NIST and the National Program in Fundamental Neutron Physics

The NIST neutron physics group[1] is very interested in collaborating with ORNL physicists and physicists from all over the world on experiments at the new SNS facility and on complementary experiments at other neutron facilities. As at most other neutron facilities, the main focus at the SNS will be on Materials Science, and more fundamental neutron physics will be accommodated to the extent that it supports or at least does not interfere with the that main focus. Existing in this sort of auxiliary status is the accustomed way of life for those of us working in fundamental physics with neutrons. This community has grown much stronger in the US in the last two decades, with significant groups now at several national laboratories and universities. However, the auxiliary status of these groups at facilities intended primarily for Materials Science or Defense has always presented somewhat of a problem in finding support for this research. I hope that the DOE and NSF sponsors will recognize the emergence of this fundamental neutron physics community and help coordinate the support for a coherent national program in this field, with the SNS as its center.

The NIST neutron group happens to possess some of the best existing neutron beam real estate in the US, even if we are just a “guest“ physics group in a Materials Science facility. We are keen to exploit our neutron source for the fascinating and important fundamental physics research that we can do there. We are keen to make these opportunities available to like minded collaborators from other institutions. And, of course, we are keen to bring our insatiable appetite for more neutrons to the new intense source under construction at Oak Ridge. We think that many other neutron sources in the US will remain important complementary facilities, even when the SNS is up and running as the center of this activity. The most common complementary activities will be experimental prototype developments, shake-down cruises, and repair jobs that should not waste the limited time available on the best source. Other complementary experiments will be unique, dedicated facilities of many kinds, such as the interferometer facility at NIST which is too massive to move about and too expensive to duplicate.

We believe that our program makes a great deal of sense on a national scale. We have a few experiments which are lead by NIST physicists, but most of our experiments are collaborations with leadership from outside of NIST. We have collaborators from at least 11 states and at least 7 other countries. In the last six years, we have turned out about a dozen Ph.D. thesis experiments at our two user facilities, the NG-6 Cold Neutron Guide End Station and the Neutron Interferometry and Optics Facility. We look forward to continuing this work with the new center of the fundamental neutron physics community at the SNS.

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