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Dear Milind, Al and Kirk:

This comes to report to you the response of Brookhaven's HENP Program Advisory Committee (PAC) to the two Letters of Intent submitted by various members of your general neutrino physics collaboration, "Neutrino Physics with Detectors at Baselines of 100-100 km from BNL" and "Neutrino Oscillation Experiments for Precise Measurements of Oscillation Parameters and Search for $\nu_\mu \rightarrow \nu_e$ Appearance and CP Violation." Since neither LoI identified a specific spokesperson, I address this letter to the three of you as perceived leaders on my part. You may, of course, redistribute this letter to all the signers of the LoIs and I encourage you to do so.

Let me now comment on how the PAC responded to this information. They discussed the content of the submissions and focused, properly, on the physics merit of the information. They felt that specific aspects of detector technologies were not mature enough for useful conclusions to be reached. They certainly appreciated the key advances in physics that could be attained by a third generation experiment employing very long baselines, a megaton scale detector and a megawatt class neutrino beam source. They also noted the special advantages, geographical and technical, of an upgraded AGS as it relates to the challenge of these conditions. They then provided the following written comments on this subject:

"There is no doubt that the broad subject of neutrino physics is one of the frontiers of physics. The mass differences and mixing angles between the three types of neutrinos and the measurement of CP-violating effects in the lepton sector promise to provide important new physics truly "beyond the standard model."

Accelerator-driven oscillation experiments to study these effects are best done with very long (~1000 km) baselines. The observation in a broad-band beam of several (1-4) nodes of neutrino oscillation would provide many powerful constraints for matter effects, oscillation, and CP-violation.

Although technically feasible, these experiments are challenging in almost all relevant areas—instrumentation, cost, and organization.

Both the interest and complexity of these experiments is increased by the fact that the required massive detectors are important for a wide range of other measurements. Examples include studies of solar neutrinos, neutrino astronomy, and nucleon decay.

The scientific staff at BNL has a long-standing interest and expertise in neutrino physics. The long history extends back to the discovery that ν_e and ν_μ are distinct species. The energy range, geographical location, and high intensity of the AGS make it a most promising source for long baseline experiments. For these reasons, we encourage the Laboratory to study what is possible in this field and to play a leadership role in developing a future neutrino program."

I took these comments as a strong endorsement of the work already performed by your general collaboration and as encouragement to persevere in your studies. It is clear that the next step in neutrino physics beyond the MINOS era will require new experimental concepts, such as those identified in the LoIs. The development of megawatt sources for neutrino beams and megaton detectors seems a correct direction in which to explore. BNL will continue to play its part, both as an enthusiastic partner in the development of the physics methods and detector design, and in refinement of a conceptual design for a suitable beam.

I can expand on these comments if you feel it would have value.

Sincerely,

Thomas B.W. Kirk
Associate Laboratory Director
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