



Donald F. Geesaman
Distinguished Argonne Fellow

1-630-252-4059 phone
1-630-252-3903 fax
geesaman@anl.gov

Physics Division
Argonne National Laboratory
9700 South Cass Avenue, Bldg. 203
Argonne, IL 60439-4845

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Dr. Patricia M. Dehmer
Acting Director, Office of Science
U. S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20583

Dr. F. Fleming Crim
Assistant Director
Directorate of Mathematical and Physical Sciences
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

Dear Drs. Dehmer and Crim:

In a letter from your offices dated March 30, 2015, the Nuclear Science Advisory Committee (NSAC) was asked to provide additional guidance to the Department of Energy (DOE) and the National Science Foundation (NSF) regarding an effective strategy for implementing a possible second generation U.S. experiment on neutrinoless double beta decay (NLDBD) capable of reaching a sensitivity necessary to determine whether the neutrino is a Majorana or Dirac particle under the inverted hierarchy mass scenario. The standing NSAC Subcommittee chaired by Dr. Robert McKeown of the Thomas Jefferson National Accelerator Facility prepared a response to the charge.

The 2014 report of the NSAC Subcommittee on NLDBD recommended that resolving R&D issues in preparation for consideration of a future "second generation" experiment was important. In the context of ongoing and planned U.S. efforts as well as international competitiveness, the Subcommittee was charged to consider the following:

- "Assess the status of ongoing R&D for next-generation NLDBD candidate technology demonstrations for a possible future ton-scale NLDBD experiment.
- For each candidate technology demonstration, identify the major remaining R&D tasks needed ONLY to demonstrate down-select criteria, including the sensitivity goals, outlined in the NSAC report of May 2014. R&D needs for candidate technology demonstrations should be sufficiently documented beyond assertion to allow critical examination both by the panel and by future assessments.
- Identify the time durations needed to accomplish these activities and the corresponding estimated resources, as reported by the candidate technology demonstration groups."

The subcommittee presented its report to NSAC at a meeting on October 15, 2015. During discussion at the meeting NSAC recommended some modifications. The revised

report was resubmitted and NSAC accepted it unanimously. A copy of the report is enclosed with this letter.

Indeed, the second recommendation of the 2015 NSAC Long Range Plan for Nuclear Science, "Reaching for the Horizon" is the timely development and deployment of a U.S.-led ton-scale neutrinoless double beta decay experiment. The importance of continuing R&D for NLDBD was also recognized as an initiative in this Long Range Plan. In its second report, the Subcommittee strongly recommends that R&D efforts aimed at solving specific technical issues relevant to the down-select decision be supported, urges the continuation of longer term R&D necessary for the future development of the subject in addition to the support of shorter term R&D aimed at a near future down-select, and suggests the agencies consider an approach that would encourage several groups to work together on common goals.

Sincerely yours,



Donald F. Geesaman
Chair, NSAC