
Keivan Stassun, Alycia Weinberger
Bruce Balick, Christopher Stubbs
Rocky Kolb