UNIVERSITY OF MARYLAND AT COLLEGE PARK

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
COLLEGE OF LIFE SCIENCES

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Robert A. Eisenstein
Assistant Director
Mathematical and Physical Sciences
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

James F. Decker
Acting Director
Office of Science
Department of Energy
Washington, DC 20585

Dear Dr. Eisenstein and Dr. Decker:

In your letter dated July 17, 2001 you charged NSAC to review and evaluate current and future scientific capabilities in nuclear structure and astrophysics in the context of activities supported by DOE within their Low Energy Nuclear Physics subprogram, given projected resources and the priorities identified in the new 2002 Long Range Plan (LRP). NSAC in turn constituted the Subcommittee on Low Energy Nuclear Physics, chaired by Bradley Filippone of the California Institute of Technology, to provide assistance in responding to the charge. The Subcommittee presented their report to NSAC at a meeting on November 29-30, 2001. NSAC accepted the report and a copy is enclosed.

The Subcommittee identified a vibrant field with outstanding scientific opportunities in researching the nature of nuclear matter, the origin of the elements and the role of nuclei in astrophysical processes, and in the use of nuclei as laboratories for tests of fundamental symmetries in nature. Addressing this science requires a mix of stable and radioactive beam accelerator facilities. The proposed Rare Isotope Accelerator (RIA) will be a vital component of the future U.S. nuclear science program and of the Low-Energy Program, in particular. In the near term, significant opportunities exist in utilizing the capabilities of the current suite of low-energy facilities. To effectively pursue this science the Subcommittee identified the need for an

increase of 15% over a constant effort level of funding in DOE Low Energy Nuclear Physics. Such an increase would allow:

- effective utilization of all DOE low-energy facilities,
- R&D essential for the conceptual design of RIA, and
- R&D leading to the implementation of gamma ray tracking technology.

NSAC endorses these priorities set in the Subcommittee Report.

Should the field be constrained to operate under a constant effort scenario, advances can still be made in these research areas. However, to allow for even modest progress, NSAC agrees with the Subcommittee that one of the DOE user facilities in this productive program must be phased out and the identification of the LBNL 88-Inch Cyclotron as that facility. As pointed out in the Subcommittee Report, ceasing operations at this facility will not only result in a significant loss of productivity and opportunity, but also the loss of the unique scientific programs driven by the faculty and students at the University of California Berkeley in fundamental symmetries and heavy element chemistry, and impact the world class ECR ion source development at LBNL.

NSAC understands the recommendation of the Subcommittee regarding the Center for Experimental Nuclear Physics and Astrophysics at the University of Washington. However, given the narrow charge, NSAC fears that their recommendation may not be in the best interest of the broader nuclear science program. Therefore, we do not endorse it. NSAC recommends that DOE examine the benefits that the non-accelerator program derives from the existence of the tandem accelerator in making any decision regarding future support of tandem operations.

NSAC would like to reiterate that it believes that outstanding scientific opportunities exist for progress in nuclear structure and astrophysics studies and that funding at a constant level of effort will seriously impact the nation's ability to maintain its present leadership role in these areas. DOE is strongly urged to find the additional resources necessary to aggressively pursue the development of new technologies for RIA and gamma ray identification, while maintaining the capabilities which are enabling the field of low energy nuclear physics to address the diverse and exciting set of scientific questions that are attracting outstanding new researchers into the field.

Sincerely,

Alice C. Mignerey

Alice C. Mignerey
Acting NSAC Chair for the deliberations regarding the
Subcommittee Report on Low Energy Nuclear Physics