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Ming Liu
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Dear Ming,

Thank you very much for your presentation: "P-1067 *LOI: Direct Search for Dark Photon and Dark Higgs*" at the June meeting of the Fermilab Physics Advisory Committee (PAC). The Committee explicitly mentioned its appreciation of the carefully prepared presentations for this meeting.

Future initiatives were an important topic at the meeting. Excerpts on your LOI from the PAC report are attached. As you can see, the committee "*… recognizes the exciting opportunity brought by P1067 to search directly for a dark photon and dark Higgs in high-energy proton□nucleus collisions using existing SeaQuest Spectrometer.*" The PAC noted that in the LOI the collaboration requests approval for inclusion of the new elements in the detector needed to make a dark sector trigger, and approval of parasitic data collection during E-1039 running. The committee "*… believes that P-1067 offers exciting physics prospects and recommends the Laboratory to grant these modest requests.*" The PAC also suggests "*A proposal for a dedicated experiment, or a parasitic experiment with electron and hadron calorimeters, should be based on the results obtained with this first phase.*"

I accept the PAC recommendations, and wish you good luck in implementing a dark sector trigger.

Sincerely,

Nigel S. Lockyer
Director of Fermilab

cc: D. Bortoletto
G. Bock
P. Reimer
J. Shank
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Excerpts from the June 2015 PAC Report:

P-1067: Letter of Intent for a Direct Search for Dark Photon and Dark Higgs Particles with the SeaQuest Spectrometer in Beam Dump Mode

The PAC recognizes the exciting opportunity brought by P1067 to search directly for a dark photon and dark Higgs in high-energy proton□nucleus collisions using existing SeaQuest Spectrometer (E906/E1039) in beam dump mode. P1067 could see or exclude the existence of dark photons and dark Higgs over a wide region of phase space in a short time scale and with a minimal cost. In addition, the impact on data collection during the upcoming E1039 experiment is expected to be small. To achieve these goals the collaboration must develop a new displaced vertex-trigger. Initial studies indicate that the installation of two planes of finely-segmented scintillating-strip tracking detectors in the SeaQuest dimuon spectrometer would fulfill the requirements for both triggering on displaced dimuon vertices and rejecting low□mass combinatorial dimuon background.

The collaboration has asked the PAC to:

- Approve the inclusion of new elements necessary to make a dark sector trigger. The necessary equipment will be constructed and supplied by the collaboration.
- Approve the parasitic collection of this data during E1039. In the unlikely situation that parasitic data collection during E1039 is not possible, approve a short, up to one month dedicated data collection period.

The PAC believes that P-1067 offers exciting physics prospects and recommends the Laboratory to grant these modest requests.

The PAC advises the collaboration to perform more detailed studies on possible background sources and encourages the collaboration to evaluate the full physics program that a run in beam dump mode could access. A proposal for a dedicated experiment, or a parasitic experiment with electron and hadron calorimeters, should be based on the results obtained with this first phase.