Dear Bob, Ed and Stefan,

Thank you for taking the time to review my application for membership in DUNE.

My motivating interest is the overall physics program of DUNE, and in the coming years I would like to concentrate on the LAr near detector.

After conversations with Igor Kreslo (Bern), Dave Warner (CSU), and Mike Mooney (CSU), I would like to work on the photon system for the near detector. Igor mentioned a specific area that needs attention: the use of PEN (Polyethylene naphthalate) films in the near detector photon system. There is a recent paper reporting that PEN wavelength shifting films can compete with deposited coatings such as TPB in terms of fluorescence yield and timing - including at LAr temperature, and the PEN films seem to be quite physically robust. So it seems worthwhile to understand and test these materials inside DUNE, and I would like to start on this possibility. I listened in on the recent ND meeting, and I had a short email exchange with Alan Bross to let him know that I am interested in ND work and that I am applying to join DUNE.

My lab at CSU is about 1000 square feet. Some relevant equipment includes a monochromator, which we used to calibrate the Auger fluorescence detectors across the nitrogen spectrum, and an 8-channel, 14-bit, 250 Mhz digitizer, which I am currently using to look at neutron signals in liquid scintillator and H2O+Gd using a PMT. I have components to make a small prototype X-ARAPUCA for the H2O signals. The lab also has optical tables and a dark box (2 x 4 x 1.5 cubic feet), oscilloscopes and assorted cosmic ray paddles. I also have a strong 252Cf neutron source, and gamma sources. I mention the neutron source because I am aware that neutron detection is an important issue in DUNE. You know that Mike Mooney, CSU faculty, is interested in ND TPC work and his LAr lab is coming up to speed now. I could imagine working with Mike to test pixel detectors with ND photon detectors in LAr at CSU, and perhaps exposing the system to neutrons; this would be a bit down the road.

Recent areas of hardware work:

- Absolute and spectral calibration of the Auger telescopes
- Large role in mechanical parts for the Auger tanks
- Protype electronics for DRIFT (used for tests only)

Thanks again. I am coming to the collaboration meeting at Fermilab later this month, and I will stay for the ND workshop.

Best regards,

John