



U.S. Department of Energy  
and the  
National Science Foundation



November 29, 2010

Dr. Susan Seestrom  
Chair, DOE/NSF Nuclear Science Advisory Committee  
Experimental Physical Sciences  
Los Alamos National Laboratory  
Los Alamos, New Mexico 87545

Dear Dr. Seestrom:

The DOE/NSF Nuclear Science Advisory Committee (NSAC) is requested to review and evaluate the current and proposed research program, scientific capabilities, and opportunities for fundamental nuclear physics with neutrons and make recommendations of priorities consistent with projected resources.

In 2003, NSAC provided an assessment of fundamental physics with neutrons in the United States and made recommendations concerning the ongoing program at that time, including an experiment to measure the electric dipole moment of the neutron (nEDM) and the construction of a new neutron beam facility at the Spallation Neutron Source (SNS). The 2007 NSAC Long Range Plan recommended pursuit of a "targeted program to study the symmetries of the New Standard Model and precise measurement of electroweak phenomena." Since 2003, DOE and NSF have made progress towards the implementation of Committee recommendations and advice, including increased base funding for fundamental neutron science research, construction of a Fundamental Neutron Physics Beamline (FNPB) at the SNS, and funding of Research and Development (R&D) that has resulted in better estimates of the experimental sensitivity, and cost and schedule of a nEDM experiment that could be mounted at the FNPB.

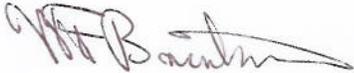
Several precision neutron beta-decay experiments, both in the United States and abroad, have since provided new insight into some of the important questions that were identified in the 2003 report. New experiments are also in the proposal and/or planning stage.

In view of these developments since 2003, NSAC is again requested to examine and evaluate the broad suite of neutron physics research opportunities and how they complement other fundamental symmetry measurements that test the Standard Model, to identify the most compelling opportunities in this field, and make recommendations of priorities consistent with projected resources. It is important that the available resources are directed by NSF and DOE to the optimal investments for a strong national research program in this scientific area for the coming decade.



Your report should identify the most compelling scientific opportunities, and the infrastructure and effort required to address them. Your assessment should be made in the context of existing and planned scientific efforts and capabilities in the United States and elsewhere. It should establish priorities for these opportunities with constant level of effort for neutron science research at the FY 2011 Congressional Request level, and should recommend priorities for incremental investments beyond this level. An assessment of the current scientific and technical workforce committed to these activities is requested, as well as the incremental workforce needed for further investments. In dealing with the proposed activities at the various funding levels, guidance regarding the appropriate mix of facility operations, research, investments in instrumentation and R&D to optimally exploit these opportunities should be provided. We request that an interim report be submitted by June 1, 2011, and a written report responsive to this charge be provided by September 2011.

Sincerely,



W. F. Brinkman  
Director  
Office of Science



Edward Seidel  
Assistant Director  
Directorate for Mathematical  
and Physical Sciences