

Summary of proposal:

PMT calibration and run coordination for the ICARUS experiment

Aiwu Zhang
Brookhaven National Lab
azhang@bnl.gov
321-2103301

The ICARUS experiment, as the far detector in the Short Baseline Neutrino Program at Fermilab, is scheduled to start commissioning in March 2020 and taking data in May 2020. The detector is under installation and the subsystems are to be integrated and tested. The proposed work through this fellowship will be on the ICARUS experiment and cover two parts. I expect to play a critical role during this period in the experiment and therefore this proposal fits in track 3 of the intensity frontier fellowship.

The first part of the work will be on the PMT calibration. My work on the ICARUS experiment was initiated in the PMT system. After the cryostats were closed, I led the work to fully calibrate all the PMTs with input light at room temperature. From this calibration the PMTs' gain and dark rates were substantially understood. The after-pulse characterization was also obtained. Similar calibrations will be needed after the detector is filled with liquid argon, and regular gain and timing calibrations are required during the detector commissioning and data taking. The tasks will include: (1) define gain and relative timing calibration procedure using the laser system; (2) define absolute timing calibration using physics events (e.g., cosmic); (3) implement and test the procedures; (4) analyze the calibration data and provide input for physics analysis.

The second part of the work is coordinating all the subsystems for a safe and productive commissioning for the ICARUS experiment. With my expertise in detector systems and experience in the subsystem coordination through the PMT calibration, I'm expected to take the role of a deputy run coordinator for the experiment during the commissioning period. I will get familiar with and engage in the operation of all detector components such as the TPC, PMT, CRT, the cryogenic system, the trigger, daq, online monitoring, slow control, etc., during this period. The tasks will include but not limit to the following: (1) coordinate for shifts and stay on call; (2) coordinate with subsystem experts for problem solving in case of issues; (3) report to the collaboration on detector status.

The proposed work will require my presence at Fermilab. The fellowship provides an ideal resource in support of my stay. Through the support, I expect to contribute significantly to the ICARUS experiment and in return benefit greatly from working on the experiment.